
NATIONAL CENTER FOR EDUCATION STATISTICS

**Findings from
THE CONDITION OF EDUCATION 1996**

NO.

8

**PREPARATION
FOR WORK**



U.S. Department of Education
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U.S. DEPARTMENT OF EDUCATION

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PREPARATION FOR WORK

Growing interest among policymakers, educators, and employers in the changing nature of work reflects two concerns: 1) today's workplace requires a range of capabilities that are quite different from those required in the workplace of the past; and 2) schools could do more to teach students the skills that would be useful to them when they enter the labor force.

Ensuring that all students are ready for work, especially those who do not attend 4-year postsecondary institutions, requires a considerable reappraisal of the relationship between school and the workplace. What must be done to ensure that those entering the labor force have the training that is necessary for success in an increasingly competitive economic environment? What kinds of training and exposure—at school and in the workplace—will enable young people to achieve quality employment and high wages throughout their working life?

The equation is further complicated by the emergence of “high performance” work organizations. This new way of working reflects increasing attachment throughout the economy to new information technology. Success in the future work force will require flexible skills and learning capabilities, and making personal commitments to training and retraining throughout one's career.

Data below are presented on several issues that are central to the process of work preparation: course-taking patterns among high school and postsecondary students; student work experience as it relates to preparation for entry into the labor force; and adult involvement in education and training while employed.

ENROLLMENT AND COURSE TAKING IN PREPARATION FOR WORK

HIGH SCHOOL

Since the 1970s, states have been tightening high school graduation requirements in “core subject” areas. Most states have increased the number of courses students seeking a diploma must complete in English, social studies, science, and mathematics.¹ To some extent, these changes have paralleled recommendations of the National Commission on Excellence in Education. The Commission’s 1983 report, *A Nation at Risk*, which argued the case for strengthening course-taking requirements in these subject areas, became an anchor of the school reform movement.

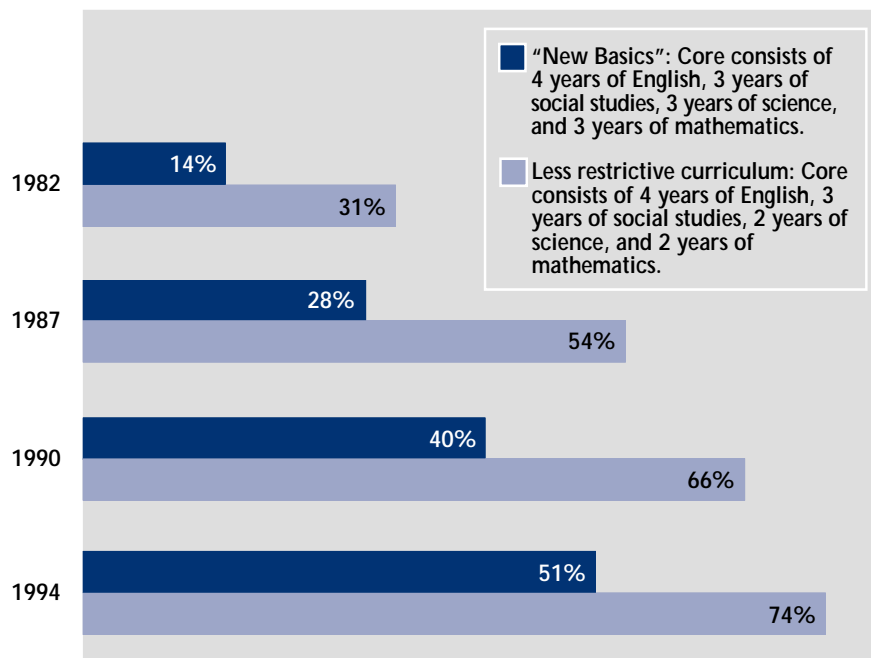
Other research, more specifically concerned with workplace and employment skills, also recognized the importance of improving the basic academic capabilities of high school graduates. For example, in 1991, the Secretary’s Commission on Achieving Necessary Skills (SCANS) identified the types of skills young people need in order to enter and succeed in the labor market.² The “foundation skills” described by SCANS, which were similar to those recommended in *A Nation at Risk*, closely followed the framework of course-taking requirements in academic areas that the states were adopting.³

The confluence of enhanced academic standards and workplace readiness standards is no accident. A student who is well prepared for the challenges of the future workplace should have a strong academic background without regard to his or her specific job or career-related objectives.

- High school graduates are taking more courses in academic core subjects.

The range of curricula reforms and the number of standards introduced have been substantial. Between 1982 and 1994, the percentage of high school graduates earning the recommended units in core courses increased sharply. This was true both among states with more restrictive and those with less restrictive laws governing academic course-taking requirements for high school graduation. It was also true both for students enrolled in academic programs and those enrolled in vocational programs.

Percentage of high school graduates who earned recommended units in core courses



SOURCE: NCES, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates*, 1996.

Students have also been earning fewer vocational units. Between 1982 and 1992, while academic units increased from 14.1 to 17.4, vocational units declined from 4.6 to 3.8, a further indication of a

trend toward focusing on academic coursework during high school.⁴

- **High school graduates in 1994 were more likely than their counterparts in 1982 to have taken mathematics courses at the level of Algebra 1 or higher, and science courses at the level of biology or higher.**

Changes in overall student course-taking patterns are further reflected in changes in student course-taking patterns in mathematics and science. This is an important development, as these fields of study often require higher level thinking skills to solve complex problems—skills that are increasingly required in the workplace. Between 1982 and 1994, the proportions of students taking coursework in both subject areas have changed substantially, especially at advanced levels.

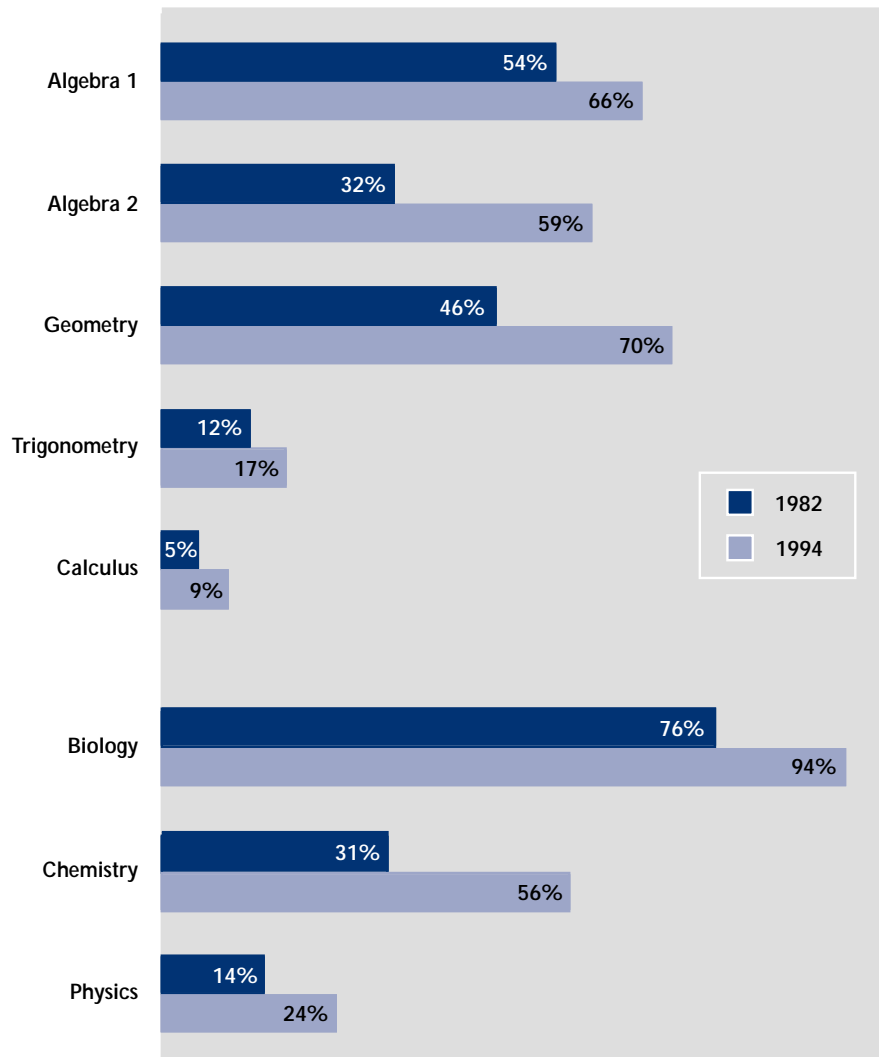
- **High school students' access to and use of computers increased substantially between 1984 and 1993.**

Computers are an important reality in the workplace, and computer literacy is becoming essential to functioning effectively in society. In this respect, the schools are a valuable venue for training and developing student computer skills. Further, there is evidence suggesting that the infusion of technology in the classroom has implications for student learning as well. A recent study notes that using technology to support instruction improved student outcomes in language arts, mathematics, social studies, and science.⁵

The proportion of students with access to a computer at school or at home doubled between 1984 and 1993. Without regard to income, the majority of students in 1993 had access to a computer at school. However, a substantial gap in computer use exists out-

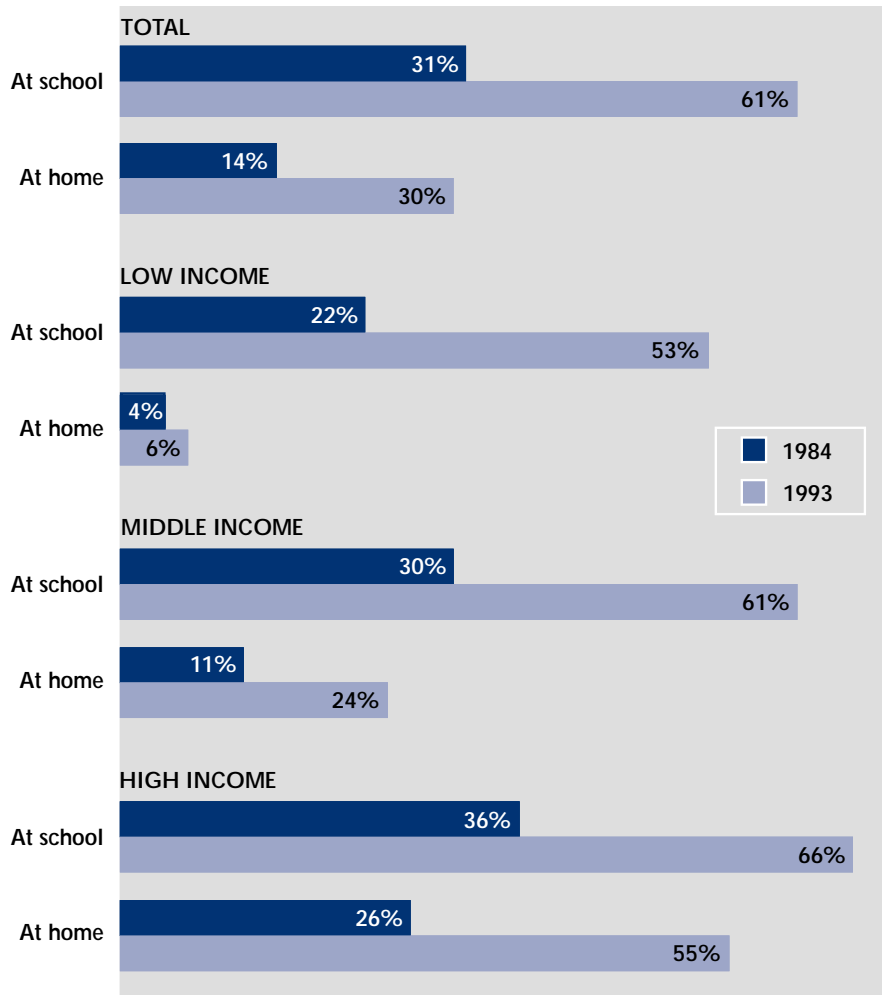
side school: students from higher income families were much more likely than students from middle or low income families to have a computer available to them at home.

Percentage of high school graduates who took selected mathematics and science courses in high school: 1982 and 1994



SOURCE: NCES, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates*, 1996.

Percentage of students in grades 7–12 who used a computer at school or at home: 1984 and 1993



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

- Proficiency levels of 17-year-olds have improved in mathematics and science since the late 1970s.

Proficiency in crucial subject areas is one way of measuring the capabilities of young adults as they enter the labor force. Between the late 1970s and 1992, proficiency scores among 17-year-olds in mathematics and science, as measured by the

National Assessment of Educational Progress (NAEP), have improved, while reading proficiency has remained stable.⁶ The 9-scale point increase in mathematics proficiency between 1982 and 1992, and the 11-scale point increase in science proficiency, are particularly notable, as this is roughly the equivalent of the gain in proficiency with 1 year of age. These improvements in proficiency suggest that students are better prepared than they have been previously in fields of study that are key to success in advanced academics and for performance in an increasingly technical work environment.

**Average mathematics and science proficiency (scale scores) of
17-year-olds: 1977–92**

Year	Mathematics	Science
1977	—	290
1978	300	—
1982	298	283
1986	302	288
1990	305	290
1992	307	294

—Not available.

SOURCE: NCES, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1992; Mathematics, 1973 to 1992; Reading, 1971 to 1992; and Writing, 1984 to 1992, 1994.*

POSTSECONDARY EDUCATION

Considerable evidence documents the lifelong employment and earnings advantage of advanced education and training.⁷ While solid high school preparation may have some meaning in the labor force, advanced training through postsecondary education provides additional, substantial benefits.

- **Increasing proportions of high school graduates are entering postsecondary education immediately after high school.**

High school graduates are considerably more likely to continue their education immediately after graduation than they were previously. In 1994, 62 percent of high school graduates enrolled in college the October following graduation, up from 47 percent in 1973. Postsecondary enrollment patterns over time have differed for males and females, with college enrollment rates for females increasing more than for males, especially at 4-year colleges and universities.

**Percentage of high school graduates aged 16–24 who enrolled in college the October following graduation:
1973, 1983, and 1994**

Characteristics	1973	1983	1994
Total	47	53	62
Male	50	52	61
Female	43	53	63
2-year college	15	19	21
4-year college	32	34	41
Males			
2-year college	15	20	23
4-year college	35	32	38
Females			
2-year college	15	18	19
4-year college	28	35	44

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

Differences in fields of concentration and course-taking patterns at subbaccalaureate and baccalaureate levels suggest substantial variation in work force preparation and employment opportunities following the completion of training.

- **Postsecondary subbaccalaureate degree majors vary considerably by sex and race–ethnicity.**

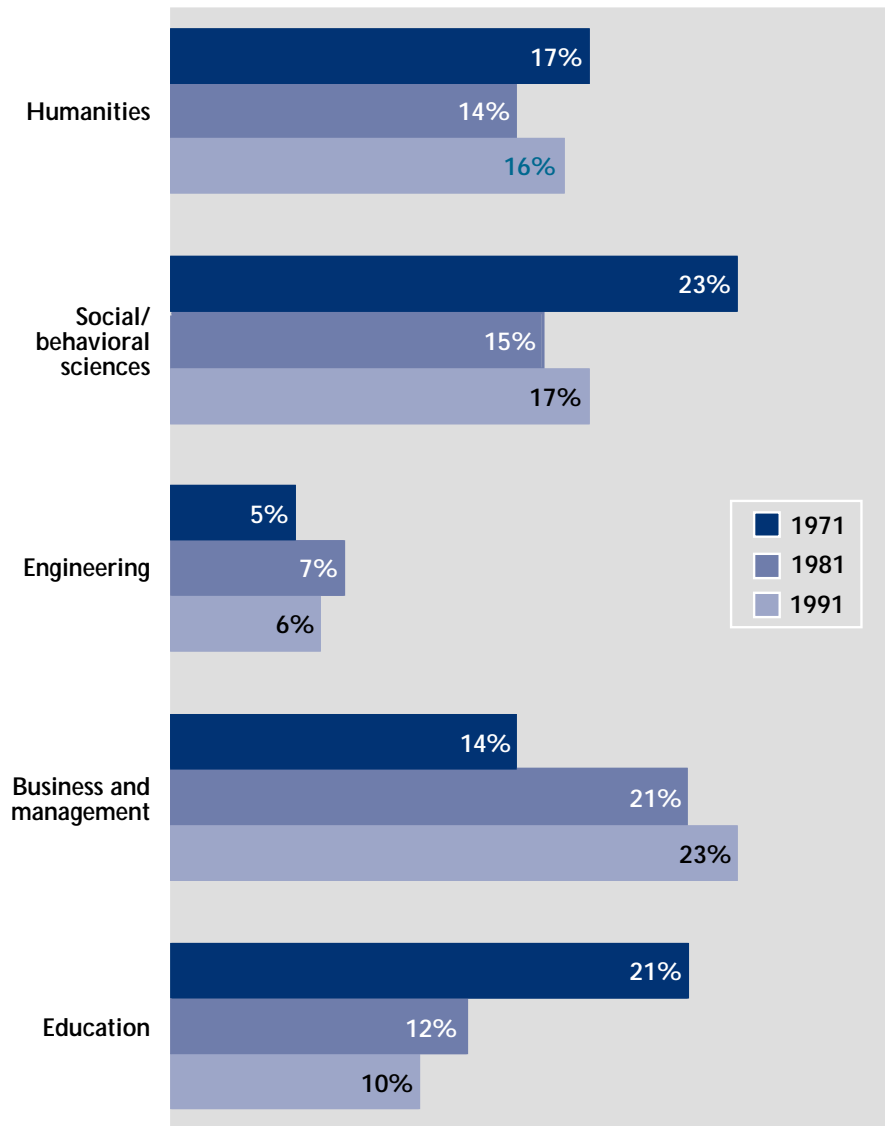
Students' focus in postsecondary education, as reflected in degree majors, provides insight into the depth, breadth, and direction of their training. While some graduates of subbaccalaureate programs go on to 4-year colleges and universities, for many an associate's degree is the final degree that provides job-related training. Differences between the sexes in fields of study are substantial. Among white, black, and Hispanic recipients of associate's degrees in 1991, females were more likely than males to complete a degree in business or health, while males were more likely to complete a degree in technological fields (e.g., computer and information sciences, engineering, and science technologies).⁸

- **At the baccalaureate level, students are paying more attention to applied fields of study, as compared to a more general, liberal arts education.**

Changing opportunities within the job market can affect students' decisions about their coursework and their major field of study. At the baccalaureate level, data are limited to percentages of students who took one or more courses in selected subjects in 1985–86, but differences in course-taking patterns are evident.

The distribution of degrees conferred across fields suggests the kinds of skills and capabilities that students want, or believe they should have, before they enter the work force on a full-time basis. Five fields of study accounted for 72 percent of all bachelor's degrees conferred in 1991. Business and management, social and behavioral sciences, humanities, education, and engineering—in that order—were the five fields of study in which most degrees were conferred in 1991. In 1971, these same five fields had represented 80 percent of bachelor's degrees conferred.

Percentage of bachelor's degrees conferred in selected fields of study: 1971, 1981, and 1991



SOURCE: NCES, IPEDS/HEGIS surveys of degrees conferred.

Males were much more likely than females to have taken courses in physical sciences, mathematics, computer science, engineering, and economics. Females were more likely than males to have taken life sciences, psychology, and sociology.

Percentage of bachelor's degree recipients who took one or more courses in different subjects: 1985–86

Field of study	Total	Male	Female
Computer science	42	48	38
Engineering	18	27	9
Mathematics	78	83	74
Life sciences	53	47	60
Physical sciences	67	72	62
Economics	53	60	46
Political science	41	43	37
Psychology	65	60	72
Sociology/anthropology	61	56	66

SOURCE: NCES, 1987 Survey of Recent College Graduates (Transcript Data File).

WORKING WHILE ENROLLED

EMPLOYMENT WHILE IN HIGH SCHOOL

- Many high school students are exposed to the world of work—nearly 30 percent work at least part time.

High school students work for many reasons. While employment may have some negative impact on students' school experience and their study time, especially if too much time is spent at work, workplace exposure can help students prepare for future, full-time employment.

**Percentage of high school students aged 16–24
who were employed: 1970–92**



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

Among all high school students aged 16–24 in 1992, 30 percent were employed. The total percentage employed in 1992 was about the same as that in 1982, and less than that in 1972. In 1992, males were somewhat more likely to be employed than females, and whites were considerably more likely to be employed than were blacks or Hispanics.⁹

EMPLOYMENT WHILE IN COLLEGE

- Among 16- to 24-year-old college students in 1993, almost half of full-time students and 85 percent of part-time students were employed.

While work experience during college may or may not be associated with a student's major or career aspirations, work is now part of the postsecondary experience for many students. Employment while enrolled in college may, at the least, provide students with the resources they need to be able to continue their college education and may also give students a better idea of the needs and standards of the workplace. At the same time, it may reduce a student's prospects for completing college or may lengthen the time it takes for those who work to complete their education and training.

Percentage of 16- to 24-year-old college students who were employed: 1973 and 1993

Characteristics	1973	1993
All full-time students	36	46
Work 20 hours or more	17	25
Low income	42	51
Middle income	37	48
High income	34	42
All part-time students	85	85
Work 20 hours or more	77	75
Low income	82	68
Middle income	86	86
High income	84	91

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

In 1993, nearly half (46 percent) of all 16- to 24-year-old full-time college students were employed, and about one-fourth worked at least 20 hours per week. Even more part-time students worked. About the same proportion of part-time college students worked in 1993 as did in 1973. In 1993, full-time college students from high income families were less likely to be employed than were full-time students from middle or low income families. In contrast, part-time college students from high income families were more likely to be employed than were students from middle or low income families.

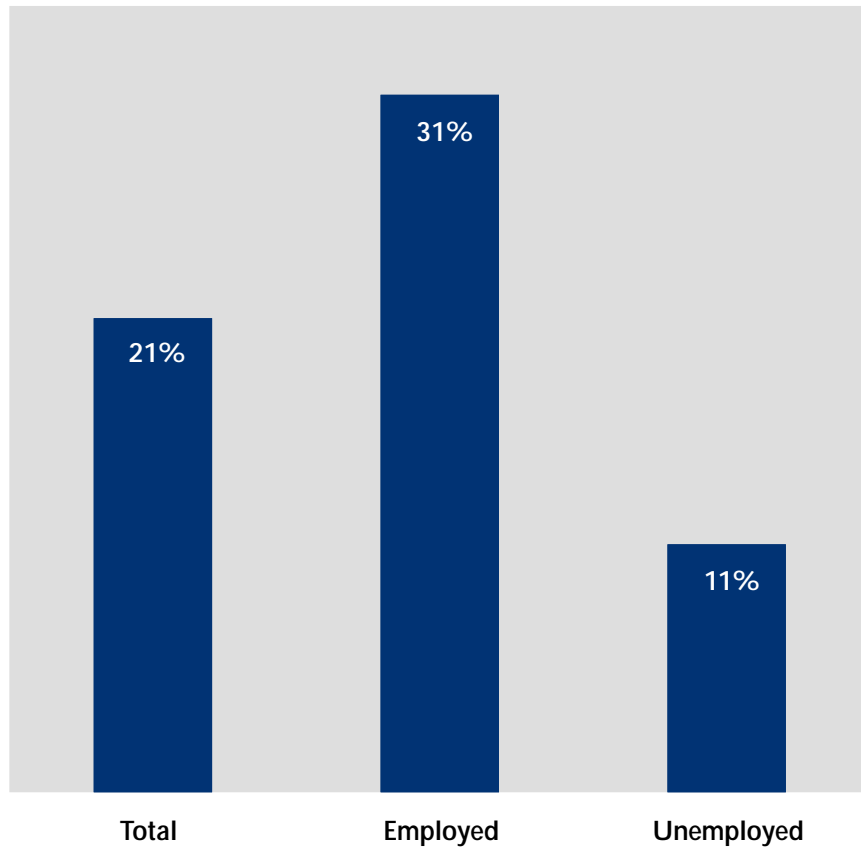
ENROLLMENT AND EDUCATION WHILE WORKING

Some occupations require continuing education of varying amount and intensity, but in general, adult education provides an important opportunity for those who are already employed to keep pace with rapid changes in the workplace. Participation rates may indicate the importance of lifelong learning as a condition of employment in the future labor force. Fully 21 percent of all adults participated in adult education in 1995 for work-related purposes.

Among those who participated in work-related courses, the majority took courses provided by businesses or professional associations. Others took work-related courses mostly provided by colleges or government agencies.

Ultimately, success in the workplace may require a lifelong commitment to training and personal skill building. In 1991, almost one-third of workers aged 16 and over had received some skill improvement training in their current job at some time during the 12 preceding months. Workers with higher levels of educa-

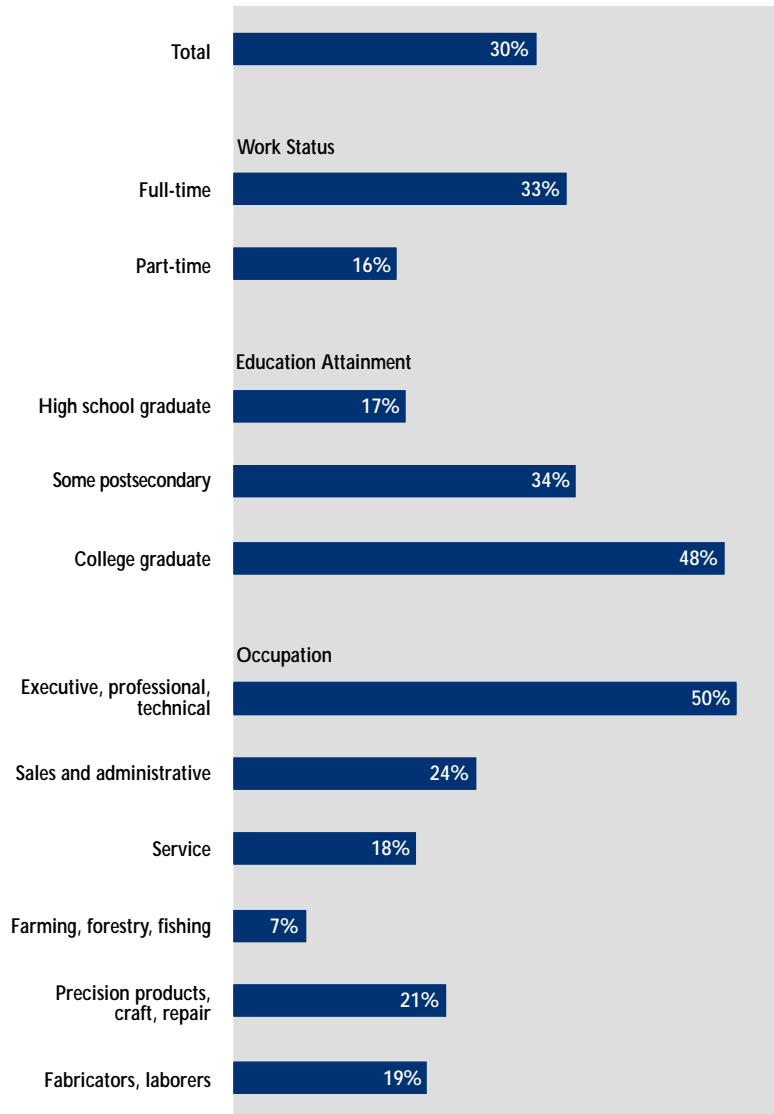
Percentage of adults who participated in adult education in the past 12 months for work-related purposes: 1995



SOURCE: NCES, National Household Education Survey (NHES), 1995 (Adult Education Component).

tional attainment were much more likely to receive training than were those with less education. Finally, workers in executive, professional, and technical occupations were most likely to receive such training on the job.

Percentage of workers aged 16 and over who received skill improvement training in the last 12 months, while in their current job: 1991



SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, *How Workers Get Their Training: A 1991 Update*, Bulletin 2407, August 1992; and NCES, National Household Education Survey (NHES), 1991.

SUMMARY

In summary, course-taking patterns at the secondary level, and course-taking and degree major patterns at the postsecondary level, suggest that students are increasingly focused on preparing for the rigors of the labor market. In high school, students are taking more courses in academic core subjects and in higher level mathematics and science courses. They also have considerably more exposure to computers than they did a decade ago. In addition, more students are entering postsecondary education immediately after high school to pursue advanced education and training before entering the labor market.

At both the secondary and postsecondary levels, many students are employed while enrolled, which offers them some opportunity for exposure to the work environment. Once individuals enter the labor force, there is considerable opportunity for them to continue training. For example, many adults participate in adult education for work-related purposes, and many receive some skill improvement training in their jobs.

REFERENCES

¹U.S. Department of Education, National Center for Education Statistics, *Overview and Inventory of State Requirements for School Coursework and Attendance* (Washington, D.C.: 1992).

²Secretary's Commission on Achieving Necessary Skills (SCANS), *What Work Requires of Schools* (Washington, D.C.: 1992).

³Foundation competencies include *basic skills* (reading, writing, arithmetic and mathematics, and speaking and listening); *thinking skills* (creativity, making decisions, solving problems, knowing how to learn, and reasoning); and *personal qualities* (individual responsibility, self-esteem, sociability, self-management, and integrity).

⁴*The Condition of Education 1994*, 72, based on NCES, the 1969 Study of Academic Growth and Prediction, High School and Beyond Transcript Study, 1987 NAEP High School Transcript Study, and National Education Longitudinal Study Transcripts, 1992.

⁵Bailo, Ellen R. and Sivin-Kachla, Jay, *Effectiveness of Technology in Schools, 1990–1994* (Washington, D.C.: Software Publishers Association, 1995).

⁶*The Condition of Education 1996*, 76, based on NCES, National Assessment of Educational Progress, *1994 Reading Report Card for the Nation and the States*, 1996.

⁷Kominski, Robert and Sutterlin, Rebecca, *What's It Worth? Educational Background and Economic Status: Spring 1990* (Washington, D.C.: U.S. Bureau of the Census, 1992).

⁸*The Condition of Education 1994*, 84, based on NCES, IPEDS/HEGIS surveys of degrees conferred.

⁹*The Condition of Education 1996*, 256, based on U.S. Department of Labor, Bureau of Labor Statistics, *Labor Force Statistics Derived from the Current Population Survey: 1940–87*, U.S. Department of Commerce, Bureau of the Census, October Current Population Surveys; and 106, based on U.S. Department of Commerce, Bureau of the Census, October Current Population Surveys.

OTHER NCES PUBLICATIONS

For more information, see the following NCES publications:

The Condition of Education 1996. Washington, D.C.: 1996
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The Condition of Education 1995. Washington, D.C.: 1995
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Digest of Education Statistics, 1995. Washington, D.C.: 1995
(NCES 95-029)

The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates, 1996 (forthcoming)

Other Findings from *The Condition of Education*:

No. 1: *High School Students Ten Years After A Nation At Risk*
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