DOCUMENT RESUME

ED 357 223 CE 063 625

TITLE	How Workers Get Their Training: A 1991 Update. Bulletin 2407.
INSTITUTION	Bureau of Labor Statistics (DOL), Washington, D.C.
PUB DATE	Aug 92
NOTE	77p.
PUB TYPE	Statistical Data (110) -- Reports - Research/Technical (143)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Corporate Education; *Employer Employee Relationship; *Employment Practices; *Job Training; *Occupational Information; Postsecondary Education; *Skill Development

ABSTRACT

Analysis of data obtained from supplemental questions to the January 1991 Current Population Survey and comparison with answers to similar questions from a 1983 survey resulted in a picture of how workers received training to obtain and to retain their jobs. Some of the finding were as follows: (1) 57 percent of all workers employed in January 1991 reported they needed specific training to qualify for their current jobs; (2) 41 percent had taken training to improve current job skills; (3) training patterns remained constant from 1983 to 1991; (4) employers increasingly sponsored qualifying training and greatly enhanced formal company programs for skill improvement; (5) similar proportions of men and women required training to qualify for their jobs, and took skill improvement training; (6) one-third of all workers received their qualifying training at schools, 27 percent got it on the job, 12 percent received training through formal company programs, and fewer than 10 percent received training from other sources; (7) the proportions of workers who reported a need for qualifying training ranged from 92 percent of professional specialty workers to 10 percent of those in private household occupations; (8) workers in precision production, craft, and repair occupations were more likely than those in other occupational groups to have received qualifying training in formal company programs; and (9) employers sponsored about 15 percent of qualifying training and 42 percent of improvement training in schools. (The report contains 71 tables.) (KC)

How Workers Get Their Training: A 1991 Update

How Workers Get Their Training: A 1991 Update

U.S. Department of Labor
Lynn Martin, Secretary

Bureau of Labor Statistics

August 1992

Bulletin 2407

Preface

Information on how workers develop the skills they need for their jobs is useful in career guidance and in planning education and training programs. Such information, however, has not been widely available. To obtain needed data, the Employment and Training Administration (ETA) funded a supplement to the January 1983 Current Population Survey (CPS). The supplement asked individuals to identify various types of scholastic, job-related, and other kinds of training they required to get their current jobs as well as those used to improve their skills. Data from that survey described training in the labor market comprehensively and uniquely, and it was used extensively by the Bureau of Labor Statistics in its Occupational Outlook Program and by many other public and private agencies. Results of the 1983 supplement were published in *How Workers Get Their Training*, BLS Bulletin 2226.

Recognizing the contribution of the 1983 data and the importance of having more current training information, ETA decided to fund a supplement to the January 1991 CPS. The 1991 supplement provides information about current training, and also allows for comparisons with the 1983 supplement because many of the questions used in the earlier survey remained the same.

Thomas A. Amirault prepared the bulletin under the supervision of Alan Eck. Neal H. Rosenthal, Chief, Division of Occupational Outlook, provided general direction.

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Introduction

To obtain information on how workers get their training, the January 1991 Current Population Survey posed a supplemental series of questions. The supplement centered on two questions: "Did you need specific skills or training to obtain your current (last) job?" and "Since you obtained your present job, did you take any training to improve your skills?" In each case, persons who responded "yes" were asked to identify the source(s) of training. If a source was a school program or a formal company program, further questions addressed subjects such as the type of school program, who paid for the training, how long it lasted, and whether respondents completed the training. The questions asked were, for the most part, identical with those asked in a supplement to the January 1983 Current Population Survey. As a consequence, information from the two surveys could help identify trends.

Because the information came from the workers, it represents their perceptions of training needs, not the views of employers. This distinction is significant for two reasons: The data do not identify qualifications required by employers, and the data are not comparable to those in studies based on the responses of employers.

Another aspect of the data requires emphasis: Individuals may identify more than one type of training. Thus the number of individuals in an occupation who reported needing training to obtain their jobs (or who reported training to improve their skills) generally was less than the total of the training reported. Finally, individuals were not asked to identify the type of training most needed to obtain their jobs or improve their skills. Only the frequency with which respondents identified the type of training can suggest the relative importance.

Statistics from the survey of training should be regarded as indicators of general magnitude, not as precise measures, because of sampling and nonsampling errors. Sampling error arises when a sample is surveyed rather than the universe. Nonsampling errors can result from a variety of causes: Differences in the interpretation of questions, respondents providing incorrect information, errors in collecting and processing data, and the inability to obtain information about all cases in the sample. Occupations with fewer than 20,000 employed were not listed in any of the tables showing detailed occupations to reduce their effects as sources of error on the analysis. See appendix B for more information about sources of error.

The magnitude of all errors cannot be quantified. The way individuals subjectively interpreted and responded to questions, for example, may understate the need for qualifying training. For instance, a few workers in occupations that obviously have strict educational requirements, such as physician and dentist, reported no need for training to get their jobs. Despite these problems, the sources of training reported by workers in different occupations seem to follow patterns that agree with general knowledge. Following a section of survey highlights, the first chapter of this bulletin supplies data on workers who needed training to qualify for their current job and compares 1991 and 1983 results. The second chapter supplies data on workers who took training to improve skills for their current job and compares 1991 and 1983 results. Appendix A presents data on qualifying training and skill improvement activities by detailed occupation. Appendix B discusses the source and limitations of the data.

The results of the 1991 CPS survey supplement on worker training are remarkably consistent with those obtained from the 1983 survey. The 1991 results show many of the relationships found in the 1983 data. The discussions that follow emphasize differences rather than similarities even though the results in the two surveys do substantially resemble each other.

Highlights

- Fifty-seven percent of all workers employed in January 1991 reported they needed specific training to qualify for their current jobs.

- Since obtaining their current jobs, 41 percent of all workers had taken training to improve current job skills.

- The proportions who needed qualifying training and who took skill improvement training were greater than measured in 1983, but the change in the proportion taking skill improvement training was greater; it increased 6 percentage points.

- Fifty-four percent of the workers who reported that they needed training to qualify for their jobs also reported taking training to improve their skills for these positions.

- The patterns of training from the January 1991 CPS training supplement are remarkably consistent with the 1983 survey results.

- Employers increasingly sponsored qualifying training and greatly enhanced formal company programs for skill improvement. These findings show that employers took initiatives to participate more actively in the development of their employees in the period 1983 to 1991.

Worker characteristics

- Similar proportions of men and women required training to qualify for their jobs and took skill improvement training.

- The youngest and oldest workers were least likely to have needed training to qualify for jobs or to have taken training to improve their skills.

- The proportion of Hispanics indicating that they needed training to qualify for their current jobs was 6 percentage points lower than for blacks and 17 percentage points lower than for whites and for all other races.

- Wage and salary workers in private industry had the lowest percentage needing training for their jobs at 53 percent. Employees of Federal, State, and local governments—with about 70 percent of each group reporting that they needed training—had the highest. The proportion for self-employed workers (58 percent) fell in between those for private and government employees.

- Government employees also had significantly higher proportions taking skill improvement training than either workers in private industry or self-employed workers. Self-employed workers had the smallest proportion reporting that they had taken skill improvement training.

Source of training

- One-third of all workers received their qualifying training at schools; 27 percent got it informally on the job (OJT); 12 percent acquired training through formal company programs. Less than 10 percent of workers qualified for jobs based on training from the Armed Forces, correspondence courses, friends and relatives, or other sources.

- Programs at 4-year colleges accounted for the majority of the qualifying training taken in schools (59 percent). Training at 4-year colleges also was the largest source for the skill improvement training in school programs (47 percent).

- Formal company training (16 percent), informal on-the-job training (15 percent), and schools (13 percent) were identified almost equally as sources of skill improvement training in 1991. Rapid expansion in the use of formal company programs was the driving force behind the 6-percentage-point increase in the overall use of skill improvement training.

Occupation and industry

- The proportion of workers who reported a need for qualifying training ranged from 92 percent of professional specialty workers to 10 percent of those in private household occupations.

- Sixty-nine percent of the workers in professional specialty occupations acquired qualifying training in 4-year college programs, accounting for 51 percent of all workers who trained for their jobs through these programs.

- Although only 11 percent of the workers in administrative support occupations qualified for positions through training in high school vocational programs, administrative support workers made up 44 percent of those who qualified for their jobs through this kind of training. Secretaries alone accounted for 21 percent of the total.

- Workers in precision production, craft, and repair occupations were more likely than those in other occupational groups to have received qualifying training in formal company programs.

- The proportion who took skill improvement training ranged from 67 percent among professional specialty workers to 6 percent in private household occupations.

- Professional specialty workers were the only occupational group to have the highest proportion of workers improving skills in school programs.

- Workers in technician and related support occupations composed the highest proportion of those improving job skills in formal company programs.

- The professional and related services industry was the only industrial group showing that school was the most important source of skill improvement training.

Sponsors

- Of the 36.9 million workers who got qualifying training through schools, employers sponsored about 15 percent, and government sponsored 3 percent in programs such as those offered under the Job Training Partnership Act (JTPA).

- Employers have more than doubled their sponsorship of qualifying training in schools since 1983, increasing from 2.1 million persons in 1983 to 5.4 million persons in 1991.

- Employers sponsored 42 percent of the 15 million workers who received skill improvement training in schools; 3 percent of the workers who took training in school to improve skills for their jobs did so in government-sponsored programs.

Chapter 1. Qualifying Training

Whether people need specific training to enter an occupation depends largely on the occupation and the experience they have. Almost 65.3 million people, or 57 percent of the persons employed in January 1991 said they needed specific training to obtain their current jobs.

From January 1983 to January 1991, the number of employed persons who needed training grew from 53.9 million to 65.3 million. Table 1 compares the numbers of workers who needed qualifying training in 1983 and 1991. The percent needing training in 1991 increased steadily with age, from 26 percent (persons 16 to 19 years old) to 63 percent (35 to 44 age group), but then declined to 44 percent for persons aged 65 and over. The percent requiring qualifying training was about the same for all men and women in both years. Among the racial groups, the proportion of workers who had need of training was similar for whites and all other races—58 percent for both groups. Smaller proportions of blacks and Hispanics reported that they needed qualifying training—47 and 41 percent respectively.[1]

As educational attainment increased, so did the percent of those requiring qualifying training for their jobs (table 1). Over two-fifths of workers with a high school education or less reported that they needed specific training. This proportion increased to over three-fifths for workers with some college training, and well over four-fifths for workers who were college graduates.[2]

Among 12 major occupational groups used to classify occupations in the Current Population Survey, training most often qualified people for jobs in professional and technician fields (table 1). About 92 percent of the workers in professional specialty occupations and 86 percent of those in technician and related support occupations needed training to qualify for their jobs. Requirements were also high for executive, administrative, and managerial occupations and for precision production, craft, and repair jobs. At 55 percent, training requirements for administrative support workers were lower than the 57-percent average. In the remaining seven occupational groups, the proportion of workers who required training was lower than the average, ranging from 43 percent of sales workers to 10 percent of private household workers.

Persons are further defined by class. The class-of-worker definition categorizes workers as private sector, government, and self-employed.[3] Government employees most frequently reported that they needed training to qualify for their current jobs. About three-quarters of State and local government workers and about two-thirds of Federal employees needed qualifying training (table 1). About 58 percent of self-employed workers and 53 percent of workers in private industry needed qualifying training.

Table 1 also shows that three-quarters of the workers in professional and related services or public administration reported the need for qualifying training; 67 percent in finance, insurance, and real estate; and 61 percent in mining industries and business and repair services. Construction; transportation, communications, and other public utilities; entertainment and recreation services; and durable goods manufacturing were all near the national average of 57 percent. Between 40 and 50 percent of the workers in nondurable goods manufacturing, wholesale trade, and personal services said they required qualifying training. Of the workers in agriculture, forestry, fisheries, and retail trade, about one-third had to get training to qualify for their jobs.

Workers in professional specialty occupations accounted for 24 percent of all workers who needed qualifying training in 1991, the largest proportion (table 2). This portion, which is roughly 70 percent higher than professional specialty workers' share of total employment, is attributable to the much higher than average proportion of professional employees who require training. The segment needing qualifying training (17 percent) also exceeded the proportion of total employment (14 percent) for executive, administrative, and managerial occupations. The other two groups making up more than 10 percent of the total requiring training were administrative support occupations (16 percent) and precision production, craft, and repair occupations (12 percent). In each of these two groups, the proportion of the total requiring training mirrored their proportion of total employment. Although a very high

[1] Hispanic is an ethnic and not a racial category; Hispanics may belong to any racial group.

[2] The Current Population Survey only provides information about years of school completed. Persons who completed 16 or more years of school are assumed to be college graduates.

[3] Private sector and government workers combined form the total of all wage and salary workers. These workers receive wages, salary, commissions, tips, or pay of any kind from a private employer or from a government unit. Self-employed persons are those who work for profit or fees in their own business, profession, or trade, or who operate a farm.

Two other worker classes not discussed in this bulletin are unpaid family workers and unemployed persons who have never worked. Unpaid family workers are not discussed because of their insignificant numbers. Those unemployed who have never worked are outside the universe of emmployed persons being examined.

Table 1. Workers who needed training to qualify for their current jobs, by selected characteristics, 1983 and 1991

Selected characteristic	Number needing training (thousands)		Percent of total employment in group	
	1983	1991	1983	1991
Age 16 and over	53,890	65,276	55	57
Age group:				
Age 16-19	1,438	1,350	25	26
Age 20-24	6,122	5,497	47	46
Age 25-34	17,280	19,633	62	60
Age 35-44	13,127	19,560	62	63
Age 45-54	8,909	11,817	57	60
Age 55-64	5,867	6,030	52	53
Age 65 and over	1,146	1,389	41	44
Sex:				
Male	30,674	35,872	56	57
Female	23,216	29,405	54	56
Race and ethnicity:				
White	48,607	57,682	57	58
Black	3,942	5,567	44	47
All other races	1,341	2,028	54	58
Hispanic	2,074	3,549	43	41
Highest grade completed:				
High school or less	24,201	25,405	42	41
Some college	11,632	16,068	62	63
College graduate	18,056	23,803	84	84
Occupational Group:				
Executive, administrative, and managerial	7,738	10,565	71	72
Professional specialty	11,797	14,923	93	92
Technicians and related support	2,579	3,414	85	86
Sales occupations	4,867	5,980	43	43
Administrative support	9,157	10,028	57	55
Private household occupations	81	85	8	10
Service, except private household	4,397	5,758	36	37
Farming, forestry, and fishing	862	815	28	28
Precision production, craft, and repair	7,603	8,088	65	62
Machine operators, assemblers, and inspectors	2,742	2,940	37	38
Transportation and material moving occupations	1,462	1,842	36	42
Handlers, equipment cleaners, and laborers	605	839	16	20
Class of worker:				
Private industry	36,196	44,246	52	53
Federal Government	1,989	2,192	64	67
State government	2,693	3,597	71	75
Local government	6,155	7,593	70	73
Self-employed	6,700	7,595	59	58
Industrial group:				
Agriculture, forestry, and fisheries	1,016	962	33	33
Mining	578	470	63	63
Construction	3,265	3,853	61	59
Manufacturing, durable goods	6,185	6,846	56	56
Manufacturing, nondurable goods	3,713	4,231	46	48
Transportation, communications, and public utilities	3,772	4,675	55	58
Wholesale trade	2,101	2,018	50	47
Retail trade	5,516	6,184	34	33
Finance, insurance, and real estate	4,205	5,402	66	67
Business and repair services	2,802	4,388	61	61
Personal services	1,558	1,941	41	42
Entertainment and recreational services	478	767	51	57
Professional and related services	15,467	19,381	74	75
Public administration	3,232	4,157	70	74

proportion of the workers in technician and related support occupations needed training, this small occupational group accounted for only 1 percent of the total who required it.

In this and succeeding sections, occupations are ranked in two ways: 1) by the number of persons in the occupation reporting that training source, and 2) by the percent of employees in the occupation reporting the training. Each ranking method shows significant, but different, occupational trends for each training type. Ranking by the number using the training source shows occupations in which persons take the training most often. Ranking by the percent of those in the occupation who use the training, however, identifies the occupations for which the training is a significant part of qualification or skill improvement.

In the former ranking method an occupation may be included simply because it is large even though the percent of employees identifying training may be small. In the latter, training may be significant for the occupation but the number of persons may be small and thus make up only a minor portion of all workers reporting training. An occupation is considered a highly significant user of a training source if it appears on both of the ranking tables.

About 57 percent of all workers who needed training were in 50 detailed occupations (table 3). These 50 occupations made up 51 percent of the total employed. In most occupations listed in table 3, the percent of persons in each occupation who needed training to qualify for their jobs surpassed the average. The most notable exceptions to this

Table 2. Percent distribution of skill improvement training by major occupational groups, 1983 and 1991

Occupational group	1983	1991
Total, all occupations	100	100
Executive, administrative, and managerial	14	17
Professional specialty	22	24
Technicians and related support	5	5
Sales occupations	9	9
Administrative support	17	16
Private household occupations	0	0
Service, except private household	8	8
Farming, forestry, and fishing	2	1
Precision production, craft, and repair	14	12
Machine operators, assemblers, and inspectors	5	4
Transportation and material moving occupations	3	3
Handlers, equipment cleaners, and laborers	1	1

are cashiers and janitors, each having fewer than one-quarter reporting training was needed to qualify.

The professional specialty group leads the other groups with 11 occupations listed in table 3. The following groups contain seven each: Executive, administrative, and managerial group; administrative support group; and the precision production, craft, and repair group. The sales group is next with six occupations listed. The remaining seven occupational groups have five or fewer occupations listed.

The 50 occupations with the highest proportions requiring qualifying training accounted for only 18 percent of the total who needed training and 10 percent of total employment (table 4). Thirty-eight of the 50 occupations listed in table 4 are professional specialty occupations; 5 are technician and related support occupations. Nine occupations appear on both tables 3 and 4.

Sources of Qualifying Training

Workers who needed training to qualify for their jobs were asked to identify one or more sources of the training from the following six categories: (1) A program in a high school or a postsecondary school, (2) a formal company

Table 3. Qualifying training: Fifty occupations with the largest numbers of workers who needed training, 1991

Occupation	Number who needed training (thousands)	Percent of total employment in occupation	Percent of total who needed training
Managers and administrators, n.e.c.	5,079	66.6	7.8
Secretaries	2,457	67.9	3.8
Supervisors and proprietors, sales occupations	1,826	48.9	2.8
Registered nurses[1]	1,616	96.7	2.5
Teachers, elementary school[1]	1,565	96.0	2.4
Teachers, secondary school[1]	1,448	98.6	2.2
Accountants and auditors	1,261	87.1	1.9
Bookkeepers, accounting, and auditing clerks	1,201	58.9	1.8
Nursing aides, orderlies, and attendants	1,025	71.1	1.6
Sales representatives, mining, manufacturing, and wholesale	891	55.7	1.4
Carpenters	721	59.1	1.1
Truckdrivers, heavy	671	42.4	1.0
Supervisors, production occupations	666	53.7	1.0
Computer systems analysts and scientists	655	89.9	1.0
Lawyers[1]	644	98.2	1.0
Hairdressers and cosmetologists[1]	637	93.9	1.0
Real estate sales occupations	602	87.4	.9
Computer programmers[1]	567	92.7	.9
Social workers	563	85.8	.9
Electricians	559	80.0	9
Administrative support occupations, n.e.c.	549	56.9	.8
Automobile mechanics	538	64.7	.8
Physicians[1]	520	99.1	.8
Cashiers	512	21.1	.8
Administrators, education and related fields	509	90.5	.8
Other financial officers	509	76.2	.8
Electrical and electronic engineers[1]	504	93.9	.8
Insurance sales occupations	480	81.4	.7
Computer operators	470	65.3	.7
Cooks, except short order	470	27.1	.7
Teachers, n.e.c.	453	84.0	.7
Licensed practical nurses[1]	445	97.0	.7
Financial managers	420	83.1	.6
Administrators and officials, public administration	419	79.2	.6
Designers	414	83.4	.6
Receptionists	392	46.9	6
Managers, marketing, advertising, and public relations	389	73.6	.6
Typists	387	63.1	6
Teachers, prekindergarten and kindergarten	380	82.7	.6
Police and detectives, public service	373	79.5	6
Machinists	367	66.8	.6
Welders and cutters	361	66.3	.6
Industrial machinery repairers	358	64.1	.5
Sales workers, other commodities	357	25.6	.5
Miscellaneous machine operators, n.e.c.	356	35.3	.5
Janitors and cleaners	343	15.4	.5
Bus drivers	343	66.7	.5
General office clerks	334	48.4	.5
Construction supervisors, n.e.c.	332	59.6	.5
Electrical and electronic technicians	330	90.0	5

[1] This occupation also appears in table 4, which ranks occupations by the proportion of workers who needed training.

Table 4. Qualifying training: Fifty occupations with the largest proportions of workers who needed training, 1991

Occupation	Number who needed training (thousands)	Percent of total employment in occupation	Percent of total who needed training
Physicists and astronomers	34	100 0	0.1
Medical scientists	57	100.0	.1
Veterinarians	59	100.0	.1
Health diagnosing practitioners, n.e.c.	40	100.0	.1
Occupational therapists	32	100.0	–
Speech therapists	55	100.0	.1
Biological science teachers	37	100.0	.1
Psychology teachers	23	100.0	–
Economics teachers	20	100.0	–
Mathematical science teachers	54	100.0	.1
Computer science teachers	29	100.0	–
Business, commerce, and marketing teachers	25	100.0	–
English teachers	56	100.0	.1
Dental hygienists	77	100.0	.1
Stenographers	26	100.0	–
Psychologists	220	99.2	.3
Physicians[1]	520	99.1	.8
Dentists	143	98.9	.2
Teachers, secondary school[1]	1,448	98.6	2.2
Camera, watch, and musical instrument repairers	33	98.6	.1
Lawyers[1]	644	98.2	1.0
Aerospace engineers	101	97.9	.2
Radiological technicians	143	97.6	.2
Teachers, special education	269	97.0	.4
Licensed practical nurses[1]	445	97.0	.7
Chemists, except biochemists	123	96.9	.2
Registered nurses[1]	1,616	96.7	2.5
Postsecondary teachers, subject not specified	250	96.5	.4
Chemical engineers	68	96.1	.1
Teachers, elementary school[1]	1,565	96.0	2.4
Mechanical engineers	300	95.2	.5
Airplane pilots and navigators	111	94.9	.2
Barbers	106	94.7	.2
Pharmacists	174	94.6	.3
Art, drama, and music teachers	38	94.4	.1
Engineering teachers	24	94.2	–
Physicians assistants	65	94.1	.1
Physical therapists	92	94.0	.1
Supervisors, electricians and power transmission installers	37	94.0	.1
Electrical and electronic engineers[1]	504	93.9	.8
Actuaries	23	93.9	–
Hairdressers and cosmetologists[1]	637	93.9	1.0
Construction inspectors	49	93.6	.1
Counselors, educational and vocational	172	93.6	.3
Civil engineers	260	93.5	.4
Sales engineers	26	93.2	–
Forestry and conservation scientists	31	93.0	–
Metallurgical and materials engineers	20	92.8	–
Geologists and geodesists	59	92.7	.1
Computer programmers[1]	567	92.7	.9

[1] This occupation also appears in table 3, which ranks occupations by the number of workers who needed training.
– Less than 0.05 percent.

program, (3) informal on-the-job training or experience in a previous job or jobs, (4) the Armed Forces, (5) correspondence courses, and (6) informal training from a friend or relative or other experience unrelated to work.

School programs providing qualifying training generally take place outside of work or in place of work. Most of those attending colleges or technical institutes must devote a large part of each day in classes, precluding them from substantial job opportunities. Some attend night school, however, as they work in their present jobs. In rare cases, employers send individuals to a school program full time and pay them full wages in addition to covering tuition and other educational expenses.

A formal company training program consists of any structured curriculum that a firm uses to teach employees required information. An employee of the firm or a representative of a training organization may lead formal company training. This training generally occurs during the workday, and the employer pays for it.

Informal on-the-job training (OJT) occurs as workers practice skills, perform a greater variety of tasks, and confront problems in their organizations. OJT may involve self-study or learning through developmental assignments and may arise out of the need for new skills to solve a problem. An employee's supervisor may initiate OJT, or more experienced co-workers may help out by sharing their knowledge.

The Armed Forces is a large organization with many complicated yet integral functions that its members must perform swiftly, smoothly, and accurately. Members of the Armed Forces are thus trained to a high degree of proficiency in their fields.

Correspondence courses allow persons to study many subjects in their own homes, ranging from a university

English course to electronics and automotive engine repair, just to mention a few.

Other sources of training may include attending conventions, professional seminars, professional journals, private lessons, or hobbies, or experience gained from a friend or relative.

School programs and informal on-the-job training (OJT) qualified workers for jobs far more frequently than other methods. About 36.9 million workers learned skills for their jobs in school, and 31.3 million gained qualifying skills through OJT (table 5). Formal company programs provided training for 13.9 million workers. About 8.5 million obtained training from a friend or a relative or other experience not related to work. The Armed Forces were a source of training for 2.4 million workers, and correspondence courses, 1.2 million.

The group of professional specialty occupations had the largest number of workers and the highest percentage of workers who identified school as a source of qualifying training (table 5). Executive, administrative, and managerial occupations had the second highest number of workers who went to school for qualifying training. Technician and related support occupations had the second highest percentage of those who qualified based on school training. School was more important than any other single source for administrative support workers. OJT was the most important source of qualifying training for workers in all other occupational groups.

Professional specialty workers accounted for 37 percent of the people who qualified themselves in school programs (table 6). Formal company training was dominated by executives, administrators, and managerial workers and precision production, craft, and repair workers. Each of these two groups accounted for 18 percent of the total who trained for their current jobs in formal company programs. OJT also had two groups outweighing the others, each with 18 percent of the total: Executives, administrators, and managers and administrative support workers. Precision production, craft, and repair workers composed nearly 30 percent of those who took qualifying training in the Armed Forces, as well as leading in the use of correspondence courses and other qualifying training.

In all classes of workers, school programs were the most used source of qualifying training. OJT came in second (table 7). The percent using school or OJT was similar for all classes except State and local government workers, for whom school was clearly the dominant source of qualifying training. Formal company training was the third most cited source of qualifying training in all classes of workers except the self-employed, whose third most used form of

Table 5. Qualifying training: Source of training by occupational group, 1991

Occupational group	Workers who needed training	Source of training					
		School	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friend or relative or other nonwork related training
Total, all occupations							
Number (in thousands)	65,276	36,924	13,948	31,260	2,434	1,241	8,490
Percent of occupational employment	57	33	12	27	2	1	7
Executive, administrative, and managerial							
Number (in thousands)	10,565	7,116	2,445	5,497	444	273	1,250
Percent of occupational employment	72	49	17	37	3	2	9
Professional specialty							
Number (in thousands)	14,923	13,351	1,757	4,098	346	188	1,288
Percent of occupational employment	92	83	11	25	2	1	8
Technicians and related support							
Number (in thousands)	3,414	2,444	655	1,233	190	48	359
Percent of occupational employment	86	63	17	31	5	1	8
Sales occupations							
Number (in thousands)	5,980	2,452	1,799	3,487	139	173	956
Percent of occupational employment	43	17	13	26	1	1	7
Administrative support							
Number (in thousands)	10,028	5,708	1,878	5,480	201	161	783
Percent of occupational employment	55	32	10	30	1	1	4
Private household occupations							
Number (in thousands)	85	24	4	26	–	–	43
Percent of occupational employment	10	4	1	3	–	–	4
Service workers, except private household							
Number (in thousands)	5,758	2,124	1,422	2,750	270	71	981
Percent of occupational employment	37	14	9	18	2	–	7
Farming, forestry, and fishing							
Number (in thousands)	815	241	79	480	17	15	328
Percent of occupational employment	28	9	2	17	1	–	12
Precision production, craft, and repair							
Number (in thousands)	8,088	2,562	2,579	4,644	665	288	1,511
Percent of occupational employment	62	19	19	36	5	2	12
Machine operators, assemblers, and inspectors							
Number (in thousands)	2,940	595	698	1,946	67	13	393
Percent of occupational employment	38	8	8	25	1	–	5
Transportation and material moving							
Number (in thousands)	1,842	196	494	1,024	77	6	454
Percent of occupational employment	42	4	11	24	1	–	10
Handlers, equipment cleaners, and laborers							
Number (in thousands)	839	110	138	595	18	4	143
Percent of occupational employment	20	2	3	14	–	–	4

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Table 6. Qualifying training: Percent distribution of training by occupational group, 1991

Occupational group	Workers who needed training	Source of training					
		School	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friend or relative or other nonwork related training
Total, all occupations							
Number (in thousands)	65,276	36,924	13,948	31,260	2,434	1,241	8,490
Percent of total reporting training source	100	100	100	100	100	100	100
Executive, administrative, and managerial							
Percent of total reporting training source	17	20	18	18	19	22	15
Professional specialty							
Percent of total reporting training source	24	37	13	13	14	15	16
Technicians and related support							
Percent of total reporting training source	5	7	5	4	8	4	4
Sales occupations							
Percent of total reporting training source	9	6	13	11	5	13	11
Administrative support							
Percent of total reporting training source	16	16	14	18	8	14	9
Private household occupations							
Percent of total reporting training source	–	–	–	–	–	–	–
Service workers, except private household							
Percent of total reporting training source	8	5	10	8	10	5	11
Farming, forestry, and fishing							
Percent of total reporting training source	1	1	1	2	1	1	4
Precision production, craft, and repair							
Percent of total reporting training source	12	6	18	14	29	23	17
Machine operators, assemblers, and inspectors							
Percent of total reporting training source	4	2	4	6	3	1	5
Transportation and material moving							
Percent of total reporting training source	3	–	4	3	3	–	5
Handlers, equipment cleaners, and laborers							
Percent of total reporting training source	1	–	1	2	1	–	2

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Table 7. Qualifying training: Sources of training by class of worker, 1991

Class of worker	Workers who needed training	Source of training					
		School	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friend or relative or other nonwork related training
Total, all workers							
Number (in thousands)	65,276	36,924	13,948	31,260	2,434	1,241	8,490
Percent of employed in class	57	33	12	27	2	1	7
Private industry							
Number (in thousands)	44,246	23,319	10,324	23,093	1,504	736	5,196
Percent of employed in class	53	29	12	28	2	1	6
Federal Government							
Number (in thousands)	2,192	1,204	665	1,040	346	129	192
Percent of employed in class	67	37	20	32	10	4	6
State government							
Number (in thousands)	3,579	2,649	661	1,350	138	45	325
Percent of employed in class	75	55	13	29	2	1	7
Local government							
Number (in thousands)	7,593	5,705	1,168	2,310	228	102	613
Percent of employed in class	73	57	10	22	2	1	6
Self-employed							
Number (in thousands)	7,595	4,021	1,117	3,443	216	225	2,139
Percent of employed in class	58	30	9	27	2	2	16

training was other methods.

Industrial groups in which school was the most popular source of qualifying training were finance, insurance, and real estate; business and repair services; personal services; professional and related services; and public administration. Workers in the professional and related services industry had the highest percent who identified school as a source of qualifying training, 61 percent (table 8). In all other industrial groups, OJT was the most frequently used source of qualifying training. Almost one-fourth of the workers in the finance, insurance, and real estate industrial group qualified for their jobs through formal company training programs. Employees in public administration were the largest users of Armed Forces training.

Many workers identified more than one source of training, and so the total of sources identified (94.7 million) is far greater than the total number of workers who said some kind of training was necessary (65.3 million). A simple measure of the extent to which workers reported more than one source of training is the ratio of the number of times each source was identified to the number of workers who required some kind of training. The ratio for all occupations was 1.45:1 (94.7 million divided by 65.3 million). Ratios for the 12 occupational groups ranged from 1.62 for executive, administrative, and managerial occupations to

Table 8. Qualifying training: Sources of training by industrial group, 1991

Industry group	Workers who needed training	Source of training					
		School	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friend or relative or other nonwork related training
Total, all industries							
Number (in thousands)	65,276	36,924	13,948	31,260	2,434	1,241	8,490
Percent of industry employment	57	33	12	27	2	1	7
Agriculture, forestry, and fisheries							
Number (in thousands)	962	396	72	534	23	24	355
Percent of industry employment	33	13	3	20	1	1	12
Mining							
Number (in thousands)	470	222	116	276	12	–	59
Percent of industry employment	63	31	17	38	2	–	9
Construction							
Number (in thousands)	3,853	1,152	897	2,389	123	55	899
Percent of industry employment	59	18	14	37	2	1	14
Manufacturing, durable goods							
Number (in thousands)	6,846	3,581	1,809	3,899	406	162	678
Percent of industry employment	56	29	15	32	3	1	6
Manufacturing, nondurable goods							
Number (in thousands)	4,231	1,938	950	2,503	113	41	522
Percent of industry employment	48	22	10	29	1	–	6
Transportation, communications, and other public utilities							
Number (in thousands)	4,675	1,873	1,625	2,384	399	118	531
Percent of industry employment	58	23	20	30	4	2	7
Wholesale trade							
Number (in thousands)	2,018	1,012	468	1,145	66	38	257
Percent of industry employment	47	23	11	27	2	1	6
Retail trade							
Number (in thousands)	6,184	1,941	1,378	3,998	150	126	915
Percent of industry employment	33	11	7	21	1	1	5
Finance, insurance, and real estate							
Number (in thousands)	5,402	2,993	1,825	2,730	72	195	679
Percent of industry employment	67	38	23	34	1	2	8
Business and repair services							
Number (in thousands)	4,388	2,413	918	2,215	207	109	729
Percent of industry employment	61	34	13	31	3	2	10
Personal services							
Number (in thousands)	1,941	919	297	711	16	19	499
Percent of industry employment	42	20	6	16	–	1	11
Entertainment and recreation services							
Number (in thousands)	767	323	143	429	21	16	214
Percent of industry employment	57	24	10	32	1	1	17
Professional and related services							
Number (in thousands)	19,381	15,617	2,191	6,153	357	187	1,740
Percent of industry employment	75	61	8	24	1	1	7
Public administration							
Number (in thousands)	4,157	2,544	1,258	1,894	471	149	413
Percent of industry employment	74	46	21	34	8	3	7

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Table 9. Qualifying training: Ratio of number of workers who needed training to total of training sources identified by occupational group, 1991

Occupational group	Workers who needed training (thousands)	Total of training sources identified (thousands)	Ratio
Total, all occupations	65,276	94,566	1.45
Executive, administrative, and managerial	10,565	17,101	1.62
Professional specialty	14,923	21,092	1.41
Technicians and related support	3,414	4,946	1.45
Sales occupations	5,980	9,030	1.51
Administrative support	10,028	14,236	1.42
Private household occupations	85	108	1.27
Service workers, except private household	5,758	7,654	1.33
Farming, forestry, and fishing	815	1,197	1.47
Precision production, craft, and repair	8,088	12,303	1.52
Machine operators, assemblers, and inspectors	2,940	3,724	1.27
Transportation and material moving	1,842	2,260	1.23
Handlers, equipment cleaners, and laborers	839	1,013	1.21

1.21 for handlers, equipment cleaners, and laborers, which means that, on average, the former group reported more than one source of training more often than the latter (table 9). A comparison of training patterns for these occupational groups shows that handlers, equipment cleaners, and laborers were more likely to have trained on the job, and those in the executive, administrative, and managerial group were far more likely to have trained in school.

Some sources of training were more likely than others to serve as the sole source. The ratio of the number of people reporting that a given source of training was the only type needed to the total reported for all types of training meas-

Table 10. Qualifying training: Ratio of number of workers with only one source of training to total reporting this training, 1991

Source of training	Workers with only one source of training (thousands)	Total reporting this source of training (thousands)	Ratio
School	20,718	36,924	0.56
Formal company training	4,756	13,948	.34
Informal on-the-job training	13,493	31,260	43
Armed Forces	610	2,434	.25
Correspondence course	107	1,241	09
Other nonwork related training	3,517	8,490	.41

Table 11. Qualifying training: Workers with only one source of qualifying training by source of training and occupational group, 1991

Occupational group	Workers with only one source of training (thousands)					
	School	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Other nonwork related training
Total, all occupations	20,718	4,756	13,493	610	107	3,517
Executive, administrative, and managerial	3,291	537	1,636	73	12	384
Professional specialty	9,125	223	543	42	5	335
Technicians and related support	1,468	215	335	66	3	149
Sales occupations	1,050	603	1,757	13	11	387
Administrative support	2,987	649	2,464	89	23	338
Private household occupations	17	4	12	–	–	22
Service workers, except private household	1,240	724	1,615	94	20	569
Farming, forestry, and fishing	106	23	255	0	0	163
Precision production, craft, and repair	962	1,028	2,323	177	31	589
Machine operators, assemblers, and inspectors	281	360	1,385	5	1	233
Transportation and material moving	126	316	710	40	1	269
Handlers, equipment cleaners, and laborers	64	74	459	10	0	78

– Data not available.

ures that tendency. As shown in table 10, respondents often reported school or OJT, with ratios of 0.56 and 0.43, as the sole source of training; correspondence courses, with a ratio of 0.09, were usually cited only with other sources of training.

Table 11 presents the occupational distribution of people who reported just one source of qualifying training across the six training categories. Two-thirds of all workers who needed training to obtain their current job qualified themselves using only one source of training. For managerial, professional, and technician occupations, more workers who had only one source of training became qualified through school than through all the other sources combined. For example, almost 17 times as many professional specialty workers qualified themselves with school alone than through just using OJT, the nearest competitor. Administrative support occupations employed school programs as a single source more often than OJT, and service occupations used OJT as a single source more often than school programs, but they did not differ widely. OJT was clearly most relied upon as a single source of qualifying training in all other occupational groups except private household occupations, for which other training methods were the most important single source.

Sources of qualifying training by detailed occupation appear in appendix table A-1.

School training

About 33 percent of all people employed in January 1991 qualified for their current jobs with training obtained from school programs, up from 29 percent in 1983. The proportion was higher than average in the following three occupational groups: Professional specialty workers, 83 percent; technicians and related support workers, 63 percent; and executive, administrative, and managerial workers, 49 percent (table 5). These three groups made up almost two-thirds of all workers who went to school to get their jobs, but accounted for less than one-third of total employment. Persons in professional specialty occupations alone accounted for 37 percent of all workers who trained in school programs; those in executive, administrative, and managerial occupations composed 20 percent (table 6).

Over half the employees in State and local government qualified themselves for their current jobs in school programs (table 7). All other worker classes had proportions taking qualifying training in school programs at rates within a few percentage points of the average.

About 61 percent of the workers in professional and related service industries reported school training as qualifying training, making it the industrial sector with the highest proportion using school training (table 8).

Twenty-five detailed occupations accounted for 43 percent of all workers who qualified for their jobs with skills

Table 12. Qualifying training: Twenty-five occupations with the largest numbers of workers who used training obtained in school programs, 1991

Occupation	Number who needed school training (thousands)	Percent of total employment in occupation	Percent of total with school training
Managers and administrators, n.e.c.	3,082	40.4	8.3
Secretaries	1,885	52.1	5.1
Teachers, elementary school[1]	1,545	94.8	4.2
Registered nurses[1]	1,528	91.5	4.1
Teachers, secondary school[1]	1,396	95.1	3.8
Accountants and auditors	1,126	77.7	3.0
Supervisors and proprietors, sales occupations	771	20.7	2.1
Bookkeepers, accounting, and auditing clerks	765	37.5	2.1
Lawyers[1]	627	95.6	1.7
Computer systems analysts and scientists	518	71.0	1.4
Physicians[1]	505	96.3	1.4
Sales representatives, mining, manufacturing, and wholesale	493	30.8	1.3
Nursing aides, orderlies, and attendants	467	32.4	1.3
Social workers	461	70.4	1.2
Administrators, education and related fields	457	81.4	1.2
Hairdressers and cosmetologists	444	65.4	1.2
Electrical and electronic engineers	440	82.0	1.2
Computer programmers	439	71.7	1.2
Licensed practical nurses	386	84.2	1.0
Teachers, prekindergarten and kindergarten	356	77.4	1.0
Financial managers	351	69.4	.9
Other financial officers	339	50.8	.9
Real estate sales occupations	336	48.8	.9
Designers	301	60.8	.8
Administrative support occupations, n.e.c.	296	30.7	.8

[1] This occupation also appears in table 13, which ranks occupations by the proportion of workers who used training obtained in school programs.

Table 13. Qualifying training: Twenty-five occupations with the largest proportions of workers who used training obtained in school programs, 1991

Occupation	Number who needed school training (thousands)	Percent of total employment in occupation	Percent of total with school training
Veterinarians	59	100.0	0.2
Occupational therapists	32	100.0	.1
Biological science teachers	37	100.0	.1
Mathematical science teachers	54	100.0	.1
English teachers	56	100.0	.2
Biological and life scientists	79	98.2	.2
Speech therapists	54	98.0	.1
Dental hygienists	75	97.7	.2
Physicians[1]	505	96.3	1.4
Aerospace engineers	99	95.9	.3
Lawyers[1]	627	95.6	1.7
Teachers, secondary school[1]	1,396	95.1	3.8
Medical scientists	54	95.0	.1
Teachers, special education	263	94.9	.7
Teachers, elementary school[1]	1,545	94.8	4.2
Pharmacists	174	94.6	.5
Engineering teachers	24	94.2	.1
Business, commerce, and marketing teachers	23	94.0	.1
Actuaries	23	93.9	.1
Psychologists	205	92.1	.6
Registered nurses[1]	1,528	91.5	4.1
Dentists	132	91.4	.4
Physicists and astronomers	31	90.7	.1
Chemists, except biochemists	115	90.6	.3
Postsecondary teachers, subject not specified	230	88.9	.6

[1] This occupation also appears in table 12, which ranks occupations by the number of workers who used training obtained in school programs.

gained in school programs (table 12). Occupations from several groups appear on the list, although professional specialties predominate. The first 10 occupations in table 12 account for about 29 percent of the workers who qualified for jobs through school training.

The 25 occupations with the highest proportions requiring school training accounted for 20 percent of those who needed school training and for 7 percent of total employment (table 13). All but dental hygienists are professional specialty occupations, and nine are teaching occupations. Five occupations appear on both table 12 and table 13.

Workers who trained in schools to qualify for their jobs also identified one or more of the following four program categories from which they received training: (1) High school vocational programs, (2) post-high school vocational programs, (3) junior or community college or technical institute programs, and (4) 4-year or longer college programs.

Table 14. Qualifying training: Sources of school training by occupational group, 1991

Occupational group	Total with school training	Source of school training			
		High school vocational education	Post-high school vocational education	Junior college or technical institute	4-year or longer college program
Total, all occupations					
Number (in thousands)	36,924	4,488	3,141	8,868	21,637
Percent of occupational employment	33	4	3	8	20
Executive, administrative, and managerial					
Number (in thousands)	7,116	436	292	1,247	5,307
Percent of occupational employment	49	3	2	9	36
Professional specialty					
Number (in thousands)	13,351	242	457	1,701	11,079
Percent of occupational employment	83	1	3	10	69
Technicians and related support					
Number (in thousands)	2,444	192	320	942	1,039
Percent of occupational employment	63	5	8	24	28
Sales occupations					
Number (in thousands)	2,452	205	205	564	1,508
Percent of occupational employment	17	1	1	4	11
Administrative support					
Number (in thousands)	5,708	1,994	602	1,892	1,573
Percent of occupational employment	32	11	3	10	9
Private household occupations					
Number (in thousands)	24	11	–	7	6
Percent of occupational employment	4	2	–	1	1
Service workers, except private household					
Number (in thousands)	2,124	274	570	961	387
Percent of occupational employment	14	2	4	6	3
Farming, forestry, and fishing					
Number (in thousands)	241	63	33	72	116
Percent of occupational employment	9	2	1	2	5
Precision production, craft, and repair					
Number (in thousands)	2,562	757	485	1,145	500
Percent of occupational employment	19	6	4	9	4
Machine operators, assemblers, and inspectors					
Number (in thousands)	595	220	117	223	78
Percent of occupational employment	8	3	1	3	1
Transportation and material moving					
Number (in thousands)	196	46	48	84	22
Percent of occupational employment	4	1	1	2	–
Handlers, equipment cleaners, and laborers					
Number (in thousands)	110	48	13	31	22
Percent of occupational employment	2	1	–	1	1

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NOTE: Because some workers did not indicate the source of school training, individual items may not sum to totals.

Table 15. Qualifying training: Workers who acquired training though school programs by length and type of program, 1991

Type of program	Total, all school programs	Length of program			
		1 week or less	2-12 weeks	13-25 weeks	More than 25 weeks
Total, all school program types	35,325	1,268	2,529	1,598	28,768
High school vocational education	4,488	175	376	340	3,384
Post-high school vocational education	3,141	152	396	314	2,205
Junior college or technical institute	8,868	380	1,069	702	6,477
4-year or longer college program	21,637	675	897	435	18,904

NOTE: Because some workers took more than one type of school program or did not indicate the length of training programs, individual items may not sum to totals

College was a source of qualifying training more frequently than all other types of schools combined. About 21.6 million workers qualified for their jobs through training in 4-year colleges (table 14). About 8.9 million workers acquired their jobs with the aid of training from junior colleges and technical institutes. High school vocational training was a source of job qualification for 4.5 million workers. About 3.1 million workers trained for their jobs in post-high school vocational training programs.

Roughly 8 out of 10 workers who received training through school programs did so in programs lasting longer than 25 weeks (table 15). About 75 percent of workers who took training in high school vocational education, post-high school vocational education, or junior college and technical institutes participated in programs that lasted longer than 25 weeks, compared with 90 percent of those in college programs lasting 4 years or longer.

Few workers who used school training to qualify for their jobs obtained it in programs paid for by employers or in government programs such as JTPA.[4] Of the 36.9 million workers who trained in school, 5.4 million—14.7 percent—attended employer-sponsored schooling and 1.2 mil-

[4] The Job Training Partnership Act provides job training and related services (i.e., institutional and on-the-job training, job search assistance, counseling, and other job-related services) for economically disadvantaged persons and provides employment-related services to dislocated workers (i.e., persons who have been laid off or who are about to be laid off and who are not likely to return to their previous jobs).

Table 16. Qualifying training: Workers who received sponsored training in school programs by occupational group, 1991

Occupational group	Employer-sponsored training		Government-sponsored training	
	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution
Total, all occupations	5,436	100	1,249	100
Executive, administrative, and managenal	1,262	24	165	15
Professional specialty	1,622	30	331	27
Technicians and related support	389	7	111	9
Sales occupations	335	6	52	4
Administrative support	716	14	221	17
Private household occupations	5	–	2	–
Service workers, except private household	348	6	162	13
Farming, forestry, and fishing	52	1	13	1
Precision production, craft, and repair	571	10	125	9
Machine operators, assemblers, and inspectors	93	2	49	4
Transportation and material moving	30	–	11	1
Handlers, equipment cleaners, and laborers	14	–	9	1

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Table 17. Qualifying training: Workers who received various levels of support when taking employer-sponsored training in school programs by occupational group, 1991

Occupational group	Employer-sponsored training		Employer-sponsored training (fully paid)		Employer-sponsored training (>= half paid)		Employer-sponsored training (< half paid)	
	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution
Total, all occupations	5,436	100	3,168	100	1,232	100	1,036	100
Executive, administrative, and managerial	1,262	24	694	23	290	25	278	26
Professional specialty	1,622	30	810	26	399	33	413	42
Technicians and related support	389	7	230	7	88	7	70	7
Sales occupations	335	6	199	6	68	6	68	5
Administrative support	716	14	462	16	140	12	114	11
Private household occupations	5	–	5	–	–	–	–	–
Service workers, except private household	348	6	256	7	68	5	24	2
Farming, forestry, and fishing	52	1	38	1	8	1	5	1
Precision production, craft, and repair	571	10	381	11	134	10	56	5
Machine operators, assemblers, and inspectors	93	2	59	2	29	2	4	–
Transportation and material moving	30	–	24	1	3	–	3	–
Handlers, equipment cleaners, and laborers	14	–	9	–	5	–	–	–

– Value too small to display or data not available.

lion—3.4 percent—attended government-sponsored school training (table 16).

The occupational distribution of employer- and government-sponsored school training differed. Executive, administrative, and managerial occupations accounted for about 24 percent of employer-sponsored training, compared to 15 percent of those who took government-sponsored training. Workers who obtained employer-sponsored training were also more likely to be in the following occupational groups: Professional specialties, sales, and precision production, craft, and repair. Workers with government-sponsored training were most likely found in the other occupational groups (table 16).

Table 17 shows the distribution of employer-sponsored qualifying training with various levels of sponsorship. Fifty-eight percent of sponsored training was reported as fully paid for. The distribution of fully sponsored qualifying training across occupational groups resembles the occupational group distribution of school training (from table 6). As the level of sponsorship decreases, however, the distribution skews toward professional specialty workers and managerial workers.

High school vocational programs. Although high school vocational programs were the source of qualifying training for only 4 percent of all workers, almost 26 percent of secretaries and 17 percent of typists trained for their jobs in these programs. Between 10 and 15 percent of the workers in about a dozen other occupations also trained in such programs, including automobile mechanics, welders and cutters, and drafters.

About 44 percent of the workers who studied in high school vocational programs to qualify for their jobs were in administrative support occupations, and 17 percent were in precision production, craft, and repair positions. High schools were more important sources of training than other schools for administrative support occupations (table 14).

Almost 49 percent of the workers who trained in high school vocational programs to secure their jobs worked in 25 detailed occupations (table 18). Secretaries accounted for 26.1 percent alone—which is highly significant considering that the occupation accounted for little more than 3 percent of total employment. Managers and administrators not elsewhere classified and bookkeeping, accounting, and auditing clerks each represented about 6 percent of the

workers who reported this method of training.

The 25 occupations with the highest proportions requiring high school vocational training accounted for 47 percent of those who needed this training and 12 percent of total employment (table 19). Twelve of the occupations appearing in table 19 were in precision production, craft, and repair; 11 occupations were in administrative support. Twelve occupations appeared on both table 18 and table 19.

Post-high school vocational programs. Nearly 3 percent of all workers obtained the training required for their jobs in post-high school vocational programs (table 14). About 29 percent of licensed practical nurses and hairdressers and cosmetologists received their training from post-high school vocational programs, as did 21 percent of the barbers. Programs in these schools also were a significant source of training for registered nurses (10 percent) and health aides, except nursing (13 percent).

About 19 percent of the total 3.1 million people who used post-high school vocational training programs as qualifying training occupied administrative support positions; 18 percent were in service occupations, except private household; and 15 percent were either in professional specialties or precision production, craft, and repair occupations (table 14).

Twenty-five occupations accounted for about 57 percent of the workers who trained in post-high school vocational programs (table 20). Almost one-third were secretaries; hairdressers and cosmetologists; registered nurses; managers and administrators not elsewhere classified; nursing aides, orderlies, and attendants; or licensed practical nurses. Some occupations make the top 25 list because of their size. Table 20, for instance, includes 7.6 million managers and administrators not elsewhere classified, of whom little more than 2 percent had post-high school vocational training.

The 25 occupations with the highest proportions requiring post-high school vocational training accounted for 34 percent of those who needed this training and 7 percent of total employment (table 21). Ten of the occupations appearing in table 21 were in precision production, craft, and repair; 5 occupations were in services. Ten occupations appeared on both table 20 and table 21.

Junior colleges and technical institutes. Junior colleges and technical institutes provided qualifying training for almost 8.9 million workers, or about 8 percent of all workers (table 14). The share of workers who qualified for their jobs through junior colleges and technical institutes rose more than 50 percent since the 1983 survey.

Twenty-four percent of technicians and related support workers studied in junior colleges and technical institutes. This was 3 times higher than the average for all occupations (table 14). Higher than average proportions of workers used junior colleges and technical institutes in the following groups: Executive, administrative, and managerial; professional specialty; administrative support; and precision production, craft, and repair.

Administrative support occupations led all other groups in the number of workers who reported junior college and technical institute training, with 1.9 million. Another 1.7 million were in professional specialties; 1.2 million worked in executive, administrative, and managerial occupations; 1.1 million worked in precision production, craft, and repair jobs; and 0.9 million held technician and related support jobs (table 14).

Twenty-five detailed occupations covered more than 52 percent of workers who trained in junior colleges and technical institutes to qualify for their jobs (table 22). Managers and administrators not elsewhere classified and secretaries topped the list, each with about 7 percent of the total. The top five occupations accounted for more than one-quarter of the total who reported this kind of training.

Junior colleges and technical institutes were major providers of training for roughly two-fifths of the licensed practical nurses and electrical and electronic technicians and for approximately one-third of the registered nurses and drafters.

The 25 occupations with the highest proportions requiring training from junior colleges or technical institutes accounted for 22 percent of those who needed this training and 6 percent of total employment (table 23). Eight of the occupations appearing in table 23 were technician and related support occupations; 7 were in precision production, craft, and repair. Eight occupations appeared on both table 22 and table 23.

4-year college programs. College programs that lasted 4 years or longer were the most common form of schooling through which workers prepared themselves for the workplace. Almost one-fifth of all workers qualified themselves this way. One-third of workers who needed training used 4-year or longer college training; three-fifths of workers who needed scholastic training had attended 4-year colleges (table 14).

About 69 percent of those in professional specialty occupations reported college instruction, and the proportion was much higher for some detailed occupations in this group. The professional specialty group accounted for more than half of the 21.6 million workers who needed college training to qualify for their jobs, which was a large proportion considering this group accounted for 14 percent of total employment.

College was also a source of training for 36 percent of workers in executive, administrative, and managerial occupations. This group had nearly one-quarter of those who needed college, although it accounted for only about 13 percent of total employment.

Administrative support and sales occupations each included about 7 percent of the workers who have had college training, but these two groups had larger proportions

Table 18. Qualifying training: Twenty-five occupations with the largest numbers of workers who used high school vocational training, 1991

Occupation	Number with high school vocational training (thousands)	Percent of total employment in occupation	Percent of total with high school vocational training
Secretaries[1]	934	25.8	26.1
Managers and administrators, n.e.c.	223	2.9	6.2
Bookkeepers, accounting, and auditing clerks[1]	213	10.5	6.0
Automobile mechanics[1]	111	13.3	3.1
Typists[1]	104	16.9	2.9
Receptionists[1]	102	12.2	2.9
Supervisors and proprietors, sales occupations	85	2.3	2.4
Nursing aides, orderlies, and attendants	79	5.5	2.2
Administrative support occupations, n.e.c.	73	7.6	2.0
General office clerks[1]	72	10.4	2.0
Electricians[1]	71	10.1	2.0
Carpenters	70	5.7	2.0
Welders and cutters[1]	68	12.6	1.9
Data-entry keyers[1]	57	12.3	1.6
Hairdressers and cosmetologists	48	7.1	1.4
Supervisors, production occupations	48	3.9	1.3
Computer operators	46	6.4	1.3
Machinists	45	8.1	1.2
Accountants and auditors	40	2.8	1.1
Farmers, except horticultural	41	3.8	1.2
Investigators and adjusters, except insurance	39	6.6	1.1
Bus. truck, and stationary engine mechanics[1]	38	12.5	1.1
Drafting occupations[1]	37	11.4	1.0
Information clerks, n.e.c.[1]	36	15.1	1.0
Licensed practical nurses	31	6.8	.9

[1] This occupation also appears in table 19, which ranks occupations by the proportion of workers who used high school vocational training.

Table 19. Qualifying training: Twenty-five occupations with the largest proportions of workers who used high school vocational training, 1991

Occupation	Number with high school vocational training (thousands)	Percent of total employment in occupation	Percent of total with high school vocational training
Secretaries[1]	934	25.8	26.1
Typists[1]	104	16.9	2.9
Information clerks, n.e.c.[1]	36	15.1	1.0
Cabinet makers and bench carpenters	9	14.9	.2
Automobile body and related repairers	27	14.0	.8
Interviewers	19	13.4	.5
Automobile mechanics[1]	111	13.3	3.1
Brickmasons and stonemasons	19	12.7	.5
Welders and cutters[1]	68	12.6	1.9
Bus. truck, and stationary engine mechanics[1]	38	12.5	1.1
Data-entry keyers[1]	57	12.3	1.6
Receptionists[1]	102	12.2	2.9
Billing clerks	27	12.1	.8
Small engine repairers	8	12.1	.2
Order clerks	24	12.0	.7
Heavy equipment mechanics	19	11.8	.5
Drafting occupations[1]	37	11.4	1.0
Mechanics and repairers, not specified	30	11.4	.8
Payroll and timekeeping clerks	20	11.1	.6
Typesetters and compositors	8	11.0	.2
Bookkeepers, accounting, and auditing clerks[1]	213	10.5	6.0
General office clerks[1]	72	10.4	2.0
Tool and die makers	14	10.4	.4
Electricians[1]	71	10.1	2.0
Supervisors, mechanics and repairers	20	10.0	.6

[1] This occupation also appears in table 18, which ranks occupations by the number of workers who used high school vocational training.

Table 20. Qualifying training: Twenty-five occupations with the largest numbers of workers who used post-high school vocational training, 1991

Occupation	Number with post-high school vocational training (thousands)	Percent of total employment in occupation	Percent of total with post-high school vocational training
Secretaries	234	6.5	7.4
Hairdressers and cosmetologists[1]	200	29.4	6.4
Registered nurses[1]	172	10.3	5.5
Managers and administrators, n.e.c.	158	2.1	5.0
Nursing aides, orderlies, and attendants[1]	135	9.4	4 3
Licensed practical nurses[1]	134	29.2	4.3
Bookkeepers, accounting, and auditing clerks	76	3.7	2.4
Electricians[1]	66	9.4	2.1
Health aides, except nursing[1]	62	12.7	2.0
Supervisors and proprietors, sales occupations	58	1.5	1.8
Automobile mechanics	53	6.4	1 7
Real estate sales occupations[1]	49	7.1	1.6
Welders and cutters[1]	44	8.0	1.4
Industrial machinery repairers	37	6.6	1.2
Computer programmers	36	6 0	1.2
Data-entry keyers[1]	35	7.6	1.1
Police and detectives, public service	33	7.0	1.0
Accountants and auditors	31	2.1	1.0
Insurance sales occupations	28	4.8	9
Teachers, secondary school	26	1.8	.8
Supervisors, production occupations	25	2.0	.8
Health technologists and technicians, n.e.c.	23	6.6	.7
Barbers[1]	23	20.9	.7
Truckdrivers, heavy	23	1.5	7
Teachers, elementary school	22	1 3	.7

[1] This occupation also appears in table 21, which ranks occupations by the proportion of workers who used post-high school vocational training.

Table 21. Qualifying training: Twenty-five occupations with the largest proportions of workers who used post-high school vocational training, 1991

Occupation	Number with post-high school vocational training (thousands)	Percent of total employment in occupation	Percent of total with post-high school vocational training
Boilermakers	7	41.3	0.2
Administrators, protective services	18	38.8	.6
Electrician apprentices	8	31.5	.3
Hairdressers and cosmetologists[1]	200	29.4	6.4
Licensed practical nurses[1]	134	29.2	4.3
Barbers[1]	23	20.9	.7
Supervisors, electricians and power transmission installers	6	15.8	.2
Radiological technicians	21	14.5	.7
Household appliance and power tool repairers	7	14.3	.2
Upholsterers	7	13.0	.2
Health aides, except nursing[1]	62	12.7	2.0
Registered nurses[1]	172	10.3	5 5
Small engine repairers	7	10.3	.2
Nursing aides, orderlies, and attendants[1]	135	9.4	4.3
Electricians[1]	66	9.4	2.1
Airplane pilots and navigators	11	9.3	.3
Heavy equipment mechanics	15	9.0	5
Electronic repairers, commercial and industrial equipment	18	9.0	.6
Supervisors, police and detectives	6	8.1	.2
Typesetters and compositors	5	8 0	2
Welders and cutters[1]	44	8 0	1 4
Actors and directors	7	7.9	2
Data-entry keyers[1]	35	7.6	1.1
Heating, air conditioning, and refrigeration mechanics	17	7 3	.5
Real estate sales occupations[1]	49	7.1	1 6

[1] This occupation also appears in table 20, which ranks occupations by the number of workers who used post-high school vocational training

Table 22. Qualifying training: Twenty-five occupations with the largest numbers of workers who used junior college or technical institute training, 1991

Occupation	Number with junior college or technical institute training (thousands)	Percent of total employment in occupation	Percent of total with junior college or technical institute training
Managers and administrators, n.e.c.	628	8.2	7.1
Secretaries	617	17.0	7.0
Registered nurses[1]	499	29.9	5.6
Bookkeepers, accounting, and auditing clerks	316	15.5	3.6
Nursing aides, orderlies, and attendants	224	15.5	2.5
Licensed practical nurses[1]	204	44.5	2.3
Hairdressers and cosmetologists[1]	192	28.2	2.2
Accountants and auditors	184	12.7	2.1
Supervisors and proprietors, sales occupations	177	4.8	2.0
Electrical and electronic technicians[1]	143	39.1	1.6
Real estate sales occupations[1]	140	20.4	1.6
Automobile mechanics	125	15.1	1.4
Computer programmers[1]	121	19.7	1.4
Computer operators	116	16.2	1.3
Drafting occupations[1]	111	34.3	1.2
Computer systems analysts and scientists	97	13.4	1.1
Designers[1]	96	19.4	1.1
Administrative support occupations, n.e.c.	95	9.9	1.1
Supervisors, production occupations	91	7.3	1.0
Teachers, secondary school	88	6.0	1.0
Teachers, prekindergarten and kindergarten	85	18.5	1.0
Teachers, elementary school	85	5.2	1.0
Typists	82	13.4	.9
Police and detectives, public service	81	17.2	.9
Electricians	81	11.6	.9

[1] This occupation also appears in table 23, which ranks occupations by the proportion of workers who used junior college or technical institute training.

Table 23. Qualifying training: Twenty-five occupations with the largest proportions of workers who used junior college or technical institute training, 1991

Occupation	Number with junior college or technical institute training (thousands)	Percent of total employment in occupation	Percent of total with junior college or technical institute training
Inhalation therapists	35	46.9	0.4
Stenographers	12	45.7	.1
Dental hygienists	34	44.7	.4
Licensed practical nurses[1]	204	44.5	2.3
Physicians assistants	30	43.8	.3
Funeral directors	20	43.1	.2
Radiological technicians	59	40.2	.7
Electrical and electronic technicians[1]	143	39.1	1.6
Drafting occupations[1]	111	34.3	1.2
Health record technologists and technicians	16	32.7	.2
Registered nurses[1]	499	29.9	5.6
Hairdressers and cosmetologists[1]	192	28.2	2.2
Office machine repairers	22	27.3	.2
Miscellaneous electrical and electronic equipment repairers	12	27.2	.1
Dental laboratory and medical appliance technicians	15	26.6	.2
Aircraft mechanics, except engine	12	25.4	.1
Stationary engineers	29	24.8	.3
Household appliance and power tool repairers	11	23.0	.1
Painters, sculptors, craft-artists, and artist printmakers	46	22.9	.5
Heating, air conditioning, and refrigeration mechanics	49	21.1	.5
Electronic repairers, commercial and industrial equipment	41	20.7	.5
Real estate sales occupations[1]	140	20.4	1.6
Supervisors, police and detectives	15	20.2	.2
Computer programmers[1]	121	19.7	1.4
Designers[1]	96	19.4	1.1

[1] This occupation also appears in table 22, which ranks occupations by the number of workers who used junior college or technical institute training.

Table 24. Qualifying training: Twenty-five occupations with the largest numbers of workers who used training in 4-year or longer college programs, 1991

Occupation	Number with 4-year college program training (thousands)	Percent of total employment in occupation	Percent of total with 4-year college program training
Managers and administrators, n.e.c.	2,200	28.9	10.2
Teachers, elementary school[1]	1,427	87.6	6.6
Teachers, secondary school[1]	1,307	88.9	6.0
Accountants and auditors	909	62.8	4.2
Registered nurses	876	52.4	4.0
Lawyers[1]	580	88.4	2.7
Supervisors and proprietors, sales occupations	484	13.0	2.2
Physicians[1]	473	90.0	2.2
Computer systems analysts and scientists	410	56.3	1.9
Administrators, education and related fields	404	72.0	1.9
Sales representatives, mining, manufacturing, and wholesale	399	25.0	1.8
Social workers	381	58.1	1.8
Electrical and electronic engineers	355	66.1	1.6
Secretaries	299	8.3	1.4
Financial managers	285	56.4	1.3
Computer programmers	270	44.2	1.2
Teachers, prekindergarten and kindergarten	257	55.9	1.2
Clergy	249	70.8	1.2
Other financial officers	248	37.2	1.1
Teachers, special education[1]	242	87.4	1.1
Mechanical engineers	226	71.6	1.0
Civil engineers	224	80.5	1.0
Teachers, n.e.c.	201	37.3	.9
Administrators and officials, public administration	200	37.9	.9
Bookkeepers, accounting, and auditing clerks	200	9.8	.9

[1] This occupation also appears in table 25, which ranks occupations by the proportion of workers who used training in 4-year or longer college programs.

Table 25. Qualifying training: Twenty-five occupations with the largest proportions of workers who used training in 4-year or longer college programs, 1991

Occupation	Number with 4-year college program training (thousands)	Percent of total employment in occupation	Percent of total with 4-year college program training
Biological science teachers	37	100.0	0.2
Economics teachers	20	100.0	.1
English teachers	55	97.8	3
Business, commerce, and marketing teachers	23	94.0	.1
Actuaries	23	93.9	.1
Veterinarians	55	93.9	.3
Pharmacists	172	93.4	.8
Speech therapists	50	91.7	2
Physicists and astronomers	31	90.7	.1
Occupational therapists	29	90.4	.1
Physicians[1]	473	90.0	2.2
Teachers, secondary school[1]	1,307	88.9	6.0
Psychologists	197	88.7	.9
Lawyers[1]	580	88.4	2.7
Mathematical science teachers	47	88.3	.2
Teachers, elementary school[1]	1,427	87.6	6.6
Teachers, special education[1]	242	87.4	1.1
Dentists	125	86.6	.6
Engineering teachers	22	86.4	.1
Art, drama, and music teachers	34	84.7	.2
Biological and life scientists	68	84.4	.3
Psychology teachers	20	84.1	1
Medical scientists	47	82.6	.2
Geologists and geodesists	52	82.1	.2
Chemists, except biochemists	103	81.7	.5

[1] This occupation also appears in table 24, which ranks occupations by the number of workers who used training in 4-year or longer college programs.

Table 26. Qualifying training: Twenty-five occupations with the largest numbers of workers who used formal company training, 1991

Occupation	Number who needed formal company training (thousands)	Percent of total employment in occupation	Percent of total who needed formal company training
Managers and administrators, n.e.c.	1,160	15.2	8.3
Supervisors and proprietors, sales occupations	494	13.2	3.5
Secretaries	278	7.7	2.0
Electricians[1]	272	38.9	1.9
Sales representatives, mining, manufacturing, and wholesale	266	16.6	1.9
Insurance sales occupations[1]	255	43.2	1.8
Supervisors, production occupations	247	19.9	1.8
Nursing aides, orderlies, and attendants	246	17.1	1.8
Accountants and auditors	227	15.7	1.6
Police and detectives, public service[1]	224	47.7	1.6
Registered nurses	193	11.5	1.4
Real estate sales occupations	186	27.0	1.3
Computer systems analysts and scientists	177	24.3	1.3
Other financial officers	167	25.0	1.2
Bus drivers	165	32.2	1.2
Bookkeepers, accounting, and auditing clerks	135	6.6	1.0
Carpenters	135	11.1	1.0
Insurance adjusters, examiners, and investigators[1]	131	36.9	.9
Automobile mechanics	131	15.7	.9
Production inspectors, checkers, and examiners	123	20.5	.9
Securities and financial services sales occupations[1]	121	40.2	.9
Supervisors, general office	117	24.6	.8
Industrial machinery repairers	117	20.9	.8
Machinists	116	21.2	.8
Computer programmers	113	18.6	.8

[1] This occupation also appears in table 27, which ranks occupations by the proportion of workers who used formal company training.

Table 27. Qualifying training: Twenty-five occupations with the largest proportions of workers who used formal company training, 1991

Occupation	Number who needed formal company training (thousands)	Percent of total employment in occupation	Percent of total who needed formal company training
Public transportation attendants	43	75.1	0.3
Structural metal workers	34	67.3	.2
Aircraft mechanics, except engine	25	54.1	.2
Tool and die makers	72	53.6	.5
Elevator installers and repairers	21	53.2	.2
Police and detectives, public service[1]	224	47.7	1.6
Locomotive operating occupations	23	46.3	.2
Supervisors, police and detectives	33	45.9	.2
Aircraft engine mechanics	54	44.0	.4
Insurance sales occupations[1]	255	43.2	1.8
Supervisors, guards	21	42.8	.2
Electrical power installers and repairers	58	41.7	.4
Securities and financial services sales occupations[1]	121	40.2	.9
Airplane pilots and navigators	47	40.0	.3
Sheriffs, bailiffs, and other law enforcement officers	53	39.7	.4
Inspectors and compliance officers, except construction	78	39.6	.6
Electricians[1]	272	38.9	1.9
Telephone installers and repairers	75	38.5	.5
Correctional institution officers	105	38.1	.8
Millwrights	31	37.7	.2
Insurance adjusters, examiners, and investigators[1]	131	36.9	.9
Firefighting occupations	68	35.7	.5
Underwriters	37	34.2	.3
Supervisors, mechanics and repairers	69	33.8	.5
Transportation ticket and reservation agents	41	33.2	.3

[1] This occupation also appears in table 26, which ranks occupations by the number of workers who used formal company training.

of total employment. Almost 5 percent of those who needed college program training were in technician and related support occupations, a group that accounted for about 3 percent of total employment.

About 60 percent of workers who needed college training to get their jobs were in 25 occupations (table 24). The largest number were managers and administrators not elsewhere classified, followed by elementary and then secondary school teachers. Each of these fields had more than 1 million workers who required 4 or more years of college.

In a few large occupations, the proportion of those who needed college training was very low. The 299,000 secretaries, for example, who reported they needed this level of training to get their jobs constituted only 8 percent of all secretaries. Some occupations with higher educational requirements were too small to make the list, such as natural science and health diagnosing occupations.

The 25 occupations with the highest proportions requiring training in 4-year college programs accounted for 24 percent of those who needed this training and 5 percent of total employment (table 25). All of the occupations appearing in table 25 were professional specialty occupations; 11 were in teaching fields. Five occupations appeared on both table 24 and table 25.

Formal company training

About 13.9 million people or 12 percent of all workers qualified for their jobs with skills they learned in formal company (employer) training programs. Workers who qualified for their jobs with formal company training were not as concentrated in particular occupational groups as those who used school (table 5).

The proportion of workers who reported company training exceeded the average in the following occupational groups: Precision production, craft, and repair, 19 percent; executive, administrative, and managerial, 17 percent; technician and related support, 17 percent; and sales, 13 percent.

Federal Government workers were the only class of workers that had significantly higher than average proportions qualifying themselves through formal company training programs (table 7). The 9 percent of self-employed workers who qualified for their current jobs through formal company training programs probably either paid for it themselves or took the training while at a previous job. For instance, many accountants get training while at a large firm and then decide to start their own business.

About 23 percent of the workers in the finance, insurance, and real estate industry show formal company training programs as a source of qualifying training, making these types of businesses the most frequent users of formal company training to qualify employees (table 8).

About 40 percent of all workers who obtained their jobs through formal company training programs were in 25 detailed occupations (table 26). Almost one-half of the public service police and detectives qualified for their jobs through this mode of training, as did about two-fifths of the workers in each of the following occupations: Electricians, insurance sales, and securities and financial services sales.

The 25 occupations with the highest proportions of people who used formal company training to qualify themselves for their current jobs accounted for 14 percent of those who needed this training and 2 percent of total employment (table 27). This suggests that a large variety of occupations use this training. Ten of the occupations appearing in table 27 were in precision production, craft, and repair; 7 were in protective service. Five occupations appeared on both table 26 and table 27.

Unlike school programs, formal company programs tended to be short in duration (table 28). Almost one-half of the programs took under 12 weeks, although more than one-fourth did last longer than 25 weeks. Forty-four percent of the formal company training taken by workers in farming, forestry, and fishing occupations lasted more than 25 weeks. Apprenticeship programs, which may require 3 or 4 years of combined training and experience, are concentrated in the precision production, craft, and repair group. Fifteen percent of the workers in precision production, craft, and repair occupations who used training to obtain their jobs did so in formal company programs lasting more than 25 weeks. Formal company training was also lengthy for professional specialty and technician and related support occupations. Roughly 30 percent of the training programs each of these two groups participated in lasted longer than 25 weeks (table 28).

About 620,000 workers, or more than 4.4 percent of all those who qualified for their jobs through formal company training, did so in government programs such as JTPA. About 21 percent of the workers who got jobs through government-sponsored programs were in precision production, craft, and repair occupations; 18 percent worked in administrative support occupations; 16 percent were employed in service occupations; and the remainder were distributed among the other occupational groups (table 29).

Informal on-the-job training

More than 31 million people or 27 percent of all workers said they gained the skills they needed to get their jobs by learning informally through previous employment. This makes informal on-the-job training the second most popular source of qualifying training (table 5). The proportion of workers who qualified for their jobs through OJT was higher than average in the following occupational groups: Executive, administrative, and managerial, 37 percent; precision production, craft, and repair, 36 percent; technician and related support, 31 percent; and administrative support, 30 percent.

Workers reported OJT more frequently than school in 8 of the 12 major occupational groups and more frequently than formal company training in all occupational groups (table 5). Occupations in which few workers used OJT to get jobs also were a very mixed group. The occupations with less than 10 percent of workers reporting this method

Table 28. Qualifying training: Workers who used training from formal company programs by length of program and occupational group, 1991

Occupational group	Total, all formal company programs	Length of program			
		1 week or less	2-12 weeks	13-25 weeks	More than 25 weeks
Total, all occupations					
Number (in thousands)	13,948	2,206	4,521	1,254	3,697
Percent distribution	100	16	33	9	26
Executive, administrative, and managerial					
Number (in thousands)	2,445	346	814	199	625
Percent distribution	100	15	33	8	25
Professional specialty					
Number (in thousands)	1,757	268	427	171	519
Percent distribution	100	15	26	9	29
Technicians and related support					
Number (in thousands)	655	66	196	66	207
Percent distribution	100	12	29	10	31
Sales occupations					
Number (in thousands)	1,799	407	616	169	346
Percent distribution	100	22	33	9	20
Administrative support					
Number (in thousands)	1,878	373	787	176	278
Percent distribution	100	20	41	9	15
Private household occupations					
Number (in thousands)	4	–	4	–	–
Percent distribution	100	–	100	–	–
Service workers, except private household					
Number (in thousands)	1,422	241	567	159	239
Percent distribution	100	15	41	12	16
Farming, forestry, and fishing					
Number (in thousands)	79	12	23	6	35
Percent distribution	100	11	31	6	44
Precision production, craft, and repair					
Number (in thousands)	2,579	256	551	199	1,183
Percent distribution	100	10	22	8	45
Machine operators, assemblers, and inspectors					
Number (in thousands)	698	101	257	79	169
Percent distribution	100	14	40	11	21
Transportation and material moving					
Number (in thousands)	494	106	236	21	66
Percent distribution	100	23	44	5	16
Handlers, equipment cleaners, and laborers					
Number (in thousands)	138	30	42	8	31
Percent distribution	100	27	32	3	22

– Data not available
NOTE: Because some workers did not indicate the length of training programs, individual items may not add to totals.

Table 29. Qualifying training: Workers who received government-sponsored training in formal company programs by occupational group, 1991

Occupational group	Government-sponsored training	
	Workers (thousands)	Percent distribution
Total, all occupations	620	100.0
Executive, administrative, and managerial	85	13.6
Professional specialty	63	10.2
Technicians and related support	29	4.7
Sales occupations	25	4.0
Administrative support	112	18.0
Private household occupations	0	.0
Service workers, except private household	99	16.0
Farming, forestry, and fishing	9	1.5
Precision production, craft, and repair	130	21.0
Machine operators, assemblers, and inspectors	37	6.0
Transportation and material moving	24	3.8
Handlers, equipment cleaners, and laborers	7	1.2

included, for example, dentists, elementary school teachers, hairdressers and cosmetologists, and taxi cab drivers and chauffeurs. This shows that school is sometimes about the only training required, while other occupations require little, if any, formal training. (See appendix table A-1.)

The occupational distribution of workers who used OJT to qualify for their jobs resembled the distribution of total employment more than that of any other type of worker training (table 6).

About one-third of Federal Government workers qualified themselves for their current jobs through OJT (table 7). Only local government workers, with 22 percent qualifying themselves through OJT, fell below the 27-percent average for all classes of workers.

Although one-third or more workers reported using OJT as qualifying training for jobs in mining, construction, finance, insurance, real estate, and public administration, the greatest proportion was in mining industries, with 38 percent (table 8). Only personal service industries fell below 20 percent of workers using OJT as qualifying training.

Almost 42 percent of all workers who qualified for their jobs through OJT were in 25 detailed occupations (table 30). The listed occupations accounted for 35 percent of total employment. The first three on this list are also the three occupations with the most workers; moreover, 16 of the occupations listed are among the top 25 in the total number of workers.

The 25 occupations with the highest proportions who used OJT to qualify themselves for their current jobs accounted for 4 percent of those who used this training and 2 percent of total employment (table 31). The data indicate that workers in a large variety of occupations learn on the

Table 30. Qualifying training: Twenty-five occupations with the largest numbers of workers who used informal on-the-job training, 1991

Occupation	Number with informal on-the-job training (thousands)	Percent of total employment in occupation	Percent of total with informal on-the-job training
Managers and administrators, n.e.c.	2,882	37.8	9.2
Secretaries	1,149	31.7	3.7
Supervisors and proprietors, sales occupations	1,107	29.7	3.5
Bookkeepers, accounting, and auditing clerks	681	33.4	2.2
Sales representatives, mining, manufacturing, and wholesale	540	33.8	1.7
Carpenters	507	41.7	1.6
Accountants and auditors	492	33.9	1.6
Nursing aides, orderlies, and attendants	490	34.0	1.6
Supervisors, production occupations	438	35.3	1.4
Cashiers	415	17.1	1.3
Registered nurses	396	23.7	1.3
Truckdrivers, heavy	358	22.6	1.1
Computer systems analysts and scientists[1]	340	46.7	1.1
Cooks, except short order	325	18.8	1.0
Administrative support occupations, n.e.c.	306	31.7	1.0
Electricians	281	40.1	.9
Computer operators	274	38.1	.9
Automobile mechanics	272	32.7	.9
Computer programmers	268	43.8	.9
Miscellaneous machine operators, n.e.c.	268	26.5	.9
Waiters and waitresses	255	21.3	.8
Receptionists	249	29.7	.8
Other financial officers	238	35.6	.8
Insurance sales occupations	233	39.6	.7
Managers, marketing, advertising, and public relations	231	43.6	.7

[1] This occupation also appears in table 31, which ranks occupations by the proportion of workers who used informal on-the-job training.

Table 31. Qualifying training: Twenty-five occupations with the largest proportions of workers who used informal on-the-job training, 1991

Occupation	Number with informal on-the-job training (thousands)	Percent of total employment in occupation	Percent of total with informal on-the-job training
Administrators, protective services	34	73.4	0.1
Surveyors and mapping scientists	25	69.1	.1
Miscellaneous printing machine operators	23	61.4	.1
Camera, watch, and musical instrument repairers	20	60.9	.1
Supervisors, related agricultural occupations	28	55.6	.1
Construction inspectors	28	53.7	.1
Data processing equipment repairers	89	53.3	.3
Industrial engineers	91	52.9	.3
Statistical clerks	32	52.8	.1
Personnel and labor relations managers	61	52.5	.2
Actors and directors	45	52.1	.1
Supervisors, electricians and power transmission installers	20	51.9	.1
Photoengravers and lithographers	24	50.8	.1
Artists, performers, and related workers, n.e.c.	31	49.8	.1
Announcers	26	49.8	.1
Athletes	34	49.0	.1
Crane and tower operators	35	48.9	.1
Photographers	68	48.5	.2
Drywall installers	50	48.5	.2
Water and sewage treatment plant operators	37	48.0	.1
Aerospace engineers	49	47.8	.2
Computer systems analysts and scientists[1]	340	46.7	1.1
Carpet installers	48	46.7	.2
Locomotive operating occupations	22	45.6	.1
Upholsterers	26	45.4	.1

[1] This occupation also appears in table 30, which ranks occupations by the number of workers who used informal on-the-job training.

Table 32. Qualifying training: Twenty-five occupations with the largest numbers of workers who used training in the Armed Forces, 1991

Occupation	Number with Armed Forces training (thousands)	Percent of total employment in occupation	Percent of total with Armed Forces training
Managers and administrators, n.e.c.	205	2.7	8.4
Electricians[1]	88	12.5	3.6
Police and detectives, public service[1]	74	15.8	3.0
Supervisors and proprietors, sales occupations	65	1.8	2.7
Electrical and electronic technicians[1]	60	16.2	2.4
Aircraft engine mechanics[1]	51	41.7	2.1
Electrical and electronic engineers[1]	50	9.4	2.1
Supervisors, production occupations	47	3.8	1.9
Administrators and officials, public administration	46	8.8	1.9
Truckdrivers, heavy	40	2.5	1.6
Airplane pilots and navigators[1]	39	33.6	1.6
Automobile mechanics	39	4.6	1.6
Electronic repairers, commercial and industrial equipment[1]	38	19.3	1.6
Guards and police, except public service	36	4.8	1.5
Industrial machinery repairers	36	6.5	1.5
Machinists	34	6.2	1.4
Secretaries	30	.8	1.2
Registered nurses	29	1.7	1.2
Accountants and auditors	26	1.8	1.1
Telephone installers and repairers[1]	24	12.5	1.0
Computer systems analysts and scientists	23	3.2	1.0
Supervisors, mechanics and repairers[1]	22	10.8	.9
Bus, truck, and stationary engine mechanics	22	7.3	.9
Data processing equipment repairers[1]	22	13.5	.9
Janitors and cleaners	21	.9	.9

[1] This occupation also appears in table 33, which ranks occupations by the proportion of workers who used training in the Armed Forces.

Table 33. Qualifying training: Twenty-five occupations with the largest proportions of workers who used training in the Armed Forces, 1991

Occupation	Number with Armed Forces training (thousands)	Percent of total employment in occupation	Percent of total with Armed Forces training
Aircraft engine mechanics[1]	51	41.7	2.1
Supervisors, guards	17	34.3	.7
Airplane pilots and navigators[1]	39	33.6	1.6
Miscellaneous electrical and electronic equipment repairers	15	33.5	.6
Air traffic controllers	14	27.8	.6
Administrators, protective services	10	21.9	.4
Electronic repairers, commercial and industrial equipment[1]	38	19.3	1.6
Supervisors, electricians and power transmission installers	7	18.3	.3
Stationary engineers	19	16.6	.8
Electrical and electronic technicians[1]	60	16.2	2.4
Police and detectives, public service[1]	74	15.8	3.0
Supervisors, police and detectives	10	14.1	.4
Data processing equipment repairers[1]	22	13.5	.9
Camera, watch, and musical instrument repairers	5	13.5	.2
Aircraft mechanics, except engine	6	13.2	.3
Telephone installers and repairers[1]	24	12.5	1.0
Electricians[1]	88	12.5	3.6
Small engine repairers	7	11.5	.3
Construction inspectors	6	11.1	.2
Supervisors, mechanics and repairers[1]	22	10.8	.9
Technical writers	8	10.7	.3
Sheriffs, bailiffs, and other law enforcement officers	14	10.4	.6
Electrician apprentices	2	9.8	.1
Supervisors, related agricultural occupations	5	9.7	.2
Electrical and electronic engineers[1]	50	9.4	2.1

[1] This occupation also appears in table which ranks occupations by the number of workers who used training in the Armed Forces

Table 34. Qualifying training: Twenty-five occupations with the largest numbers of workers who used training from correspondence courses, 1991

Occupation	Number with training from correspondence courses (thousands)	Percent of total employment in occupation	Percent of total with training from correspondence courses
Managers and administrators, n.e.c.	132	1.7	10.6
Supervisors and proprietors, sales occupations	60	1.6	4.8
Secretaries	46	1.3	3.7
Supervisors, production occupations	34	2.7	2.7
Insurance sales occupations[1]	33	5.7	2.7
Accountants and auditors	30	2.0	2.4
Electrical and electronic engineers[1]	30	5.6	2.4
Electronic repairers, commercial, and industrial equipment[1]	28	14.4	2.3
Industrial machinery repairers[1]	27	4.9	2.2
Electricians	25	3.6	2.0
Other financial officers	24	3.5	1.9
Electrical and electronic technicians[1]	20	5.4	1.6
Bookkeepers, accounting, and auditing clerks	20	1.0	1.7
Supervisors, mechanics and repairers[1]	20	9.8	1.6
Teachers, secondary school	18	1.2	1.4
Securities and financial services sales occupations[1]	18	6.0	1.5
Real estate sales occupations	15	2.2	1.2
Sales representatives, mining, manufacturing, and wholesale	14	.9	1.1
Nursing aides, orderlies, and attendants	14	1.0	1.2
Teachers, n.e.c.	13	2.4	1.1
Automobile mechanics	13	1.5	1.0
Aircraft engine mechanics[1]	13	10.3	1.0
Financial managers	12	2.4	1.0
Sales workers, other commodities	11	.8	.9
Specified mechanics and repairers, n.e.c.	11	2.7	.9

[1] This occupation also appears in table 35, which ranks occupations by the proportion of workers who used training from correspondence courses.

Table 35. Qualifying training: Twenty-five occupations with the largest proportions of workers who used training from correspondence courses, 1991

Occupation	Number with training from correspondence courses (thousands)	Percent of total employment in occupation	Percent of total with training from correspondence courses
Administrators, protective services	8	17.2	0.6
Supervisors, computer equipment operators	4	17.0	.3
Electronic repairers, commercial and industrial equipment[1]	28	14.4	2.3
Postmasters and mail superintendents	3	10.9	.3
Aircraft engine mechanics[1]	13	10.3	1.0
Supervisors, mechanics and repairers[1]	20	9.8	1.6
Underwriters	10	9.0	.8
Aircraft mechanics, except engine	4	8.7	.3
Elevator installers and repairers	3	8.6	.3
Farm equipment mechanics	3	8.0	.3
Construction inspectors	4	7.9	.3
Precious stones and metals workers (jewelers)	3	6.7	.3
Broadcast equipment operators	2	6.4	.2
Supervisors, guards	3	6.4	.3
Mathematical science teachers	3	6.2	.3
Photographers	9	6.1	.7
Supervisors, financial records processing	6	6.1	.5
Securities and financial services sales occupations[1]	18	6.0	1.5
Insurance sales occupations[1]	33	5.7	2.7
Electrical and electronic engineers[1]	30	5.6	2.4
Industrial engineers	9	5.4	.7
Electrical and electronic technicians[1]	20	5.4	1.6
Inhalation therapists	4	4.9	.3
Data processing equipment repairers[1]	9	5.4	.7
Industrial machinery repairers	27	4.9	2.2

[1] This occupation also appears in table 34 which ranks occupations by the number of workers who used training from correspondence courses

Table 36. Qualifying training: Twenty-five occupations with the largest numbers of workers who used training from friends or relatives or other experience unrelated to work, 1991

Occupation	Number with training from friends or relatives or other nonwork experience (thousands)	Percent of total employment in occupation	Percent of total with training from friends or relatives or other nonwork experience
Managers and administrators, n.e.c.	752	9.9	8.9
Supervisors and proprietors, sales occupations	304	8.2	3.6
Truckdrivers, heavy	222	14.0	2.6
Secretaries	221	6.1	2 6
Farmers, except horticultural	187	17.0	2.2
Carpenters	187	15 4	2.2
Real estate sales occupations[1]	175	25.5	2.1
Hairdressers and cosmetologists[1]	170	25.1	2.0
Automobile mechanics	164	19.7	1.9
Sales representatives, mining, manufacturing, and wholesale	114	7.1	1.3
Cooks, except short order	107	6.2	1.3
Teachers, n.e.c.	102	19.0	1.2
Janitors and cleaners	101	4.6	1.2
Textile sewing machine operators	100	15.4	1.2
Supervisors, n.e.c.	99	17.7	1.2
Nursing aides, orderlies, and attendants	93	6.4	1.1
Bookkeepers, accounting, and auditing clerks	92	4.5	1.1
Child care workers, except private household	90	8.5	1.1
Teachers, secondary school	87	5.9	1.0
Plumbers, pipefitters, and steamfitters	77	17.4	.9
Registered nurses	73	4.4	.9
Accountants and auditors	70	4.9	.8
Computer systems analysts and scientists	70	9.6	.8
Musicians and composers[1]	67	49.4	.8
Computer programmers	67	11.0	.8

[1] This occupation also appears in table 37, which ranks occupations by the proportion of workers who used training from friends or relatives or other experience unrelated to work.

Table 37. Qualifying training: Twenty-five occupations with the largest proportions of workers who used training from friends or relatives or other experience unrelated to work, 1991

Occupation	Number with training from friends or relatives or other nonwork experience (thousands)	Percent of total employment in occupation	Percent of total with training from friends or relatives or other nonwork experience
Patternmakers, layout workers, and cutters	12	58.6	0.1
Musicians and composers[1]	67	49.4	.8
Metallurgical and materials engineers	10	44.9	.1
Camera, watch, and musical instrument repairers	13	38.9	.2
Barbers	43	38.7	.5
Computer science teachers	10	36.0	.1
Small engine repairers	20	30.5	.2
Boilermakers	5	29.6	.1
Tile setters, hard and soft	13	28.9	.2
Marine engineers and naval architects	5	26.1	.1
Dressmakers	28	26.1	.3
Miscellaneous hand working occupations	20	26.1	.2
Real estate sales occupations[1]	175	25.5	2.1
Precious stones and metals workers (jewelers)	13	25.3	.1
Health diagnosing practitioners, n.e.c.	10	25.2	.1
Elevator installers and repairers	10	25.2	.1
Hairdressers and cosmetologists[1]	170	25.1	2.0
Concrete and terrazzo finishers	14	25.1	.2
Photographers	35	24.7	.4
Construction inspectors	13	24.0	.1
Actors and directors	21	24.0	.2
Protective service occupations, n.e.c.	10	23.7	.1
Athletes	16	23.5	.2
Animal caretakers, except farm	30	23.5	.4
Grader, dozer, and scraper operators	17	23.5	.2

[1] This occupation also appears in table 36, which ranks occupations by the number of workers who used training from friends or relatives or other experience unrelated to work.

job. OJT was the most important source of training for such diverse occupations as construction inspectors, surveyors and mapping scientists, announcers, data processing equipment repairers, and photoengravers and lithographers. Over 50 percent of the workers in these occupations gained their qualifying skills through OJT. Nine of the occupations listed in table 31 are professional specialty occupations; 7 are in precision production, craft, and repair. Only computer systems analysts and scientists appeared on both tables 30 and 31, showing that OJT is a highly significant source of qualifying training for workers in this occupation.

Training in the Armed Forces

About 2.4 million people, or 2 percent of all workers, received training in military service that gave them the skills they needed to get their jobs (table 5). More than one-fourth of the workers who used this training were in the precision production, craft, and repair group (table 6), but these workers represented only 5 percent of total employment in the occupational group.

Table 7 shows that Federal Government workers qualified themselves with Armed Forces training five times more frequently than the national average. Workers in public administration trained in the Armed Forces in both greater numbers (471,000) and proportions (8 percent) than any other industrial group (table 8). Skills learned in Armed Forces training often transfer quite readily to public administration jobs, especially those relating to defense or aviation.

Twenty-five detailed occupations accounted for almost 46 percent of all workers who used Armed Forces training to obtain their jobs (table 32). Two of the top 3 occupations are large managerial and supervisory categories that had small proportions of workers reporting training in the military services.

The 25 occupations with the highest proportions of people who qualified for current jobs based on Armed Forces training accounted for 25 percent of those who needed this training and 3 percent of total employment (table 33). Training in the Armed Forces was especially important for aircraft engine mechanics and airplane pilots and navigators. More than one-third of each (40 percent for aircraft engine mechanics) learned their skills in the service. The Armed Forces also was a significant source of training for many electrical and electronics-related occupations. Thirteen of the occupations appearing in table 33 are in precision production, craft, and repair; 9 out of these 12 are mechanic and repair occupations. Ten occupations appeared in both table 32 and table 33, indicating that Armed Forces training is a highly significant source of qualifying training for a variety of occupations.

Correspondence schools

Correspondence courses were the least significant method of job training. About 1.2 million people obtained their jobs with skills learned through correspondence training, which includes little more than 1 percent of all workers (table 5).

More than one-half of the people who used correspondence training to secure their jobs were in the top 25 occupations (table 34). More than one-third were in the top 10 occupations. Some of these occupations ranked high because of their large size; they did not have a large proportion of workers reporting the training. In addition, the largest occupation, managers and administrators not elsewhere classified, had the largest number of workers reporting correspondence courses, but they represented only 1.7 percent of employment in the occupation. Correspondence school training, however, was a source of training for more than 14 percent of the electronic repairers of commercial and industrial equipment.

The 25 occupations with the highest proportions of those who studied through correspondence courses to qualify themselves for their current jobs accounted for 22 percent of those who needed this training and 4 percent of total employment (table 35). Nine of the occupations appearing in table 35 are in precision production, craft, and repair; 8 out of these 9 are mechanic and repair occupations. Five occupations in table 35 belong to either managerial or professional specialty occupations. Eight occupations appeared in both table 34 and table 35.

Other training

About 8.5 million people, or 7 percent of all workers, developed necessary skills through informal training from a friend or relative or through other experience unrelated to work (table 5). Twelve percent of the people in farming, forestry, and fishing occupations reported this category of training as did 12 percent of the precision production, craft, and repair workers; 10 percent of transportation and material moving workers; 9 percent of executive, administrative, and managerial personnel; 8 percent of those in professional specialty occupations; and 8 percent of technicians and related support people.

The proportion of workers qualifying for their jobs through other sources of training more than doubled in many occupational groups since 1983.

Occupational group	*Percent of all workers*	
	1983	1991
Total, all workers	3	7
Executive, administrative, and managerial	3	9
Professional specialty	3	8
Technician and related support	2	8
Sales occupations	3	7
Administrative support	1	4
Private household occupations	5	4
Service workers, except private household	2	7
Farming, forestry, and fishing	11	12
Precision production, craft, and repair	8	12
Machine operators, assemblers, and inspectors	3	5
Transportation and material moving	5	10
Handlers, equipment cleaners, and laborers	1	4

The self-employed had the highest percentage of workers who reported qualifying themselves through other

training sources, at 16 percent (table 7). Self-employed workers often must have attended seminars and conventions, read professional literature, raised their skill level through practice, or undertaken other activities to obtain the skills necessary to become self-employed.

About 17 percent of the workers in entertainment and recreation service businesses reported that they used other sources of training to qualify for their current positions. Employees in those industries had the highest percentage using these training sources (table 8). Other industries with 10 percent or more of their workers qualifying through other sources were: Construction, 14 percent; agriculture, forestry, and fisheries, 12 percent; personal services, 11 percent; and business and repair services, 10 percent.

Twenty-five detailed occupations accounted for about 45 percent of all workers who gained qualifying job skills in training unrelated to work (table 36). About 20 percent of these employees were in the top five occupations. A high proportion of workers in some large occupations—such as truckdrivers, farmers, carpenters, real estate sales persons, hairdressers and cosmetologists, and automobile mechanics—learned their skills from relatives and friends and through other methods unrelated to work. The proportion of workers with this kind of training was low, however, for 3 out of the top 4 occupations listed in table 36.

The 25 occupations with the highest proportions of workers who used other sources of training to qualify for their current jobs accounted for 9 percent of those who needed this training and 2 percent of total employment (table 37). Nine of the occupations appearing in table 37 are in precision production, craft, and repair. Eight occupations involve professional specialties. Because many occupations use this source to some degree, large occupations appearing on table 36 are absent from table 37, which lists many small, specialized occupations with unique training requirements; 3 occupations are on both tables 36 and 37.

Chapter 2. Skill Improvement Training

Acquiring skills to qualify for jobs is one essential purpose of training; the other fundamental objective is to improve the job skills of currently employed persons. In January 1991, 46.8 million persons (41 percent of the workforce) reported that they obtained skill improvement training on their current jobs (table 38).

The most significant changes in survey results from 1983 to 1991 occurred in skill improvement training. This type of training increased in all demographic groups except workers aged 16-19 (table 38).

The percent distribution of skill improvement training across age groups resembled the distribution of employment by age. However, 31 percent of training to improve skills was taken by workers aged 35 to 44, 5 percentage points higher than their share of total employment. Employees under 25 or over 44 accounted for a percentage of all training smaller than their percentage of employment. Middle aged workers exhibited larger increases than the youngest and oldest. About 60 percent of skill improvement training was taken by workers aged 25 to 44.

Men and women took training in equal proportions to enhance their job skills. Although all racial groups and Hispanics increased the proportion taking skill improvement training since 1983, the difference that existed among the groups has not changed significantly.

Skill improvement training relates closely to educational attainment. Persons with college degrees obtained a disproportionately high share of skill improvement training, accounting for 37 percent of the training but only 25 percent of employment. Individuals with a high school education or less received only 38 percent of skill training although they accounted for 53 percent of total employment. This relationship exists probably because workers with higher job qualifications often need further training for continued job success due to new technology, techniques, or other factors. Jobs with few formal qualifications often require little skill improvement training to improve required skills. Workers at all levels of educational attainment have increased their skill improvement training proportionally since 1983. The amount of increase, however, was greater as educational attainment increased. While the proportion of college graduates increased skill improvement training by 7 percentage points, workers with a high school education increased by only 3 percentage points.

Skill improvement training was most common among professional specialty occupations; 67 percent of employees in these occupations obtained such training (table 38). Workers in this group, such as physicians, engineers, and other technical specialists, must update their skills and knowledge or face obsolescence. Large proportions of workers in technician and related support occupations and executive, administrative, and managerial occupations (59 percent and 53 percent, respectively) also bettered their skills through training. The shares of workers acquiring training in all other occupational groups did not exceed the 41-percent average for all employees. Private household workers reported the smallest proportion (6 percent). Even though all occupational groups registered an increase in the percent improving skills since 1983, the general pattern of increase skews to the managerial, professional, technician, and administrative support occupations. The transportation and material moving occupational group goes against this trend. It showed a gain of 7 percentage points, exceeding the average gain for all employees.

Workers who took skill improvement training are also grouped by the class of worker in table 38. Government workers, having the highest proportions who reported needing qualifying training, also had the highest percentage indicating that they had taken skill improvement training since they obtained their current jobs. This percentage was similar for Federal, State, and local government workers. Although they accounted for only 16 percent of all workers, those employed in the three sectors of government took 24 percent of skill improvement training. Private industry workers, on the other hand, made up almost three-quarters of the survey respondents, but they composed only about two-thirds of the total who took training. At 34 percent, self-employed workers had the lowest proportion taking skill improvement training. Since 1983, all worker classes increased the proportions of people who improved their skills. State government workers had the largest increase in proportions taking skill improvement training, while Federal Government employees had the smallest increase.

Table 38 also groups workers who took skill improvement training by the industry in which they work. At least 23 percent of the workers in each major industrial group have taken some form of skill improvement training since obtaining their current jobs. Public administration workers

Table 38. Workers who took skill improvement training while in their current jobs, by selected characteristics, 1983 and 1991

Selected characteristic	Number needing training (thousands)		Percent of total employment in group	
	1983	1991	1983	1991
Age 16 and over	33,901	46,814	35	41
Age group:				
Age 16-19	1,039	972	18	18
Age 20-24	3,703	3,707	28	31
Age 25-34	10,879	13,438	39	41
Age 35-44	8,573	14,660	41	46
Age 45-54	5,713	9,015	37	46
Age 55-64	3,471	4,239	31	37
Age 65 and over	523	784	19	25
Sex:				
Male	19,238	25,120	35	40
Female	14,663	21,694	34	41
Race and ethnicity:				
White	30,581	41,461	36	42
Black	2,528	4,019	28	34
All other races	792	1,333	32	38
Hispanic	1,081	2,380	23	28
Highest grade completed:				
High school or less	14,635	17,936	26	29
Some college	7,698	11,670	41	46
College graduate	11,568	17,208	54	61
Occupational Group:				
Executive, administrative, and managerial	5,098	7,853	47	53
Professional specialty	7,802	10,847	61	67
Technicians and related support	1,588	2,365	52	59
Sales occupations	3,578	4,809	32	35
Administrative support	5,152	7,342	32	40
Private household occupations	33	39	3	6
Service, except private household	3,151	4,339	25	29
Farming, forestry, and fishing	500	602	16	21
Precision production, craft, and repair	4,133	4,949	35	38
Machine operators, assemblers, and inspectors	1,639	1,913	22	25
Transportation and material moving occupations	706	1,112	18	25
Handlers, equipment cleaners, and laborers	520	643	14	15
Class of worker:				
Private industry	22,157	31,146	32	37
Federal Government	1,725	2,065	56	60
State government	1,857	2,793	49	58
Local government	4,808	6,400	55	62
Self-employed	3,282	4,355	29	34
Industrial group:				
Agriculture, forestry, and fisheries	591	697	19	23
Mining	326	336	35	45
Construction	1,283	1,715	24	26
Manufacturing, durable goods	3,797	4,967	34	40
Manufacturing, nondurable goods	2,270	3,040	28	35
Transportation, communications, and public utilities	2,638	3,741	38	46
Wholesale trade	1,282	1,470	30	34
Retail trade	3,569	4,578	22	24
Finance, insurance, and real estate	2,989	4,336	47	54
Business and repair services	1,340	2,471	29	34
Personal services	709	1,052	19	23
Entertainment and recreational services	223	426	24	32
Professional and related services	10,219	14,139	49	55
Public administration	2,665	3,845	58	68

showed the highest proportion taking such training, 68 percent. Above average proportions of workers taking training occurred in professional and related services, 55 percent; finance, insurance, and real estate, 54 percent; transportation, communications, and other public utilities, 46 percent; and mining, 45 percent. Industries with less than 30 percent of the workers having taken skill improvement training were construction; agriculture, forestry, and fishing; retail trade; and personal services.

Workers in professional specialties also accounted for the largest proportion (24 percent) of all workers who trained to better their job skills (table 39). This result is attributable both to the large number of employees in this group and the much higher than average proportion of employees who obtained this training. Executive, administrative, and managerial occupations and administrative support occupations had the next highest proportions (17 percent and 16 percent, respectively) of the total taking skill improvement training. These three occupational groups accounted for over one-half of all workers who reported skill improvement training.

Table 40 presents the 50 occupations having the largest number of employees who took training to improve skills. These 50 occupations accounted for 57 percent of all workers with such training and 51 percent of employment. The distribution of the top 50 occupations among the major occupational groups generally follows the distribution of employment. Some occupations appear in table 40 mainly

Table 39. Percent distribution of skill improvement training by major occupational groups, 1983 and 1991

Occupational group	1983	1991
Total, all occupations	100	100
Executive, administrative, and managerial	15	17
Professional specialty	23	24
Technicians and related support	5	5
Sales occupations	11	10
Administrative support	15	16
Service, except private household	9	9
Farming, forestry, and fishing	1	1
Precision production, craft, and repair	12	10
Machine operators, assemblers, and inspectors	5	4
Transportation and material moving occupations	2	2
Handlers, equipment cleaners, and laborers	2	1

because of their size. For example, only 18 percent of cashiers—compared with an average of 41 percent— ok training. Because it is a large occupation, however, it appears near the top of the list when ranked by number.

Table 41 provides another perspective on skill training, presenting the 50 occupations having the largest proportions of all workers who took skill improvement training. These 50 occupations account for 20 percent of those who took skill improvement training and 8 percent of total employment. Professional specialty occupations and executive, administrative, and managerial occupations account for 31 of the 50 occupations listed in table 41, a share far greater than the two groups' percent of total employment. Ten occupations appear on both table 40 and table 41.

Sources of Skill Improvement Training

Beyond being asked whether they took training to improve skills used on their current jobs, individuals were requested to identify the source of training as either school, formal company, informal on-the-job (OJT), or other. The definitions of school, formal company, and informal on-

Table 40. Skill improvement training: Fifty occupations with the largest numbers of workers who took training, 1991

Occupation	Number who took training (thousands)	Percent of total employment in occupation	Percent of total who took training
Managers and administrators, n.e.c.	3,643	47.8	7.8
Secretaries	1,597	44.1	3.4
Supervisors and proprietors, sales occupations	1,438	38.5	3.1
Teachers, elementary school[1]	1,302	79.9	2.8
Registered nurses[1]	1,222	73.1	2.6
Teachers, secondary school[1]	1,126	76.6	2.4
Accountants and auditors	803	55.5	1.7
Bookkeepers, accounting, and auditing clerks	709	34.8	1.5
Sales representatives, mining, manufacturing, and wholesale	662	41.4	1.4
Nursing aides, orderlies, and attendants	646	44.8	1.4
Supervisors, production occupations	617	49.8	1.3
Computer systems analysts and scientists	495	68.0	1.1
Real estate sales occupations[1]	485	70.5	1.0
Administrative support occupations, n.e.c.	454	47.0	1.0
Social workers	451	68.8	1.0
Cashiers	444	18.4	.9
Lawyers	439	66.9	.9
Other financial officers	433	64.9	.9
Physicians[1]	420	80.1	.9
Insurance sales occupations[1]	420	71.1	.9
Administrators, education and related fields[1]	395	70.3	.8
Police and detectives, public service[1]	391	83.3	.8
Computer programmers	379	61.9	.8
Electrical and electronic engineers[1]	378	70.5	.8
Administrators and officials, public administration[1]	371	70.2	.8
Automobile mechanics	367	44.0	.8
Computer operators	343	47.7	.7
Electricians	341	48.8	.7
Hairdressers and cosmetologists	337	49.6	.7
Managers, marketing, advertising, and public relations	331	62.6	.7
Financial managers	318	63.0	.7
Teachers, n.e.c.	315	58.4	.7
Teachers, prekindergarten and kindergarten	314	68.2	.7
Cooks, except short order	305	17.6	.7
Licensed practical nurses	303	66.2	.6
Truckdrivers, heavy	296	18.7	.6
Miscellaneous machine operators, n.e.c.	277	27.5	.6
Janitors and cleaners	276	12.4	.6
Sales workers, other commodities	274	19.6	.6
Child care workers, except private household	272	25.8	.6
Investigators and adjusters, except insurance	267	44.9	.6
Bank tellers	266	52.7	.6
Farmers, except horticultural	265	24.1	.6
Industrial machinery repairers	255	45.7	.5
General office clerks	255	36.9	.5
Assemblers	252	23.6	.5
Guards and police, except public service	243	32.9	.5
Sales occupations, other business services	242	47.3	.5
Clergy	239	67.7	.5
Electrical and electronic technicians	239	65.0	.5

[1] This occupation also appears in table 41, which ranks occupations by the proportion of workers who took training.

the-job training used to categorize skill improvement training are the same as those used to describe qualifying training. Other sources of training, however, now include correspondence schools in addition to attending conventions, professional seminars, professional journals, private lessons, hobbies, or experience gained from a friend or relative.

Formal company programs and informal on-the-job training were a source of skill improvement training for more workers than other methods. About 18 million employees improved their job skills in formal company programs, and 17.5 million improved skills through OJT (table 42). School was not far behind: 15 million people enhanced their skills through these programs. About 8 million bettered their job skills through friends or relatives or other experience unrelated to work.

Further analysis of the data from 1983 and 1991 shows that formal company training programs have surpassed informal on-the-job training as the most used form of skill improvement training. Formal company training programs also lasted longer on average than they did in 1983. Another significant change from 1983 to 1991 was that the use of other methods of skill improvement training doubled.

In both professional specialty occupations and those in farming, forestry, and fishing, school was identified most frequently as a source of skill improvement training.

Formal company training was the most often reported source by executives, administrators, and managers; technicians and related support workers; sales workers; and precision production, craft, and repair employees.

OJT was the most frequent source of training in the following categories: Administrative support; service, except private household; machine operators, assemblers, and inspectors; transportation and material moving; and handlers, equipment cleaners, and laborers.

Table 41. Skill improvement training: Fifty occupations with the largest proportions of workers who took training, 1991

Occupation	Number who took training (thousands)	Percent of total employment in occupation	Percent of total who took training
Veterinarians	57	97.0	0.1
Supervisors, firefighting and fire prevention occupations	53	96.0	1
Supervisors, police and detectives	69	95.4	1
Optometrists	27	93.5	1
Agricultural and food scientists	20	89.4	–
Actuaries	21	87.7	–
Administrators, protective services	39	84.8	1
Health diagnosing practitioners, n.e.c.	33	84.4	1
Police and detectives, public service[1]	391	83.3	8
Miscellaneous electrical and electronic equipment repairers	37	83.3	1
Airplane pilots and navigators	96	81.9	2
Occupational therapists	26	81.5	1
Dental hygienists	63	81.4	1
Therapists, n.e.c.	56	80.5	1
Health specialties teachers	39	80.2	1
Physicians[1]	420	80.1	9
Teachers, elementary school[1]	1,302	79.9	2.8
Statisticians	25	79.7	1
Telephone installers and repairers	154	79.2	3
Speech therapists	43	78.6	1
Forestry and conservation scientists	26	78.2	1
Physical therapists	76	77.8	2
Office machine repairers	61	77.1	1
Broadcast equipment operators	26	76.9	1
Dentists	111	76.8	2
Firefighting occupations	147	76.8	3
Teachers, secondary school[1]	1,126	76.6	2.4
Postmasters and mail superintendents	24	76.0	1
Water and sewage treatment plant operators	58	75.8	1
Physicians assistants	52	75.6	1
Construction inspectors	40	75.3	1
Pest control occupations	27	74.9	1
Data processing equipment repairers	124	74.3	3
Teachers, special education	206	74.1	4
Chief executives/general administrators public administration	23	73.6	1
Physicists and astronomers	25	73.4	1
Psychologists	163	73.3	3
Production testers	40	73.3	1
Registered nurses[1]	1,222	73.1	2.6
Personnel and labor relations managers	84	72.5	2
Managers, medicine and health	143	72.1	3
Insurance sales occupations[1]	420	71.1	9
Correctional institution officers	196	71.1	4
Sheriffs, bailiffs, and other law enforcement officers	94	71.0	2
Electrical and electronic engineers[1]	378	70.5	8
Real estate sales occupations[1]	485	70.5	1.0
Administrators, education and related fields[1]	395	70.3	8
Industrial engineers	120	70.3	3
Health record technologists and technicians	34	70.3	1
Administrators and officials, public administration[1]	371	70.2	8

[1] This occupation also appears in table 40, which ranks occupations by the number of workers who took training
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Although other sources were not the most common source of skill improvement training for any group, workers in executive, administrative, and managerial; professional specialty; and technician and related support occupations used other sources more frequently than average.

Professional specialty workers accounted for 38 percent of the people who reported taking skill improvement training in school programs (table 43). No occupational group dominated formal company training, but the following groups accounted for a proportion greater than their share of workers who took training: Executives, administrators, and managers; technicians and related support workers; sales workers; administrative support workers; and precision production, craft, and repair persons. Administrative support workers accounted for the largest percent of OJT for skill improvement, but professional specialty workers and executives, administrators, and managers followed close behind. Farming, forestry, and fishing occupations accounted for a proportion of other skill improvement training that was 3 times its share of total employment. Nearly a third of training in the other category was accounted for by the professional specialty workers.

Private industry workers improved skills through OJT and formal company training almost equally (table 44). Formal company training predominated for Federal Government workers. Those working in State government relied on formal company programs and school programs most commonly, using them in equal amounts. Local government employees enhanced skills in school programs most often. The self-employed used schools and other methods of skill improvement training the most.

Formal company training was the most used form of skill improvement training in 7 out of 14 major industrial groups (table 45). School-based training was the dominant method only in the professional and related services industry, whose workers accounted for 44 percent of all school-based training. OJT was the most frequently used source of skill improvement training in the following industries: Construction, nondurable goods manufacturing, retail trade, personal services, and entertainment and related services.

Because many workers selected more than one response, the total number of responses (58.5 million) was 25 percent higher than the total number of workers (46.8 million) who reported any kind of training to improve skills. Table 46 presents the ratio of total reports of training to numbers of individuals. Executives, administrators, and managers reported more than one type of training most frequently; conversely, private household workers were least likely to report more than one source of training.

Except for the "other" category, the proportion of people reporting only one type of skill improvement training was consistent over the types of training at 60 percent (table 47). Workers who took training through other methods were more likely to have used only one source of skill improvement training.

Three-quarters of all workers who improved their skills did so using only one training source. Table 48 presents the occupational distribution of people who only reported one source of skill improvement training across the training types. For example, if a manager had only one source of skill improvement training, it was most likely to be formal company training. If a professional specialty worker had only one source of skill improvement training, school training was reported more than twice as often as any other source. Often occupational groups were close enough in the distribution that one source did not predominate. For example, workers in farming, forestry, and fishing occupations who reported only one source of training had nearly identical numbers for school and other sources of training.

The preferences of workers and employers in deciding the need for and the source of skill improvement training have apparently changed since 1983, when this survey was previously undertaken. As shown below, the percent of workers who participated in formal company programs and in training from other sources each increased more than the percent taking training in school or through OJT.

Training Source	*Percent of total employment*	
	1983	1991
School	12	13
Formal company programs	11	16
Informal on-the-job training	14	15
Other sources	4	7

Skill improvement training sources by detailed occupation can be found in appendix table A-2.

School training

Fifteen million individuals, 13 percent of all workers, improved their skills by attending schools (table 49). A small percent used vocational training programs while in high school or after high school. A greater percent of workers improved their skills in junior colleges, technical institutes, and 4-year college programs.

Table 42 shows that the proportion of all workers improving their skills in school was less than the proportion using formal company training (16 percent) and OJT (15 percent), but significantly larger than for other types of skill improvement training (7 percent).

The proportion of workers who trained in school exceeded the 13-percent average in professional specialty occupations; technician and related support occupations; and executive, administrative, and managerial occupations (table 49). While these occupational groups accounted for only 30 percent of all workers, they covered about 60 percent of those who trained in school and 81 percent of those who took skill improvement training in 4-year or longer college programs.

Among the various classes of workers, those employed in government had the highest proportion of employees who took skill improvement training in schools. Among the three levels of government workers, however, there was

Table 42. Skill improvement training: Sources of training by occupational group, 1991

(Numbers in thousands)

Occupational group	Workers who took training	Source of training			
		School	Formal company program	Informal on-the-job training	Other
Total, all occupations	46,814	15,033	17,973	17,537	7,931
Percent of occupational employment	41	13	16	15	7
Executive, administrative, and managerial	7,853	1,644	3,634	2,623	1,711
Percent of occupational employment	53	18	25	18	12
Professional specialty	10,847	5,520	3,228	2,747	2,484
Percent of occupational employment	67	34	20	17	15
Technicians and related support	2,365	817	1,032	862	377
Percent of occupational employment	59	20	26	22	9
Sales occupations	4,809	966	2,187	2,029	815
Percent of occupational employment	35	7	16	15	6
Administrative support	7,342	2,243	2,961	2,995	723
Percent of occupational employment	40	12	16	16	4
Private household occupations	39	14	0	8	18
Percent of occupational employment	6	2	0	1	3
Service workers, except private household	4,339	1,003	1,418	1,950	705
Percent of occupational employment	29	7	9	13	5
Farming, forestry, and fishing	602	207	91	202	199
Percent of occupational employment	21	7	3	7	7
Precision production, craft, and repair	4,949	1,151	2,178	2,084	591
Percent of occupational employment	38	9	17	16	4
Machine operators, assemblers, and inspectors	1,913	300	585	1,140	123
Percent of occupational employment	25	4	8	15	2
Transportation and material moving	1,112	107	456	504	141
Percent of occupational employment	25	2	10	11	3
Handlers, equipment cleaners, and laborers	643	60	203	392	43
Percent of occupational employment	15	1	5	9	1

Table 43. Skill improvement training: Percent distribution of training by occupational group, 1991

Occupational group	Workers who took training	Source of training			
		School	Formal company program	Informal on-the-job training	Other
Total, all occupations					
Number (in thousands)	46,814	15,033	17,973	17,537	7,931
Percent of total reporting training source	100	100	100	100	100
Executive, administrative, and managerial					
Percent of total reporting training source	17	18	20	15	21
Professional specialty					
Percent of total reporting training source	24	38	19	16	31
Technicians and related support					
Percent of total reporting training source	5	5	6	5	5
Sales occupations					
Percent of total reporting training source	10	6	12	11	10
Administrative support					
Percent of total reporting training source	16	15	17	17	10
Private household occupations					
Percent of total reporting training source	–	–	–	–	–
Service workers, except private household					
Percent of total reporting training source	9	6	8	11	9
Farming, forestry, and fishing					
Percent of total reporting training source	1	2	–	1	3
Precision production, craft, and repair					
Percent of total reporting training source	10	7	12	11	7
Machine operators, assemblers, and inspectors					
Percent of total reporting training source	4	2	3	6	2
Transportation and material moving					
Percent of total reporting training source	2	1	2	3	2
Handlers, equipment cleaners, and laborers					
Percent of total reporting training source	1	–	1	2	–

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Table 44. Skill improvement training: Sources of training by class of worker, 1991

(Numbers in thousands)

Class of worker	Workers who took training	Source of training			
		School	Formal company training	Informal on-the-job training	Other
Total, all workers	46,814	15,033	17,973	17,537	7,931
Percent of employed in class	41	13	16	15	7
Private industry	31,146	8,358	12,921	13,004	4,534
Percent of employed in class	37	10	15	16	5
Federal Government	2,065	527	1,262	832	193
Percent of employed in class	60	15	37	24	6
State government	2,793	1,068	1,062	1,014	430
Percent of employed in class	58	22	22	21	9
Local government	6,400	3,415	1,912	1,584	1,057
Percent of employed in class	62	33	18	15	10
Self-employed	4,355	1,640	811	1,085	1,704
Percent of employed in class	34	13	6	9	13

Table 45. Skill improvement training: Sources of training by industry group, 1991

(Numbers in thousands)

Industry group	Workers who took training	Source of training			
		School	Formal company training	Informal on-the-job training	Other
Total, all industries	46,814	15,033	17,973	17,537	7,931
Percent of industry employment	41	13	16	15	7
Agriculture, forestry, and fisheries	697	255	102	215	251
Percent of industry employment	23	9	3	7	8
Mining	336	66	174	146	50
Percent of industry employment	45	9	23	19	7
Construction	1,715	469	460	730	329
Percent of industry employment	26	7	7	11	5
Manufacturing, durable goods	4,967	1,554	2,360	2,063	492
Percent of industry employment	40	13	19	17	4
Manufacturing, nondurable goods	3,040	723	1,269	1,508	335
Percent of industry employment	35	8	14	17	4
Transportation, communications, and other public utilities	3,741	788	2,046	1,505	408
Percent of industry employment	46	10	25	19	5
Wholesale trade	1,470	346	616	613	270
Percent of industry employment	34	8	14	14	6
Retail trade	4,578	781	1,652	2,248	565
Percent of industry employment	24	4	9	12	3
Finance, insurance, and real estate	4,336	1,227	2,185	1,532	727
Percent of industry employment	54	15	27	19	9
Business and repair services	2,471	602	975	972	470
Percent of industry employment	34	8	14	14	7
Personal services	1,052	272	211	372	335
Percent of industry employment	23	6	5	8	7
Entertainment and recreation services	426	119	106	190	101
Percent of industry employment	32	9	8	14	8
Professional and related services	14,139	6,675	3,733	4,037	3,048
Percent of industry employment	55	26	14	16	12
Public administration	3,845	1,154	2,084	1,405	549
Percent of industry employment	68	20	37	25	10

Table 46. Skill improvement training: Ratio of number of workers who took training to total of training sources identified by occupational group, 1991

Occupational group	Workers who took training (thousands)	Total of training sources identified (thousands)	Ratio
Total, all occupations	46,814	58,473	1.25
Executive, administrative, and managerial	7,853	10,612	1.35
Professional specialty	10,847	13,979	1.29
Technicians and related support	2,365	3,088	1.31
Sales occupations	4,809	5,998	1.25
Administrative support	7,342	8,922	1.22
Private household occupations	39	40	1.01
Service workers, except private household	4,339	5,077	1.17
Farming, forestry, and fishing	602	700	1.16
Precision production, craft, and repair	4,949	6,004	1.21
Machine operators, assemblers, and inspectors	1,913	2,149	1.12
Transportation and material moving	1,112	1,208	1.09
Handlers, equipment cleaners, and laborers	643	698	1.08

Table 47. Skill improvement training: Ratio of number of workers with only one source of training to total reporting this training, 1991

Source of training	Workers with only one source of training (thousands)	Total reporting this source of training (thousands)	Ratio
School	9,191	15,033	0.61
Formal company training	10,853	17,973	.60
Informal on-the-job training	10,203	17,537	.58
Other	5,210	7,931	.66

Table 48. Skill improvement training: Workers with only one source of skill improvement training by source of training and occupational group, 1991

Occupational group	Workers with only one source of training (thousands)			
	School	Formal company training	Informal on-the-job training	Other
Total, all occupations	9,191	10,853	10,203	5,210
Executive, administrative, and managerial	1,295	2,003	1,069	1,020
Professional specialty	3,665	1,657	1,082	1,602
Technicians and related support	481	585	396	252
Sales occupations	494	1,384	1,243	535
Administrative support	1,468	1,939	1,853	503
Private household occupations	11	–	4	18
Service workers, except private household	627	907	1,378	511
Farming, forestry, and fishing	153	57	132	152
Precision production, craft, and repair	709	1,400	1,350	386
Machine operators, assemblers, and inspectors	194	402	951	82
Transportation and material moving	58	365	420	111
Handlers, equipment cleaners, and laborers	34	155	327	38

– Data not available.

a significant spread. Local government workers were the highest at 33 percent and Federal Government employees, the lowest at 15 percent (table 44).

Over one-quarter of the workers in professional and related service industries took skill improvement training in schools, making it the industry with the highest proportion. Workers in public administration and finance, insurance, and real estate also had higher than average proportions training to improve skills. At 4 percent, workers in retail trade had the lowest proportion taking skill improvement training in schools (table 45).

Table 50 presents the 25 occupations having the largest numbers taking skill improvement training in schools. The training was concentrated among teachers. Elementary, secondary, prekindergarten and kindergarten, and special education teachers together made up 15 percent of the total who took skill improvement training but only 3.3 percent of employment. The concentration results both from the large number of teachers and because the proportion of teachers who reported training in schools (an average of 55.9 percent for the four groups) was far above the 13-percent average for all employees. On the other hand, sales supervisors and proprietors; mining, manufacturing, and wholesale sales representatives; and nursing aides, orderlies, and attendants had a lower than average proportion of workers, and yet they still made the list because of their

Table 49. Skill improvement training: Sources of school training by occupational group, 1991

(Numbers in thousands)

Occupational group	Total who took school training	Source of school training			
		High school vocational education	Post-high school vocational education	Junior college or technical institute	4-year or longer college program
Total, all occupations	15,033	504	1,203	4,801	5,556
Percent of occupational employment	13	–	1	4	5
Executive, administrative, and managerial	2,644	44	162	779	1,062
Percent of occupational employment	18	–	1	5	7
Professional specialty	5,520	54	193	848	3,236
Percent of occupational employment	34	–	1	5	20
Technicians and related support	817	25	68	323	226
Percent of occupational employment	20	1	2	8	6
Sales occupations	966	44	73	369	259
Percent of occupational employment	7	–	1	3	2
Administrative support	2,243	120	255	992	393
Percent of occupational employment	12	1	1	5	2
Private household occupations	14	2	0	2	3
Percent of occupational employment	2	–	0	–	–
Service workers, except private household	1,003	74	146	419	160
Percent of occupational employment	7	–	1	3	1
Farming, forestry, and fishing	207	21	35	80	56
Percent of occupational employment	7	1	1	3	2
Precision production, craft, and repair	1,151	76	203	534	122
Percent of occupational employment	9	1	2	4	1
Machine operators, assemblers, and inspectors	300	34	47	164	23
Percent of occupational employment	4	–	1	2	–
Transportation and material moving	107	2	16	44	8
Percent of occupational employment	2	–	–	1	–
Handlers, equipment cleaners, and laborers	60	9	6	28	8
Percent of occupational employment	1	–	–	1	–

– Value too small to display or data not available

NOTE. Because some workers did not indicate the source of school training, individual items may not sum to totals.

size—all had over 1 million employees. They also may be prominent in other tables ranking occupations obtaining training in different types of schools.

The 25 occupations with the highest proportions of workers who have improved their skills in school programs are presented in table 51. These 25 occupations account for 24 percent of those who took skill improvement training but only 3 percent of total employment. Professional specialty occupations dominate the list, accounting for 18 of the 25 occupations listed. Seven occupations appear on both table 50 and table 51.

Table 52 shows that skill improvement training obtained in schools was primarily obtained in junior colleges, technical institutes, and 4-year college programs. These types of schools provided instruction for over 95 percent of workers who took skill improvement training in schools. About one-quarter of school-based skill improvement training was taken in 2- to 12-week programs at junior colleges, technical institutes, and 4-year colleges. People in these programs most likely took a class aimed at improving skills in a particular subject area. Thirty-four percent of all school-based skill improvement training was taken in junior college, technical institute, and 4-year college programs lasting more than 25 weeks. People in these programs are probably training themselves in a broader category of work-related skills, or are in a degree or certificate program.

About 60 percent of skill improvement training provided by either post-high school vocational programs, junior colleges, and technical institutes lasted less than 26 weeks. This is consistent with the assumption that many workers who do not require a specific level of school training to obtain their jobs train to improve a specific job skill. For example, secretaries may enroll in a junior college to learn word processing and not pursue other courses. In contrast, about 55 percent of training taken in 4-year colleges lasted more than 25 weeks. The longer time taken for college training probably reflects the tendency to work toward a degree.

Approximately 6.3 million people, 42 percent of those pursuing training in schools, reported that employers sponsored their training. For 69 percent of the workers with employer-sponsored school training, the employers paid the full cost. Employer sponsorship was over 13 times as common as government-sponsored school training: Only 486,000 people reported government-sponsored training, accounting for about 3 percent of all individuals acquiring skill improvement training in schools (table 53). This results partially from the fact that JTPA benefits are available only to those working who are about to be laid

Table 50. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took school training, 1991

Occupation	Number who took school training (thousands)	Percent of total employment in occupation	Percent of total who took school training
Managers and administrators, n.e.c.	1,121	14.7	7.5
Teachers, elementary school[1]	1,022	62.7	6.8
Teachers, secondary school[1]	921	62.7	6.1
Secretaries	640	17.7	4.3
Registered nurses	431	25.8	2.9
Accountants and auditors	351	24.2	2.3
Supervisors and proprietors, sales occupations	329	8.8	2.2
Bookkeepers, accounting, and auditing clerks	326	16.0	2.2
Administrators, education and related fields[1]	235	41.9	1.6
Real estate sales occupations	205	29.7	1.4
Electrical and electronic engineers[1]	191	35.6	1.3
Teachers, prekindergarten and kindergarten[1]	190	41.4	1.3
Computer systems analysts and scientists	182	25.0	1.2
Supervisors, production occupations	182	14.7	1.2
Physicians	180	34.3	1.2
Teachers, special education[1]	166	59.9	1.1
Sales representatives, mining, manufacturing, and wholesale	142	8.9	.9
Clergy[1]	140	39.7	.9
Computer operators	137	19.1	.9
Nursing aides, orderlies, and attendants	130	9.0	.9
Police and detectives, public service	129	27.6	.9
Lawyers	126	19.3	.8
Social workers	122	18.6	.8
Other financial officers	118	17.7	.8
Financial managers	115	22.7	.8

[1] This occupation also appears in table 51, which ranks occupations by the proportion of workers who took school training.

Table 51. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took school training, 1991

Occupation	Number who took school training (thousands)	Percent of total employment in occupation	Percent of total who took school training
Teachers, elementary school[1]	1,022	62.7	6.8
Teachers, secondary school[1]	921	62.7	6.1
Teachers, special education[1]	166	59.9	1.1
Horticultural specialty farmers	11	53.6	.1
Supervisors, electricians and power transmission installers	21	53.5	.1
Administrators, protective services	24	53.3	.2
Mathematical science teachers	28	52.8	.2
English teachers	29	51.9	.2
Veterinarians	30	50.4	.2
Dental hygienists	37	48.6	.2
Counselors, educational and vocational	84	45.9	.6
Physicists and astronomers	16	45.4	.1
Dentists	64	44.5	.4
Librarians	95	44.5	.6
Supervisors, police and detectives	32	43.8	.2
Physicians assistants	30	43.3	.2
Health diagnosing practitioners, n.e.c.	17	42.4	.1
Administrators, education and related fields[1]	235	41.9	1.6
Teachers, prekindergarten and kindergarten[1]	190	41.4	1.3
Health specialties teachers	20	41.2	.1
Clergy[1]	140	39.7	.9
Postsecondary teachers, subject not specified	100	38.5	.7
Therapists, n.e.c.	26	37.7	.2
Personnel clerks, except payroll and timekeeping	21	37.2	.1
Electrical and electronic engineers[1]	191	35.6	1.3

[1] This occupation is also found on table 50, which ranks occupations by the number of workers who took school training.

off. Once they are laid off, they fall outside the scope of this analysis.

As shown in table 53, school training sponsored by employers or the government was distributed among the major occupational groups in much the same way as all skill improvement training in schools. Professional specialty workers, who took the most scholastic training to enhance skills, also accounted for the largest percentage of sponsored training. Service workers, except private household, accounted for 15 percent of the government-sponsored training, which is more than double their share of total skill improvement training taken in schools.

Table 54 shows the distribution of employer-sponsored skill improvement training with various levels of sponsorship. Sixty-nine percent of employer-sponsored training was reported as fully paid for. The distribution of fully sponsored training across occupational groups resembles the occupational distribution of school training, as shown

Table 52. Skill improvement training: Workers who took training though school programs by length and type of program, 1991

Type of program	Total, all school programs (thousands)	Length of program			
		1 week or less	2-12 weeks	13-25 weeks	More than 25 weeks
Total, all school program types	11,192	1,318	2,821	1,590	5,051
High school vocational education	504	48	139	52	244
Post-high school vocational education	1,203	197	394	198	371
Junior college or technical institute	4,601	545	1,404	771	1,701
4-year or longer college program	5,556	579	1,036	677	3,064

NOTE: Because some workers took more than one type of school program or did not indicate the length of training programs, individual items may not sum to totals.

Table 53. Skill improvement training: Workers who received sponsored training in school programs by occupational group, 1991

Occupational group	Employer-sponsored training		Government-sponsored training	
	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution
Total, all occupations	6,323	100	486	100
Executive, administrative, and managerial	1,278	21	37	11
Professional specialty	2,052	33	165	35
Technicians and related support	342	6	29	5
Sales occupations	368	6	20	4
Administrative support	966	16	66	13
Service workers, except private household	410	6	86	15
Farming, forestry, and fishing	87	2	11	3
Precision production, craft, and repair	616	9	47	9
Machine operators, assemblers, and inspectors	140	2	16	2
Transportation and material moving	38	1	4	1
Handlers, equipment cleaners, and laborers	27	–	5	1

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Table 54. Skill improvement training: Workers who received various levels of support when taking employer-sponsored training in school programs by occupational group, 1991

Occupational group	Employer-sponsored training		Employer-sponsored training (fully paid)		Employer-sponsored training (>= half paid)		Employer-sponsored training (< half paid)	
	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution	Workers (thousands)	Percent distribution
Total, all occupations	6,323	100	4,369	100	1,217	100	736	100
Executive, administrative, and managerial	1,278	21	916	22	220	19	142	19
Professional specialty	2,052	33	1,166	27	483	41	403	56
Technicians and related support	342	6	233	5	72	6	36	5
Sales occupations	368	6	254	6	83	6	32	3
Administrative support	966	16	749	18	143	12	74	10
Service workers, except private household	410	6	342	7	48	4	21	3
Farming, forestry, and fishing	87	2	78	2	6	1	3	1
Precision production, craft, and repair	616	9	483	10	119	8	15	2
Machine operators, assemblers, and inspectors	140	2	92	2	37	2	11	1
Transportation and material moving	38	1	32	1	6	–	–	–
Handlers, equipment cleaners, and laborers	27	–	25	–	–	–	1	–

– Value too small to display or data not available.

in table 43. As the percent of costs paid by the employer decreases, however, professional specialty workers and managerial workers get more of the training.

When comparing full employer sponsorship of qualifying training (58 percent, determined from table 17) with that of skill improvement training (69 percent), it is apparent that employers are more willing to fully sponsor skill improvement training. Employers are more likely to invest in the training of an employee who has shown the potential to use learned skills productively.

High school vocational programs. High school vocational education was not a significant source of skill improvement training. Only 504,000 people, 0.4 percent of all employed persons, identified high school vocational education programs as a source of this training (table 49). High school vocational training was a source in only one-third of the occupations with over 50,000 employees; the highest proportion for occupations this size was 4.4 percent.

Table 55 identifies the 25 occupations with the largest numbers of workers taking skill improvement training in high school vocational programs. These 25 occupations accounted for more than half the total who took skill im-

provement training in high school vocational programs. The top two occupations, secretaries and cooks, accounted for 13 percent of the total who took such training in these programs, although they accounted for less than 5 percent of total employment. Not more than 3 percent of any occupation listed in the top 25 reported this type.

The 25 occupations with the highest proportions of workers who have improved their skills in high school vocational programs are presented in table 56. These 25 occupations cover 28 percent of those who took skill improvement training and make up 7 percent of total employment. Professional specialty occupations accounted for 6 of the 25 occupations listed; administrative support occupations and operator, fabricator, and laborer occupations each composed 5 of the top 25. Six occupations appear on both table 55 and table 56.

Post-high school vocational programs. About 1.2 million people took skill improvement training in post-high school vocational programs. Although this is more than twice the number acquiring skills in high school vocational programs, it is only 10 percent of those who reported the source of their school training and 1 percent of total employment (table 49).

Table 57 presents the 25 occupations with the largest numbers of employees reporting training in post-high school vocational education programs. The percent of workers reporting this training did not exceed 8 percent in any occupation with more than 50,000 workers, and exceeded 10 percent in only three occupations, each of which had less than 30,000 employees.

The 25 occupations with the highest proportions of workers who have improved their skills in post-high school vocational programs are presented in table 58. These 25 occupations account for 19 percent of those who took post-high school vocational training and 3 percent of total employment. Precision production, craft, and repair occupations made up 6 of the 25 occupations listed, with service occupations accounting for 5. Four occupations appear on both table 57 and table 58.

Junior colleges and technical institutes. About 39 percent of those who reported the source of school training took their training in junior colleges or technical institutes (table 49). The 4.6 million people with this training also made up 4 percent of total employment and almost 10 percent of those who took training. Although only 4 percent of all workers took skill improvement training in these schools, the proportion was higher in technician and related support occupations; executive, administrative, and managerial occupations; professional specialty occupations; and administrative support occupations.

Twenty-five occupations accounted for almost 50 percent of the skill improvement training in this category (table 59). Although large occupations dominate the list, junior colleges are a significant source of skill improvement training for several of the smaller occupations on the list as well. Over one-half of the automobile mechanics, computer operators, electrical technicians, electricians, and production supervisors who took skill improvement training in schools took that training in junior colleges or technical institutes. Occupations listed from the executive, administrative, and managerial group or the professional specialty group took skill improvement training from these schools less than one-third of the time.

The 25 occupations with the highest proportions of workers who have improved their skills in junior college or technical institutes are presented in table 60. These 25 occupations account for 10 percent of those who trained at junior colleges or technical institutes and for 2 percent of total employment. Precision production, craft, and repair occupations made up 5 of the 25 occupations listed, with managerial; professional specialty; and operator, fabricator, and laborer occupations each accounting for 4 on the list. Two occupations appear on both table 59 and table 60, indicating that occupations for which this training is significant may be the smaller, more specialized ones.

4-year college programs. With 5.6 million people who took skill improvement training, college programs that lasted 4 years or longer were the most significant source of training taken in schools (table 49). Those reporting this type of training accounted for about 5 percent of all workers, 12 percent of workers who took training, and 47 percent of all who reported the school source. The proportion of workers who trained in college programs was higher than average in professional specialty occupations; executive, administrative, and managerial occupations; and technician and related support occupations.

About one-fifth of all workers in professional specialty occupations improved their job skills in college programs. Professionals accounted for about 58 percent of the total number of workers who improved their skills in these programs. A total of 24 percent were elementary and secondary school teachers, roughly nine times their proportion of total employment. The prominence of teachers in this category reflects the fact that two-fifths of all teachers who took skill improvement training did so in college programs.

Twenty-five occupations accounted for almost 54 percent of the skill improvement training in this category (table 61). Occupations such as secretaries and sales supervisors and proprietors appear in table 61 because of their size; others reflect the unique contribution of colleges. Physicians, engineers, clergy, librarians, lawyers, social workers, and psychologists all require a high level of academic training.

The 25 occupations with the highest proportions of workers who have improved their skills in 4-year college programs are presented in table 62. These 25 occupations account for 39 percent of those who took 4-year-college program training and 5 percent of total employment. Professional occupations overwhelmingly dominate table

Table 55. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took high school vocational training, 1991

Occupation	Number who took high school vocational training (thousands)	Percent of total employment in occupation	Percent of total who took high school vocational training
Secretaries[1]	51	1.4	10.0
Cooks, except short order	16	.9	3.3
Managers and administrators, n.e.c.	15	.2	3.0
Janitors and cleaners	15	.7	3.0
Bookkeepers, accounting, and auditing clerks	14	.7	2.8
Farmers, except horticultural	14	1.2	2.7
Supervisors and proprietors, sales occupations	11	.3	2.1
Carpenters	11	.9	2.1
Electricians	11	1.6	2.3
Child care workers, except private household	10	.9	2.0
Teachers, elementary school	9	.6	1.9
Assemblers	9	.9	1.8
Teachers, secondary school	8	.6	1.6
Licensed practical nurses[1]	8	1.7	1.5
Computer operators	8	1.1	1.6
Teachers aides[1]	8	1.5	1.5
Automobile mechanics	8	1.0	1.7
Accountants and auditors	7	.5	1.4
Teachers, n.e.c.[1]	7	1.3	1.4
Drafting occupations[1]	7	2.1	1.3
Sales representatives, mining, manufacturing, and wholesale	7	.4	1.3
Miscellaneous food preparation occupations	7	1.1	1.5
Nursing aides, orderlies, and attendants	7	.5	1.4
Bus, truck, and stationary engine mechanics[1]	6	1.9	1.1
Welders and cutters	6	1.0	1.1

[1] This occupation also appears in table 56, which ranks occupations by the proportion of workers who took high school vocational training.

Table 56. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took high school vocational training, 1991

Occupation	Number who took high school vocational training (thousands)	Percent of total employment in occupation	Percent of total who took high school vocational training
Metallurgical and materials engineers	4	17.6	0.8
Supervisors, electricians and power transmission installers	5	12.3	1.0
Miscellaneous woodworking machine operators	3	10.6	.5
Milling and planing machine operators	2	10.2	.4
Proofreaders	2	7.8	.3
Forging machine operators	2	7.3	.5
Biological technicians	3	4.4	.5
Inspectors, testers, and graders	5	3.8	1.0
Physicians assistants	2	3.4	.5
Advertising and related sales occupations	4	3.2	.9
Musicians and composers	4	3.1	.8
Announcers	2	2.9	.3
Supervisors, police and detectives	2	2.7	.4
Helpers, construction trades	2	2.3	.5
Drafting occupations[1]	7	2.1	1.3
Order clerks	4	2.1	.8
Barbers	2	2.1	.5
Bus, truck, and stationary engine mechanics[1]	6	1.9	1.1
Mail clerks, except postal service	3	1.8	.6
Garage and service station related occupations	4	1.8	.9
Licensed practical nurses[1]	8	1.7	1.5
Teachers aides[1]	8	1.5	1.5
Secretaries[1]	51	1.4	10.0
Photographers	2	1.4	.4
Teachers, n.e.c.[1]	7	1.3	1.4

[1] This occupation is also found on table 55, which ranks occupations by the number of workers who took high school vocational training.

Table 57. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took post-high school vocational training, 1991

Occupation	Number who took post-high school vocational training (thousands)	Percent of total employment in occupation	Percent of total who took post-high school vocational training
Secretaries	106	2.9	11.0
Managers and administrators, n.e.c.	67	.9	7.0
Bookkeepers, accounting, and auditing clerks	36	1.7	3.7
Registered nurses	30	1.8	3.1
Supervisors and proprietors, sales occupations	29	.8	3.0
Accountants and auditors	25	1.8	2.6
Teachers, secondary school	25	1.7	2.6
Hairdressers and cosmetologists[1]	25	3.7	2.6
Child care workers, except private household	24	2.2	2.4
Real estate sales occupations	22	3.2	2.3
Farmers, except horticultural	22	2.0	2.3
Police and detectives, public service[1]	21	4.5	2.2
Supervisors, production occupations	21	1.7	2.2
Industrial machinery repairers	19	3.5	2.0
Machinists	19	3.5	2.0
Licensed practical nurses[1]	18	3.9	1.9
Teachers, elementary school	17	1.0	1.7
Heating, air conditioning, and refrigeration mechanics[1]	17	7.5	1.8
Computer systems analysts and scientists	15	2.0	1.5
General office clerks	15	2.2	1.6
Managers, properties and real estate	14	2.8	1.4
Teachers, n.e.c.	14	2.5	1.4
Automobile mechanics	14	1.7	1.4
Guards and police, except public service	13	1.8	1.4
Electricians	12	1.8	1.3

[1] This occupation also appears in table 58, which ranks occupations by the proportion of workers who took post-high school vocational training.

Table 58. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took post-high school vocational training, 1991

Occupation	Number who took post-high school vocational training (thousands)	Percent of total employment in occupation	Percent of total who took post-high school vocational training
Metallurgical and materials engineers	4	17.6	0.4
Agricultural and food scientists	3	13.7	.3
Surveyors and mapping scientists	3	9.3	.4
Administrators, protective services	4	9.0	.4
Hand molding, casting, and forming occupations	2	8.8	.2
Funeral directors	4	8.7	.4
Stenographers	2	8.3	.2
Heating, air conditioning, and refrigeration mechanics[1]	17	7.5	1.8
Stationary engineers	8	7.2	.9
Supervisors, extractive occupations	3	6.9	.3
Surveying and mapping technicians	5	6.6	.5
Sheriffs, bailiffs, and other law enforcement officers	8	6.2	.8
Typesetters and compositors	4	5.8	.4
Electronic repairers, commercial and industrial equipment	9	4.6	.9
Personnel clerks, except payroll and timekeeping	3	4.5	.3
Police and detectives, public service[1]	21	4.5	2.2
Structural metal workers	2	4.5	.2
Health record technologists and technicians	2	4.3	.2
Correctional institution officers	11	4.0	1.1
Licensed practical nurses[1]	18	3.9	1.9
Buyers, wholesale and retail trade, except farm products	8	3.8	.9
Telephone installers and repairers	7	3.8	.8
Hairdressers and cosmetologists[1]	25	3.7	2.6
Firefighting occupations	7	3.6	.7
Punching and stamping press machine operators	5	3.6	.5

[1] This occupation is also found on table 57, which ranks occupations by the number of workers who took post-high school vocational training

Table 59. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took junior college or technical institute training, 1991

Occupation	Number with junior college or technical institute training (thousands)	Percent of total employment in occupation	Percent of total who took junior college or technical institute training
Managers and administrators, n.e.c.	389	5.1	10.5
Secretaries	304	8.4	8.2
Bookkeepers, accounting, and auditing clerks	150	7.4	4.0
Supervisors and proprietors, sales occupations	128	3.4	3.5
Real estate sales occupations[1]	101	14.7	2.7
Registered nurses	98	5.9	2.6
Teachers, secondary school	95	6.4	2.6
Supervisors, production occupations	93	7.5	2.5
Accountants and auditors	86	6.0	2.3
Computer operators	76	10.5	2.0
Teachers, elementary school	71	4.4	1.9
Computer programmers	61	10.0	1.6
Electrical and electronic engineers	60	11.2	1.6
Sales representatives, mining, manufacturing, and wholesale	56	3.5	1.5
Supervisors, general office	56	11.9	1.5
Police and detectives, public service	54	11.5	1.5
Teachers, prekindergarten and kindergarten	53	11.5	1.4
Nursing aides, orderlies, and attendants	53	3.7	1.4
Electricians	49	7.0	1.3
Computer systems analysts and scientists	48	6.5	1.3
Licensed practical nurses	47	10.3	1.3
Electrical and electronic technicians[1]	47	12.8	1.3
Other financial officers	46	7.0	1.3
Automobile mechanics	42	5.1	1.1
Designers	37	7.4	1.0

[1] This occupation also appears in table 60, which ranks occupations by the proportion of workers who took junior college or technical institute training.

Table 60. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took junior college or technical institute training, 1991

Occupation	Number with junior college or technical institute training (thousands)	Percent of total employment in occupation	Percent of total who took junior college or technical institute training
Health record technologists and technicians	13	27.4	0.4
Water and sewage treatment plant operators	19	24.6	.5
Electrician apprentices	6	24.5	.2
Dental hygienists	18	23.6	.5
Supervisors, police and detectives	16	22.7	.4
Miscellaneous electrical and electronic equipment repairers	10	22.1	.3
Metallurgical and materials engineers	5	21.2	.1
Inhalation therapists	16	20.7	.4
Chief executives/general administrators, public administration	6	20.3	.2
Typesetters and compositors	13	18.9	.3
Hand molding, casting, and forming occupations	4	18.1	.1
Funeral directors	8	17.5	.2
Production testers	8	15.6	.2
Real estate sales occupations[1]	101	14.7	2.7
Physicians assistants	10	13.9	.3
Firefighting occupations	26	13.8	.7
Health diagnosing practitioners, n.e.c.	5	13.7	.1
Supervisors, electricians and power transmission installers	5	13.2	.1
Milling and planing machine operators	3	13.0	.1
Administrators, protective services	6	12.9	.2
Electrical and electronic technicians[1]	47	12.8	1.3
Supervisors, firefighting and fire prevention occupations	7	12.8	.2
Horticultural specialty farmers	3	12.7	.1
Construction inspectors	7	12.5	.2
Sheetmetal duct installers	6	12.4	.2

[1] This occupation is also found on table 59, which ranks occupations by the number of workers who took junior college or technical institute training.

Table 61. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took training in 4-year or longer college programs, 1991

Occupation	Number who took 4-year college program training (thousands)	Percent of total employment in occupation	Percent of total who took 4-year college program training
Teachers, elementary school[1]	589	36.1	12.9
Teachers, secondary school[1]	500	34.1	11.0
Managers and administrators, n.e.c.	325	4.3	7.1
Registered nurses	156	9.3	3.4
Administrators, education and related fields[1]	121	21.5	2.7
Accountants and auditors	119	8.2	2.6
Physicians	87	16.6	1.9
Teachers, special education[1]	86	31.1	1.9
Supervisors and proprietors, sales occupations	86	2.3	1.9
Electrical and electronic engineers	85	15.9	1.9
Computer systems analysts and scientists	75	10.2	1.6
Clergy[1]	69	19.7	1.5
Teachers, prekindergarten and kindergarten	66	14.2	1.4
Secretaries	63	1.7	1.4
Librarians[1]	59	27.6	1.3
Teachers, n.e.c.	58	10.8	1.3
Lawyers	57	8.7	1.3
Social workers	55	8.3	1.2
Bookkeepers, accounting, and auditing clerks	54	2.7	1.2
Postsecondary teachers, subject not specified[1]	53	20.4	1.2
Counselors, educational and vocational[1]	53	29.1	1.2
Psychologists[1]	51	23.0	1.1
Mechanical engineers	48	15.3	1.1
Managers, marketing, advertising, and public relations	44	8.4	1.0
Sales representatives, mining, manufacturing, and wholesale	43	2.7	.9

[1] This occupation also appears in table 62, which ranks occupations by the proportion of workers who took training in 4-year or longer college programs.

Table 62. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took training in 4-year or longer college programs, 1991

Occupation	Number who took 4-year college program training (thousands)	Percent of total employment in occupation	Percent of total who took 4-year college program training
Teachers, elementary school[1]	589	36.1	12.9
Teachers, secondary school[1]	500	34.1	11.0
English teachers	18	32.2	.4
Veterinarians	18	31.1	.4
Teachers, special education[1]	86	31.1	1.9
Health specialties teachers	15	30.8	.3
Business, commerce, and marketing teachers	7	30.1	.2
Physicists and astronomers	10	29.3	.2
Counselors, educational and vocational[1]	53	29.1	1.2
Optometrists	8	28.5	.2
Mathematical science teachers	15	28.2	.3
Librarians[1]	59	27.6	1.3
Horticultural specialty farmers	6	27.4	.1
Dentists	35	24.0	.8
Therapists, n.e.c.	16	23.4	.4
Psychologists[1]	51	23.0	1.1
Physical scientists, n.e.c.	4	22.3	.1
Agricultural and food scientists	5	22.0	.1
Administrators, education and related fields[1]	121	21.5	2.7
Economics teachers	4	20.9	.1
Biological science teachers	8	20.5	.2
Postsecondary teachers, subject not specified[1]	53	20.4	1.2
Clergy[1]	69	19.7	1.5
Psychology teachers	4	18.7	.1
Art, drama, and music teachers	8	18.7	.2

[1] This occupation is also found on table 61, which ranks occupations by the number of workers who took training in 4-year or longer college programs.

Table 63. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took formal company training, 1991

Occupation	Number who took formal company training (thousands)	Percent of total employment in occupation	Percent of total who took formal company training
Managers and administrators, n.e.c.	1,627	21.3	9.1
Supervisors and proprietors, sales occupations	657	17.6	3.7
Secretaries	573	15.8	3.2
Registered nurses	477	28.6	2.7
Sales representatives, mining, manufacturing, and wholesale	366	22.9	2.0
Supervisors, production occupations	365	29.4	2.0
Accountants and auditors	339	23.4	1.9
Computer systems analysts and scientists[1]	307	42.2	1.7
Other financial officers	235	35.2	1.3
Insurance sales occupations[1]	234	39.6	1.3
Police and detectives, public service[1]	234	49.8	1.3
Electrical and electronic engineers[1]	226	42.0	1.3
Administrators and officials, public administration[1]	217	41.0	1.2
Nursing aides, orderlies, and attendants	211	14.6	1.2
Computer programmers	210	34.3	1.2
Administrative support occupations, n.e.c.	205	21.3	1.1
Teachers, elementary school	197	12.1	1.1
Supervisors, general office[1]	193	40.6	1.1
Real estate sales occupations	188	27.4	1.0
Social workers	181	27.6	1.0
Financial managers	176	34.8	1.0
Managers, marketing, advertising, and public relations	176	33.3	1.0
Automobile mechanics	173	20.7	1.0
Bookkeepers, accounting, and auditing clerks	165	8.1	.9
Teachers, secondary school	158	10.8	.9

[1] This occupation also appears in table 64, which ranks occupations by the proportion of workers who took formal company training.

Table 64. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took formal company training, 1991

Occupation	Number who took formal company training (thousands)	Percent of total employment in occupation	Percent of total who took formal company training
Supervisors, police and detectives	56	77.1	0.3
Fire inspection and fire prevention occupations	11	74.3	.1
Supervisors, firefighting and fire prevention occupations	40	73.1	.2
Supervisors, computer equipment operators	16	67.8	.1
Telephone line installers and repairers	45	56.9	.3
Supervisors, guards	25	50.2	.1
Police and detectives, public service[1]	234	49.8	1.3
Telephone installers and repairers	96	49.4	.5
Public transportation attendants	28	48.7	.2
Broadcast equipment operators	17	48.6	.1
Agricultural and food scientists	11	46.6	.1
Operations and systems researchers and analysts	86	45.0	.5
Firefighting occupations	85	44.6	.5
Production testers	23	42.9	.1
Airplane pilots and navigators	50	42.8	.3
Data processing equipment repairers	71	42.5	.4
Computer systems analysts and scientists[1]	307	42.2	1.7
Electrical and electronic engineers[1]	226	42.0	1.3
Administrators and officials, public administration[1]	217	41.0	1.2
Office machine repairers	33	41.0	.2
Postmasters and mail superintendents	13	40.6	.1
Supervisors, general office[1]	193	40.6	1.1
Chemical engineers	28	40.3	.2
Aircraft engine mechanics	49	40.0	.3
Insurance sales occupations[1]	234	39.6	1.3

[1] This occupation is also found on table 63, which ranks occupations by the number of workers who took formal company training.

62, accounting for 23 of the top 25 occupations. Nine occupations appear on both table 61 and table 62.

Formal company training

Formal company training programs were the most commonly reported source of skill improvement training. Nearly 18 million people identified company programs as a source of their training, making up 16 percent of all workers (table 42). This proportion was marginally greater than that of informal on-the-job training (OJT) (15 percent), greater than that from schools (13 percent), and more than twice that of other methods (7 percent).

The percent of workers who improved their job skills through company training surpassed the average in technician and related support occupations (26 percent); executive, administrative, and managerial occupations (25 percent); professional specialty occupations (20 percent); and precision production, craft, and repair occupations (17 percent). The percent of workers who reported this training was equal to the overall average in sales and administrative support occupations (table 42).

Over one-third of Federal Government employees, the highest proportion of any class of workers, improved their skills in formal company programs (table 44). This is corroborated by table 45, which shows that workers in public administration had the highest proportion (37 percent) of workers who enhanced their skills in this way. Workers in finance, insurance, and real estate and transportation, communications, and other public utilities had over one-quarter of their workers train in formal company programs.

The 25 occupations listed in table 63 account for 45 percent of the workers who identified company training programs as a source of skill improvement. This category of training was significant for most of the occupations on the list. Occupations with lower than average proportions reporting company program training made the list, such as nursing aides, orderlies, and attendants; elementary and secondary school teachers; and bookkeeping, accounting, and auditing clerks.

Companies provide formal training to ensure that employees learn specific technical or other information. Table 64, which ranks the occupations by the proportion of workers who took formal company training, identifies the occupations for which this type of training was most important. Persons in these occupations must be thoroughly familiar with their employers' products or services. Not surprisingly, the top three occupations in table 64 are in public protective service. Six occupations appear in both table 63 and table 64.

In most cases, formal company training was limited in duration; 65 percent of it lasted 25 or fewer weeks (table 65). Training did tend to last longer than it had in 1983, however, as shown in the table below.

Length of Program	*Percent of workers taking formal company training*	
	1983	1991
Under 12 weeks	72	33
13 to 25 weeks	8	32
26 to 52 weeks	5	6
More than 52 weeks	8	12

Employers devise their training programs to suit their particular needs, and it is apparent from the above table that employers are using longer training programs than in 1983. Employers are usually still keeping them under 25 weeks in length.

Government training programs, such as JTPA, sponsored 4 percent of formal company skill improvement training. The largest number of workers in government-sponsored programs were in executive, administrative, and managerial occupations. At 11 percent, workers in farming, forestry, and fishing occupations were clearly the most likely to have taken government-sponsored training to improve skills.

Table 65. Skill improvement training: Workers who took training in formal company programs by length of program and government sponsorship by occupational group, 1991

Occupational group	Workers who took formal company training		Percent of workers by length of program				Percent government-sponsored
	Number (thousands)	Percent of total employment in occupation	Under 12 weeks	13-25 weeks	26-52 weeks	More than 52 weeks	
Total, all occupations	17,973	16	33	32	6	12	4
Executive, administrative, and managerial	3,634	25	32	30	7	13	4
Professional specialty	3,228	20	35	29	6	14	4
Technicians and related support	1,032	26	27	35	7	14	3
Sales occupations	2,187	16	37	29	7	10	1
Administrative support	2,961	16	37	36	6	7	4
Private household occupations	0	0	*	*	*	*	*
Service workers, except private household	1,418	9	29	31	8	13	6
Farming, forestry, and fishing	91	3	36	32	7	12	11
Precision production, craft, and repair	2,178	17	24	31	7	19	3
Machine operators, assemblers, and inspectors	585	8	24	47	4	10	3
Transportation and material moving	456	10	44	33	2	6	7
Handlers, equipment cleaners, and laborers	203	5	44	31	3	8	6

* Division by zero undefined.
NOTE: Because some workers did not indicate the length of training programs, individual items may not sum to 100 percent.

Informal on-the-job training

The 17.5 million people—15 percent of all workers and 37 percent of those reporting training—who underwent informal on-the-job training made OJT the second largest source of skill development (table 42).

The proportions of workers taking OJT to improve skills were more evenly distributed across worker classes and industries than with other types of training. Federal Government workers had the highest proportion improving skills through OJT, 24 percent; the self-employed had the least, 9 percent (table 44). Public administration also had 25 percent of its workers report that they took OJT skill training. Workers in mining; finance, insurance, and real estate; transportation, communications, and other public utilities; manufacturing, durable and nondurable goods; and professional and related services all had above average proportions of workers bettering their skills through OJT (table 45).

The top 25 occupations using OJT accounted for 39 percent of those reporting such training (table 66). Employment in these 25 occupations made up 35 percent of total employment, which shows a close relationship between employment levels and OJT numbers.

The 25 occupations with the highest proportions of workers who have improved their skills through OJT are presented in table 67. These 25 occupations include 4 percent of those who took 4-year college programs and 2 percent of total employment. This shows that employees in many occupations use OJT. Only 1 occupation appears on both table 66 and table 67.

The proportion of employees in an occupation reporting OJT fell within a narrow range, generally less than a third of the total employed in the occupation. Only three occupations with 40 percent or more reporting OJT had more than 50,000 employed: Data processing equipment repairers, supervisors of firefighting and fire prevention occupations, and supervisors of police and detectives.

Other training

Training taken to improve job skills other than that in formal schools or company programs, or by informal on-the-job training, was much less common than each of these more traditional methods. The other category was reported by 7.9 million persons or 7 percent of the total employed and by 17 percent of the people reporting skill improvement training (table 42).

Self-employed workers had the highest proportion of those who improved skills through other methods, 13 percent. State and local government workers also had a higher than average incidence of other skill improvement training (table 44). A 10 percent or higher share of persons in professional and related service industries and public administration had improved skills through this type of training. Workers in finance, insurance, and real estate; and entertainment and recreation service industries had a higher than average incidence for this source of skill improvement training (table 45).

Table 68 presents the 25 occupations with the largest number of persons acquiring training from the other source. For the top three occupations—managers and administrators not elsewhere classified, registered nurses, and supervisors and proprietors in sales occupations—other sources of training are not very significant. These occupations appear in table 68 primarily because of the large numbers of people they employ. High employment also explains the presence of secretaries; sales representatives in mining, manufacturing, and wholesale trade; child-care workers, except private household; bookkeeping, accounting, and auditing clerks; and nursing aides, orderlies, and attendants. Although table 68 is dominated by occupations with high employment for whom other sources may not be very significant, the occupations listed still accounted for over half this training and for 31 percent of total employment.

Table 69 ranks occupations by the proportions acquiring skill improvement training through other methods, and probably presents a truer list of the top 25 occupations using this training method than table 68. Nineteen of the 25 occupations listed are professional specialty occupations. Many of those in the professional specialties listed probably improve their skills by attending professional seminars, participating in local interest groups, and reading professional journals. Hairdressers and cosmetologists learn about new techniques, styles, and products through attending conventions and reading professional publications. For musicians and artists, skills are often improved through private lessons with individuals not associated with schools and through practicing on their own.

In contrast to table 68, the occupations in table 69 account for only 13 percent of those who improved their job skills through other methods, and only 3 percent of total employment. Three occupations appear in both table 68 and table 69.

Type of skill improvement training

In addition to knowing the source of training, it is useful to note the kind of training obtained. The training supplement to the January 1991 CPS also collected some information about the type of skill improvement training. This information was not gathered in 1983. Workers who reported taking skill improvement training were asked a further question, "What kind of training did you take?" The type of training taken was divided into five areas: 1) managerial or supervisory skills, 2) reading, writing, and math skills, 3) computer-related skills, 4) occupation-specific technical skills, and 5) other skills. Table 70 presents the responses to this question.

For all occupational groups except administrative support and private household, occupation-specific technical training was the most often cited form of skill improvement

Table 66. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took informal on-the-job training, 1991

Occupation	Number who took informal on-the-job training (thousands)	Percent of total employment in occupation	Percent of total who took informal on-the-job training
Managers and administrators, n.e.c.	1,263	16.6	7.2
Secretaries	596	16.5	3.4
Supervisors and proprietors, sales occupations	572	15.3	3.3
Registered nurses	396	23.7	2.3
Cashiers	311	12.8	1.8
Nursing aides, orderlies, and attendants	308	21.4	1.8
Sales representatives, mining, manufacturing, and wholesale	273	17.1	1.6
Bookkeepers, accounting, and auditing clerks	263	12.9	1.5
Accountants and auditors	251	17.3	1.4
Supervisors, production occupations	236	19.1	1.3
Administrative support occupations, n.e.c.	202	20.9	1.1
Social workers	188	28.7	1.1
Insurance sales occupations	178	30.1	1.0
Teachers, elementary school	176	10.8	1.0
Cooks, except short order	176	10.1	1.0
Computer programmers	164	26.8	.9
Miscellaneous machine operators, n.e.c.	163	16.2	.9
Police and detectives, public service[1]	157	33.5	.9
Automobile mechanics	155	18.6	.9
Electrical and electronic engineers	147	27.4	.8
Other financial officers	146	21.9	.8
Assemblers	146	13.6	.8
Computer systems analysts and scientists	142	19.5	.8
Truckdrivers, heavy	141	8.9	.8
Computer operators	138	19.2	.8

[1] This occupation also appears in table 67, which ranks occupations by the proportion of workers who took informal on-the-job training.

Table 67. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took informal on-the-job training, 1991

Occupation	Number who took informal on-the-job training (thousands)	Percent of total employment in occupation	Percent of total who took informal on-the-job training
Agricultural and food scientists	14	61.1	0.1
Postmasters and mail superintendents	16	51.4	.1
Forestry and conservation scientists	15	44.8	.1
Physicists and astronomers	15	44.5	.1
Supervisors, police and detectives	31	43.1	.2
Data processing equipment repairers	69	41.5	.4
Supervisors, firefighting and fire prevention occupations	22	40.7	.1
Electrician apprentices	10	40.5	.1
Production testers	21	39.2	.1
Actuaries	9	38.5	.1
Pest control occupations	14	38.3	1
Patternmakers, lay-out workers, and cutters	8	37.2	–
Miscellaneous plant and system operators	12	36.7	.1
Optical goods workers	18	35.5	.1
Statistical clerks	21	35.2	.1
Occupational therapists	11	35.0	.1
Electrical power installers and repairers	49	35.0	.3
Forging machine operators	11	34.7	.1
Hand molding, casting, and forming occupations	7	34.3	–
Hand engraving and printing occupations	13	34.2	.1
Separating, filtering, and clarifying machine operators	27	34.1	.2
Railroad conductors and yardmasters	15	34.0	.1
Miscellaneous electrical and electronic equipment repairers	15	33.8	.1
Police and detectives, public service[1]	157	33.5	9
Correctional institution officers	91	33.0	.5

[1] This occupation is also found on table 66, which ranks occupations by the number of workers who took informal on-the-job training.
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Table 68. Skill improvement training: Twenty-five occupations with the largest numbers of workers who took training from other sources, 1991

Occupation	Number who took informal on-the-job training (thousands)	Percent of total employment in occupation	Percent of total who took training from other sources
Managers and administrators, n.e.c	816	10.7	10.3
Registered nurses	288	17.2	3.6
Supervisors and proprietors, sales occupations	270	7.2	3.4
Lawyers[1]	251	38.3	3.2
Physicians[1]	187	35.6	2.4
Teachers, secondary school	185	12.6	2.3
Teachers, elementary school	177	10.9	2.2
Accountants and auditors	171	11.8	2.2
Hairdressers and cosmetologists[1]	153	22.6	1.9
Secretaries	148	4.1	1.9
Farmers, except horticultural	141	12.8	1.8
Real estate sales occupations	127	18.5	1.6
Social workers	122	18.5	1.5
Sales representatives, mining, manufacturing, and wholesale	115	7.2	1.4
Child care workers, except private household	92	8.7	1.2
Financial managers	82	16.3	1.0
Insurance sales occupations	81	13.8	1.0
Bookkeepers, accounting, and auditing clerks	81	4.0	1.0
Administrators, education and related fields	80	14.2	1.0
Administrators and officials, public administration	78	14.8	1.0
Teachers, prekindergarten and kindergarten	77	16.8	1.0
Teachers, n.e.c.	76	14.1	1.0
Nursing aides, orderlies and attendants	76	5.3	1.0
Other financial officers	75	11.3	.9
Managers, properties and real estate	60	12.4	.8

[1] This occupation also appears in table 69, which ranks occupations by the proportion of workers who took training from other sources.

Table 69. Skill improvement training: Twenty-five occupations with the largest proportions of workers who took training from other sources, 1991

Occupation	Number who took informal on-the-job training (thousands)	Percent of total employment in occupation	Percent of total who took training from other sources
Optometrists	16	55.4	0.2
Speech therapists	27	50.0	.3
Veterinarians	24	40.9	.3
Actuaries	10	40.1	.1
Occupational therapists	13	39.6	.2
Dentists	56	38.7	.7
Lawyers[1]	251	38.3	3.2
Physical therapists	36	36.6	.5
Health diagnosing practitioners, n.e.c.	14	36.5	.2
Physicians[1]	187	35.6	2.4
Construction inspectors	16	31.0	.2
Personnel and labor relations managers	32	27.5	.4
Statisticians	8	24.9	.1
Psychologists	55	24.8	.7
Pharmacists	45	24.4	.6
Sales engineers	7	24.4	.1
Artists, performers, and related workers, n.e.c.	15	23.7	.2
Hairdressers and cosmetologists[1]	153	22.6	1.9
Purchasing managers	21	22.1	.3
Supervisors, personal service occupations	14	21.1	.2
Foreign language teachers	4	20.8	.1
Health specialties teachers	10	20.5	1
Art, drama, and music teachers	8	19.9	1
Metallurgical and materials engineers	4	19.5	.1
Musicians and composers	26	19.3	.3

[1] This occupation is also found on table 68, which ranks occupations by the number of workers who took training from other sources

training. Because each occupation has its own functions and responsibilities in a business, the training varies from numerically controlled lathe operation for a machinist to financial statement analysis for an accountant to sale-closing for a industrial sales representative. Administrative support workers improved their computer skills more often than the other skill areas.

The second most cited form of training often shed more insight into the kind of training required for an occupation than the first. Managerial and supervisory skills were the secondary focus in the following occupational groups: Executive, administrative, and managerial; sales; farming, forestry, and fishing; and precision production, craft, and repair. Computer-related training was the secondary focus of professional specialty workers; technicians and related support workers; and machine operators, assemblers, and inspectors. Administrative support occupations had secondary emphasis on occupation-specific technical skills. Other skills were the secondary focus of service workers, except private household; transportation and material moving workers; and handlers, equipment operators, and laborers. Occupation-specific training was the secondary focus of private household workers.

The relationship between qualifying training and skill improvement training

Skill improvement training frequently relates to whether employees in an occupation need specific training or skills to obtain a job. Overall, 30 percent of workers needed training to qualify for their jobs and also took training to improve their skills (table 71). Thus, it is not surprising that 42 of the 50 occupations with the most employees obtaining skill improvement training were among the 50 occupations with the most employees reporting that training or skills were needed to qualify for their job. Workers in professional specialty occupations; technician and related support occupations; and executive, administrative, and managerial occupations both needed qualifying training and took skill improvement training in proportions higher than average. Private household occupations had the lowest proportion of workers who reported both types of training.

About 25 percent of all workers said they needed qualifying training but did not take any subsequent skill improvement training. This proportion did not rise above one-third for any occupational group.

Roughly 10 percent of the workforce reported that they did not need any qualifying training but did take skill improvement training since obtaining their current jobs. Higher than average proportions of workers who reported this were found in administrative support occupations; sales occupations; machine operating, assembling, and inspecting occupations; service occupations, except private household; and precision production, craft, and repair

Table 70. Skill improvement training: Type of training by occupational group, 1991

(Numbers in thousands)

Occupational group	Workers who took training	Type of training				
		Managerial or supervisory training	Reading, writing, or math training	Computer-related training	Occupation-specific technical training	Other training
Total, all occupations	46,814	12,484	6,587	15,021	29,949	7,811
Percent of occupational employment	41	11	6	13	26	7
Executive, administrative, and managerial	7,853	4,277	1,205	3,175	4,466	1,100
Percent of occupational employment	53	29	8	22	30	7
Professional specialty	10,847	2,545	2,054	3,424	7,298	2,338
Percent of occupational employment	67	16	13	21	45	14
Technicians and related support	2,365	326	315	946	1,722	237
Percent of occupational employment	59	8	8	24	43	6
Sales occupations	4,809	1,703	574	1,303	2,826	913
Percent of occupational employment	35	12	4	10	21	7
Administrative support	7,342	1,459	1,112	4,223	3,420	877
Percent of occupational employment	40	8	6	23	19	5
Private household occupations	39	4	0	4	17	19
Percent of occupational employment	6	1	0	1	2	3
Service workers, except private household	4,339	686	413	390	3,130	1,056
Percent of occupational employment	29	5	3	3	21	7
Farming, forestry, and fishing	602	153	27	68	420	126
Percent of occupational employment	21	5	1	2	14	4
Precision production, craft, and repair	4,949	1,000	555	867	3,992	480
Percent of occupational employment	38	8	4	7	30	4
Machine operators, assemblers, and inspectors	1,913	115	211	390	1,473	261
Percent of occupational employment	25	1	3	5	19	3
Transportation and material moving	1,112	132	64	117	750	267
Percent of occupational employment	25	3	1	3	17	6
Handlers, equipment cleaners, and laborers	643	84	56	113	434	139
Percent of occupational employment	15	2	1	3	10	3

Table 71. Workers with various combinations of qualifying training and skill improvement training, 1991

(Numbers in thousands)

Occupational group	Total employed	Workers who needed qualifying training	Workers who took skill improvement training	Employed who needed skills and improved skills	Employed who needed skills but did not improve skills	Employed who did not need skills but improved skills	Employed who neither needed skills nor improved skills
Total, all occupations	115,121	65,276	46,814	34,998	29,296	11,816	37,538
Percent of total employment	100	57	41	30	25	10	33
Executive, administrative, and managerial	14,688	10,565	7,853	6,372	4,084	1,481	2,606
Percent of total employment	100	72	53	43	28	10	18
Professional specialty	16,197	14,923	10,647	10,347	4,458	501	762
Percent of total employment	100	92	67	64	28	3	5
Technicians and related support	3,991	3,414	2,365	2,091	1,275	274	293
Percent of total employment	100	86	59	52	32	7	7
Sales occupations	13,664	5,980	4,809	3,020	2,801	1,789	5,794
Percent of total employment	100	44	35	22	21	13	42
Administrative support	18,379	10,028	7,342	4,738	5,154	2,603	5,706
Percent of total employment	100	55	40	26	28	14	31
Private household occupations	692	85	39	21	56	18	570
Percent of total employment	100	12	6	3	8	3	82
Service occupations, except private household	14,931	5,758	4,339	2,744	2,929	1,595	7,494
Percent of total employment	100	39	29	18	20	11	50
Farming, forestry, and fishing	2,906	815	602	342	470	259	1,798
Percent of total employment	100	28	21	12	16	9	62
Precision production, craft, and repair	13,175	8,088	4,949	3,520	4,392	1,429	3,616
Percent of total employment	100	61	38	27	33	11	27
Machine operators, assemblers, and inspectors	7,789	2,940	1,913	922	1,942	991	3,821
Percent of total employment	100	38	25	12	25	13	49
Transportation and material moving	4,461	1,842	1,112	660	1,137	453	2,124
Percent of total employment	100	41	25	15	25	10	48
Handlers, equipment cleaners, and laborers	4,248	839	643	221	595	423	2,952
Percent of total employment	100	20	15	5	14	10	69

occupations.

Almost one-third of all workers reported that they neither needed qualifying training nor took skill improvement training. Over 80 percent of the private household workers fell into this category. More than 60 percent of the workers who were handlers, equipment cleaners, and laborers; and farmers, foresters, and fishers did not report either type of training. In service occupations, except private household; machine operating, assembling, and inspecting occupations; transportation and material moving occupations; and sales occupations, more than 40 percent of workers reported not needing or having taken any training. Less than 8 percent of the professional specialty workers or the technicians and related support employees fell into this category.

Appendix A. Sources of Training by Detailed Occupation, 1991

Table A-1. Qualifying training: Sources of training by detailed occupation, 1991

Occupation[1]	Workers who needed training		Source of training (percent of total employment in occupation)									
			School									
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friends or relatives or other nonwork-related training
Total employed, age 16 and over	65,276	57	32	4	3	8	19	12	27	2	1	7
Executive, administrative, and managerial occupations	10,565	72	48	3	2	8	36	17	37	3	2	9
Officials and administrators, public administration	448	76	55	5	2	8	37	19	39	8	1	8
Chief executives/general administrators, public administration	25	79	53	0	0	15	39	6	29	0	0	0
Administrators and officials, public administration	419	79	55	6	2	7	38	20	40	9	2	8
Executives, officials, and managers, except public administration	7,091	69	45	3	2	8	33	15	38	3	2	9
Administrators, protective services	39	84	56	3	39	15	8	9	73	22	17	2
Financial managers	420	83	69	5	–	10	56	18	39	2	2	3
Personnel and labor relations managers	98	85	52	5	1	8	42	19	52	8	0	13
Purchasing managers	77	81	56	7	0	10	41	23	44	6	2	11
Managers, marketing, advertising, and public relations	389	74	45	2	1	5	37	19	44	3	2	5
Administrators, education and related fields	509	91	81	2	1	5	72	9	30	3	1	9
Managers, medicine and health	169	85	71	1	3	16	51	20	44	4	1	10
Managers, properties and real estate	254	52	25	2	2	6	15	10	28	3	1	13
Postmasters and mail superintendents	18	57	19	10	0	9	2	5	29	3	11	1
Funeral directors	39	87	81	0	6	43	42	36	39	0	0	17
Managers and administrators, n.e.c.	5,079	67	40	3	2	8	29	15	38	3	2	10
Management related occupations	3,026	78	58	3	2	9	44	20	36	3	2	6
Accountants and auditors	1,261	87	78	3	2	13	63	16	34	2	2	5
Underwriters	79	73	40	0	4	7	28	34	43	1	9	15
Other financial officers	509	76	51	3	1	9	37	25	36	1	4	6
Management analysts	182	81	68	0	0	3	60	19	35	7	3	6
Personnel, training, and labor relations specialists	278	77	51	1	2	7	43	22	39	4	1	10
Buyers, wholesale and retail trade, except farm products	120	54	25	3	3	3	17	19	33	0	2	4
Purchasing agents and buyers, n.e.c.	155	64	41	3	1	10	27	11	40	3	0	5
Construction inspectors	49	94	22	4	0	9	10	27	54	11	8	24
Inspectors and compliance officers, except construction	158	81	42	0	–	9	27	40	33	8	2	9
Management related occupations, n.e.c.	232	71	40	8	3	9	24	20	45	3	–	3
Professional specialty occupations	14,923	92	82	1	3	11	68	11	25	2	1	8
Engineers, architects, and surveyors	1,846	93	81	2	2	11	68	18	40	6	3	7
Architects	115	88	80	3	0	3	75	17	40	5	0	10
Engineers	1,704	93	82	1	3	12	68	19	39	6	3	7
Aerospace engineers	101	98	96	0	3	11	82	23	48	6	2	10
Metallurgical and materials engineers	20	93	54	0	18	18	36	25	37	0	0	45
Chemical engineers	68	96	87	0	1	4	73	11	34	2	0	0
Civil engineers	260	93	87	0	4	7	81	15	31	3	1	4
Electrical and electronic engineers	504	94	82	1	3	15	66	21	37	9	6	7
Industrial engineers	156	91	72	2	2	13	58	23	53	9	5	8
Mechanical engineers	300	95	86	2	1	10	72	14	38	4	3	6
Marine engineers and naval architects	10	52	10	0	0	1	8	8	26	11	0	26
Engineers, n.e.c.	250	92	79	0	4	13	64	20	44	5	1	6
Surveyors and mapping scientists	27	74	58	9	0	20	29	0	69	7	3	12
Mathematical and computer scientists	858	88	70	1	3	13	56	23	45	3	–	10
Computer systems analysts and scientists	655	90	71	1	3	13	56	24	47	3	–	10
Operations and systems researchers and analysts	153	81	60	2	4	13	45	21	41	4	0	10
Actuaries	23	94	94	0	0	0	94	23	39	0	5	10
Statisticians	27	87	83	0	0	14	76	7	48	0	0	10
Natural scientists	436	97	90	2	1	5	81	11	32	2	1	5
Physicists and astronomers	34	100	91	0	0	0	91	6	41	0	0	16
Chemists, except biochemists	123	97	91	3	0	6	82	15	26	1	0	3
Geologists and geodesists	59	93	88	1	0	0	82	10	30	0	0	0
Physical scientists, n.e.c.	20	100	81	0	0	0	81	28	60	1	6	18
Agricultural and food scientists	20	86	84	0	0	12	72	21	39	2	0	5
Biological and life scientists	80	100	98	0	0	4	84	8	28	0	0	4
Forestry and conservation scientists	31	93	82	1	11	14	71	16	60	9	0	1
Medical scientists	57	100	95	8	0	0	83	5	13	0	0	7
Health diagnosing occupations	789	98	95	–	–	1	89	8	11	2	–	8
Physicians	520	99	96	1	–	2	90	11	15	2	1	10
Dentists	143	99	91	0	0	1	87	1	6	4	0	5
Veterinarians	59	100	100	0	0	0	94	0	0	0	0	0
Optometrists	21	75	75	0	0	0	75	0	0	0	0	0
Health diagnosing practitioners, n.e.c.	40	100	88	0	0	0	78	0	1	0	0	25
Health assessment and treating occupations	2,221	95	90	1	8	25	57	11	24	2	1	4
Registered nurses	1,616	97	91	1	10	30	52	12	24	2	1	4
Pharmacists	174	95	95	0	0	2	93	7	18	0	2	4
Dietitians	58	80	77	0	6	16	55	7	30	0	0	1
Therapists	307	93	87	0	3	15	71	11	25	1	2	5
Inhalation therapists	66	88	84	0	7	47	33	4	16	4	5	1
Occupational therapists	32	100	100	0	0	10	90	14	37	0	8	0
Physical therapists	92	94	82	0	0	4	75	17	29	0	0	2
Speech therapists	55	100	98	0	3	3	92	9	16	0	0	12
Therapists, n.e.c.	62	89	84	0	3	5	79	12	30	0	0	12
Physicians assistants	65	94	70	0	6	44	22	25	20	5	0	7
Teachers, college and university	753	97	92	1	1	5	84	2	14	2	1	6
Biological science teachers	37	100	100	0	0	0	100	0	2	0	0	0
Psychology teachers	23	100	84	0	0	11	84	0	38	0	0	2
Engineering teachers	24	94	94	0	0	8	86	0	14	0	0	0
Mathematical science teachers	54	100	100	0	0	6	88	0	0	7	6	0

Table A-1. Qualifying training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who needed training		Source of training (percent of total employment in occupation)									
			School									
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friends or relatives or other nonwork-related training
Computer science teachers	29	100	82	0	0	30	45	8	41	0	0	36
Health specialties teachers	41	84	84	0	6	11	69	4	15	5	0	0
Business, commerce, and marketing teachers	25	100	94	0	14	0	94	0	0	0	0	6
Art, drama, and music teachers	38	94	88	0	0	0	85	0	7	0	6	10
English teachers	56	100	100	0	0	0	98	0	24	0	0	0
Foreign language teachers	18	86	77	8	0	0	68	0	8	0	0	2
Postsecondary teachers, subject not specified	250	96	89	4	2	6	77	4	17	4	2	9
Teachers, except college and university	4,116	94	87	2	2	7	78	6	13	1	1	6
Teachers, prekindergarten and kindergarten	380	83	77	2	3	18	56	5	20	1	1	5
Teachers, elementary school	1,565	96	95	1	1	5	88	4	8	0	1	2
Teachers, secondary school	1,448	99	95	2	2	6	89	6	11	1	1	6
Teachers, special education	269	97	95	1	3	5	87	2	11	0	1	8
Teachers, n.e.c.	453	84	48	4	3	7	37	17	30	3	2	19
Counselors, educational and vocational	172	94	86	–	0	5	78	6	17	2	3	9
Librarians, archivists, and curators	186	83	74	–	1	5	68	1	21	0	0	3
Librarians	176	83	74	–	1	5	67	1	20	0	0	3
Social scientists and urban planners	352	91	82	0	1	1	76	11	23	1	–	10
Economists	102	83	71	0	0	5	61	19	38	2	–	7
Psychologists	220	99	92	0	0	0	89	6	14	1	0	12
Social scientists, n.e.c.	21	63	45	0	6	0	39	7	29	0	0	11
Social, recreation, and religious workers	968	82	71	1	2	8	61	14	29	1	1	9
Social workers	563	86	70	2	2	10	58	16	33	1	1	7
Recreation workers	49	72	67	0	0	13	57	5	16	0	0	0
Clergy	299	85	79	1	3	5	71	13	25	2	3	14
Religious workers, n.e.c.	57	57	54	0	1	6	48	10	26	0	3	11
Lawyers and judges	655	98	95	0	–	0	88	5	19	1	0	7
Lawyers	644	98	96	0	–	0	88	5	19	1	0	7
Writers, artists, entertainers, and athletes	1,568	85	61	4	3	13	43	14	40	2	1	18
Authors	87	90	71	7	6	7	56	0	45	1	–	17
Technical writers	62	88	76	0	0	16	55	16	48	11	0	3
Designers	414	83	61	3	4	19	36	19	40	1	–	12
Musicians and composers	118	87	52	6	1	5	42	0	28	0	0	49
Actors and directors	79	91	61	2	8	8	43	16	52	0	0	24
Painters, sculptors, craft-artists, and artist printmakers	173	85	65	5	7	23	34	5	30	2	1	21
Photographers	114	81	50	0	0	19	25	18	48	2	6	25
Artists, performers, and related workers, n.e.c.	49	79	43	0	0	15	38	22	50	0	0	16
Editors and reporters	244	87	73	4	2	7	64	14	42	4	3	13
Public relations specialists	127	87	65	2	2	8	57	21	33	5	–	14
Announcers	38	72	37	10	0	14	14	9	50	4	0	3
Athletes	55	80	41	5	0	0	33	16	49	0	0	23
Technicians and related support occupations	3,414	86	61	5	8	24	26	16	31	5	1	9
Health technologists and technicians	1,275	90	68	3	14	30	20	14	21	2	1	8
Clinical laboratory technologists and technicians	304	90	63	3	3	16	43	27	30	4	–	5
Dental hygienists	77	100	98	0	6	45	45	0	2	2	2	0
Health record technologists and technicians	40	82	56	10	4	33	9	11	36	0	4	0
Radiological technicians	143	98	66	0	14	40	15	10	15	4	0	16
Licensed practical nurses	445	97	84	7	29	44	6	7	17	1	1	9
Health technologists and technicians, n.e.c.	265	78	45	1	7	17	16	16	23	1	1	9
Technologists and technicians, except health	2,139	83	58	6	5	20	29	18	36	6	1	10
Engineering and related technologists and technicians	850	83	59	9	5	31	18	16	37	7	3	9
Electrical and electronic technicians	330	90	63	8	6	39	13	20	31	16	5	6
Engineering technicians, n.e.c.	175	72	44	8	4	17	21	11	37	3	2	10
Drafting occupations	288	89	72	11	6	34	24	16	43	1	–	10
Surveying and mapping technicians	42	57	26	5	0	12	10	8	38	3	3	8
Science technicians	165	68	43	3	1	8	29	22	29	2	1	3
Biological technicians	28	47	36	4	0	8	21	8	17	0	0	5
Chemical technicians	76	72	44	3	3	5	33	27	33	3	3	0
Science technicians, n.e.c.	61	77	48	3	0	11	30	25	33	2	0	5
Technicians, except health, engineering, and science	1,124	86	60	4	6	14	38	18	37	6	1	11
Airplane pilots and navigators	111	95	46	0	9	5	28	40	15	34	0	23
Air traffic controllers	25	52	0	0	0	0	0	13	6	28	0	7
Broadcast equipment operators	20	57	38	6	5	13	14	13	26	11	6	6
Computer programmers	567	93	72	4	6	20	44	19	44	3	0	11
Legal assistants	160	82	55	6	6	15	30	9	37	3	0	6
Technicians, n.e.c.	235	78	56	4	4	9	41	16	38	2	2	11
Sales occupations	5,980	44	18	1	1	4	11	13	26	1	1	7
Supervisors and proprietors, sales occupations	1,826	49	21	2	2	5	13	13	30	2	2	8
Sales representatives, finance and business services	1,721	77	39	2	4	11	21	30	34	1	3	15
Insurance sales occupations	480	81	31	2	5	8	19	43	40	–	6	9
Real estate sales occupations	602	87	49	1	7	20	19	27	27	0	2	25
Securities and financial services sales occupations	237	79	47	1	2	6	38	40	36	1	6	9
Advertising and related sales occupations	73	53	25	0	5	5	16	13	36	0	0	5
Sales occupations, other business services	329	64	33	2	2	8	19	17	34	3	1	11
Sales representatives, commodities except retail (including sales engineers)	917	56	32	1	1	4	25	17	34	1	1	7
Sales engineers	26	93	74	9	9	12	38	29	65	0	0	23
Sales representatives, mining, manufacturing, and wholesale	891	56	31	1	1	4	25	17	34	1	1	7
Sales workers, retail and personal services	1,491	25	5	1	–	1	2	6	18	1	–	3
Sales workers, motor vehicles and boats	85	31	7	2	1	3	4	9	22	1	0	6
Sales workers, apparel	77	17	3	2	1	0	1	6	12	0	1	2

Table A-1. Qualifying training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who needed training		Source of training (percent of total employment in occupation)									
			School									
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friends or relatives or other nonwork-related training
Sales workers, shoes	23	21	1	1	0	0	0	4	16	0	0	0
Sales workers, furniture and home furnishings	45	26	6	0	1	1	4	8	18	0	2	3
Sales workers, radio, television, hi-fi, and appliances	72	42	10	0	1	4	6	18	28	2	0	9
Sales workers, hardware and building supplies	67	32	6	1	1	1	3	5	27	0	1	4
Sales workers, parts	51	34	16	2	5	5	3	6	22	4	4	16
Sales workers, other commodities	357	26	6	1	–	1	4	7	16	1	1	3
Sales counter clerks	67	37	11	1	3	2	2	6	19	2	0	11
Cashiers	512	21	2	1	–	–	–	4	17	–	–	1
Street and door-to-door sales workers	119	35	10	2	0	2	8	12	19	0	0	7
News vendors	18	13	2	0	0	0	2	2	8	0	0	4
Sales related occupations	25	40	16	0	6	3	7	8	20	0	4	14
Demonstrators, promoters and models, sales	5	16	0	0	0	0	0	6	6	0	0	4
Sales support occupations, n.e.c.	10	44	8	0	0	0	8	14	36	0	0	14
Administrative support occupations, including clerical	10,028	55	31	11	3	10	9	10	30	1	1	4
Supervisors, administrative support occupations	508	62	31	4	1	10	19	22	38	5	3	3
Supervisors, general office	310	65	31	4	1	10	18	25	36	5	1	2
Supervisors, computer equipment operators	20	88	35	0	0	14	26	53	74	0	17	13
Supervisors, financial records processing	67	67	46	7	1	17	27	2	37	5	6	11
Supervisors, distribution, scheduling, and adjusting clerks	107	50	23	2	2	6	15	22	39	5	4	2
Computer equipment operators	472	65	35	6	4	16	9	12	38	2	–	2
Computer operators	470	65	35	6	4	16	9	12	38	2	–	2
Secretaries, stenographers, and typists	2,869	67	51	24	6	17	8	8	32	1	1	6
Secretaries	2,457	68	52	26	6	17	8	8	32	1	1	6
Stenographers	26	100	87	7	8	46	24	7	45	1	0	0
Typists	387	63	42	17	4	13	9	10	32	–	1	5
Information clerks	684	48	23	11	2	6	5	9	28	1	–	4
Interviewers	74	52	30	13	3	5	10	11	29	0	0	1
Hotel clerks	31	33	6	0	4	0	2	11	16	0	0	3
Transportation ticket and reservation agents	90	73	23	2	4	3	12	33	42	2	–	6
Receptionists	392	47	24	12	2	7	4	6	30	–	–	5
Information clerks, n.e.c.	96	40	24	15	0	7	6	8	17	1	1	–
Records processing occupations, except financial	377	43	22	8	1	7	7	7	24	1	1	3
Order clerks	104	53	22	12	0	8	4	17	28	3	1	3
Personnel clerks, except payroll and timekeeping	29	52	35	5	1	7	21	4	22	5	0	11
Library clerks	44	35	21	4	0	4	11	0	20	0	0	0
File clerks	109	35	19	9	1	6	6	6	17	1	2	4
Records clerks	80	52	23	7	4	10	4	2	38	0	2	4
Financial records processing occupations	1,494	58	35	10	4	13	9	7	33	1	1	5
Bookkeepers, accounting, and auditing clerks	1,201	59	38	10	4	16	10	7	33	–	1	5
Payroll and timekeeping clerks	101	55	25	11	2	7	6	8	32	2	0	7
Billing clerks	114	50	26	12	5	3	9	5	28	3	0	4
Cost and rate clerks	49	49	18	0	2	5	10	13	40	0	0	4
Billing, posting, and calculating machine operators	29	62	24	6	7	7	0	13	41	0	0	3
Duplicating, mail and other office machine operators	29	41	4	4	0	0	0	5	31	4	0	3
Duplicating machine operators	9	23	0	0	0	0	0	0	23	0	0	2
Office machine operators, n.e.c.	20	74	9	9	0	0	0	12	49	10	0	6
Communications equipment operators	100	53	14	2	1	4	3	17	34	2	0	1
Telephone operators	94	53	14	2	2	3	4	18	34	1	0	1
Mail and message distributing occupations	314	30	3	1	–	1	2	13	17	–	0	2
Postal clerks, except mail carriers	158	46	5	2	0	1	2	24	27	–	0	3
Mail carriers, postal service	101	25	1	–	–	0	–	11	15	–	0	2
Mail clerks, except postal service	31	19	7	2	1	1	4	2	11	1	0	0
Messengers	25	16	1	0	0	0	1	6	7	0	0	5
Material recording, scheduling, and distributing clerks n.e.c.	734	38	14	2	2	5	6	8	26	2	1	2
Dispatchers	124	56	19	4	1	7	9	17	30	2	0	5
Production coordinators	116	59	30	–	4	12	19	14	45	6	2	3
Traffic, shipping, and receiving clerks	172	28	8	3	2	2	1	5	23	2	1	1
Stock and inventory clerks	229	37	16	2	2	5	7	6	22	2	1	2
Meter readers	17	35	15	5	0	6	4	13	21	0	0	0
Weighers, measurers, and checkers	21	34	0	0	0	0	0	0	30	0	0	10
Expediters	47	34	8	–	0	6	1	6	28	–	–	0
Material recording, scheduling, and distributing	9	29	18	0	0	13	0	3	19	0	0	0
Adjusters and investigators	707	58	28	5	2	8	13	20	31	1	1	6
Insurance adjusters, examiners, and investigators	243	68	33	3	3	8	20	37	32	0	2	6
Investigators and adjusters, except insurance	330	56	26	7	1	9	11	15	31	1	1	6
Eligibility clerks, social welfare	59	63	45	7	5	15	9	18	35	0	0	4
Bill and account collectors	74	43	17	3	3	4	7	6	23	1	0	4
Miscellaneous administrative support occupations	1,740	54	29	8	3	9	10	10	29	1	1	5
General office clerks	334	48	27	10	3	9	8	7	29	1	1	4
Bank tellers	279	55	15	5	2	3	4	22	32	0	1	3
Proofreaders	12	61	20	0	0	10	10	10	29	0	0	21
Data-entry keyers	307	67	41	12	8	12	10	8	31	1	–	6
Statistical clerks	39	65	39	5	0	14	25	8	53	0	0	2
Teachers aides	219	44	31	5	3	10	14	4	16	0	0	6
Administrative support occupations, n.e.c	549	57	31	8	2	10	12	11	32	1	1	5
Private household occupations	85	12	4	2	0	1	1	1	4	0	0	6
Launderers, cooks, housekeepers, and butlers	5	14	9	0	0	0	9	0	14	0	0	0
Housekeepers and butlers	2	8	0	0	0	0	0	0	8	0	0	0
Child care workers, private household	43	15	6	3	0	1	1	1	6	0	0	6

Table A-1. Qualifying training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who needed training		Source of training (percent of total employment in occupation)									
			School									
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friends or relatives or other nonwork-related training
Private household cleaners and servants	38	10	1	–	0	1	0	1	1	0	0	7
Service workers, except private household	5.758	39	14	2	4	6	3	10	18	2	–	7
Protective service occupations	1.265	61	24	2	3	13	8	31	23	9	1	10
Supervisors, protective service occupations	125	71	28	1	3	14	16	42	34	17	2	11
Supervisors, firefighting and fire prevention occupations	31	57	21	0	0	8	13	35	22	5	0	9
Supervisors, police and detectives	53	74	39	2	8	20	23	46	38	14	0	13
Supervisors, guards	40	83	18	0	0	10	9	43	42	34	6	11
Firefighting and fire prevention occupations	151	73	26	–	0	18	6	35	25	8	3	9
Firefighting occupations	138	72	22	–	0	16	6	36	26	9	3	10
Police and detectives	650	74	34	3	6	16	11	43	27	12	2	10
Police and detectives, public service	373	80	39	3	7	17	14	48	32	16	1	12
Sheriffs, bailiffs, and other law enforcement officers	92	70	32	0	2	17	11	40	24	10	2	13
Correctional institution officers	184	67	25	3	5	12	6	38	20	7	4	6
Guards	338	42	13	1	1	8	3	14	16	4	–	8
Crossing guards	8	30	0	0	0	0	0	16	14	0	0	0
Guards and police, except public service	297	40	13	1	1	8	3	14	16	5	–	8
Protective service occupations, n.e.c.	33	75	18	6	0	6	5	22	17	0	0	24
Food preparation and service occupations	1,202	23	3	1	1	1	–	3	18	–	–	3
Supervisors, food preparation and service occupations	123	38	8	1	2	3	3	9	30	–	1	4
Bartenders	101	35	5	0	1	1	0	3	28	0	0	3
Waiters and waitresses	296	25	1	–	–	1	–	3	21	0	–	2
Cooks, except short order	470	27	4	1	1	2	–	3	19	1	1	6
Short order cooks	28	35	2	0	2	0	0	7	26	0	0	4
Food counter, fountain and related occupations	50	19	0	0	0	0	0	2	13	0	0	–
Kitchen workers, food preparation	18	13	3	0	3	0	0	0	11	0	0	0
Waiters/waitresses assistants	37	9	0	0	0	0	0	2	8	0	0	0
Miscellaneous food preparation occupations	79	11	2	1	–	–	–	1	8	–	0	2
Health service occupations	1.476	70	33	5	10	15	5	15	33	1	1	6
Dental assistants	142	76	33	3	6	15	6	9	43	3	0	6
Health aides, except nursing	310	63	36	3	13	14	8	11	27	2	–	6
Nursing aides, orderlies, and attendants	1.025	71	32	5	9	16	3	17	34	–	1	6
Cleaning and building service occupations, except private household	508	16	3	1	1	1	1	3	11	1	–	4
Supervisors, cleaning and building service workers	53	30	8	2	4	4	7	11	23	2	0	7
Maids and housemen	91	13	1	0	–	–	–	2	10	0	0	3
Janitors and cleaners	343	15	3	1	1	1	–	2	10	1	–	5
Pest control occupations	21	60	0	0	0	0	0	41	41	0	4	5
Personal service occupations	1.307	53	28	3	10	12	3	9	13	1	–	14
Supervisors, personal service occupations	46	72	27	7	5	7	4	27	33	0	0	11
Barbers	106	95	44	8	21	17	2	14	14	2	0	39
Hairdressers and cosmetologists	607	94	65	7	29	28	1	8	8	0	1	25
Attendants, amusement and recreation facilities	62	46	8	0	3	5	0	14	28	3	0	2
Guides	14	47	16	0	0	6	10	0	10	6	0	19
Public transportation attendants	50	87	17	0	0	0	17	75	25	0	0	3
Baggage porters and bellhops	13	35	0	0	0	0	0	9	29	0	0	0
Welfare service aides	28	30	10	3	1	3	2	6	8	3	0	10
Child care workers, except private household	262	25	11	2	–	6	3	2	10	–	–	8
Personal service occupations, n.e.c.	85	43	15	0	1	3	10	12	22	0	–	9
Farming, forestry, and fishing occupations	815	28	8	2	1	2	4	3	17	1	1	11
Farm operators and managers	402	32	14	4	1	4	7	2	17	1	1	16
Farmers, except horticultural	329	30	12	4	1	4	6	2	16	1	1	17
Horticultural specialty farmers	19	92	67	8	0	0	59	0	25	0	0	0
Managers, farms, except horticultural	50	35	17	5	1	3	10	3	20	0	0	9
Farm occupations, except managerial	131	16	3	1	1	1	2	–	10	–	–	6
Supervisors, farm workers	10	21	8	0	0	0	8	2	15	0	0	2
Farm workers	117	16	3	1	1	1	1	–	10	–	–	7
Nursery workers	4	11	0	0	0	0	0	6	6	0	0	0
Related agricultural occupations	243	35	6	0	2	2	2	6	24	1	1	10
Supervisors, related agricultural occupations	33	65	13	0	0	6	7	22	56	10	0	19
Groundskeepers and gardeners, except farm	133	26	3	0	1	1	1	4	19	1	0	5
Animal caretakers, except farm	76	59	12	0	5	5	2	8	34	0	3	23
Forestry and logging occupations	24	23	3	0	0	2	1	10	13	0	0	3
Forestry workers, except logging	10	33	9	0	0	7	2	14	13	0	0	0
Timber cutting and logging occupations	11	16	0	0	0	0	0	5	10	0	0	4
Fishers, hunters, and trappers	14	41	5	5	0	0	0	0	22	0	0	24
Fishers	12	37	6	6	0	0	0	0	21	0	0	19
Precision production, craft, and repair occupations	8.088	61	19	6	4	9	4	20	35	5	2	11
Mechanics and repairers	3.023	67	26	8	5	13	4	23	35	8	4	12
Supervisors, mechanics and repairers	144	71	26	10	1	14	7	34	41	11	10	6
Mechanics and repairers, except supervisors	2.879	67	26	8	5	13	3	22	35	8	3	13
Vehicle and mobile equipment mechanics and repairers	1.209	68	28	12	6	13	2	19	34	8	3	16
Automobile mechanics	538	65	28	13	6	15	2	16	33	5	2	20
Bus, truck, and stationary engine mechanics	215	70	25	13	3	10	2	17	35	7	4	15
Aircraft engine mechanics	112	92	37	6	7	18	7	44	39	42	10	3
Small engine repairers	52	81	35	12	10	14	0	29	45	12	0	30
Automobile body and related repairers	140	73	22	14	4	9	0	14	36	1	0	17
Aircraft mechanics, except engine	31	67	29	6	4	25	0	54	30	13	9	0
Heavy equipment mechanics	107	65	29	12	9	9	4	16	36	9	2	15
Farm equipment mechanics	13	31	11	3	0	8	0	2	26	8	8	4
Industrial machinery repairers	358	64	20	4	7	11	2	21	35	7	5	9
Machinery maintenance occupations	8	37	0	0	0	0	0	4	27	10	0	0

Table A-1. Qualifying training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who needed training		Source of training (percent of total employment in occupation)									
			School									
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friends or relatives or other nonwork-related training
Electrical and electronic equipment repairers	538	74	29	6	5	14	8	29	39	15	5	7
Electronic repairers, commercial and industrial equipment	154	79	38	7	9	21	7	25	40	19	14	7
Data processing equipment repairers	146	88	50	6	4	19	24	30	53	13	5	14
Household appliance and power tool repairers	35	75	32	15	14	23	0	20	38	8	6	20
Telephone line installers and repairers	36	46	8	4	0	4	0	26	22	4	0	3
Telephone installers and repairers	132	68	9	2	2	3	3	38	36	13	0	1
Miscellaneous electrical and electronic equipment repairers	34	78	37	12	9	27	0	21	32	33	0	11
Heating, air conditioning, and refrigeration mechanics	176	77	37	3	7	21	6	32	43	6	3	12
Miscellaneous mechanics and repairers	589	61	20	5	3	11	2	22	32	4	2	12
Camera, watch, and musical instrument repairers	33	99	24	0	0	14	10	43	61	14	0	39
Office machine repairers	66	82	29	0	2	27	0	31	28	4	2	12
Mechanical controls and valve repairers	16	60	17	8	0	8	8	38	28	10	2	4
Elevator installers and repairers	28	69	5	5	0	0	0	53	23	0	9	25
Millwrights	54	65	25	10	3	16	0	38	39	3	0	13
Specified mechanics and repairers, n.e.c.	229	53	15	1	3	11	–	16	30	3	3	10
Not specified mechanics and repairers	152	58	26	11	3	8	6	16	30	7	1	10
Construction trades	2,921	62	15	5	4	6	3	18	37	3	1	14
Supervisors, construction occupations	408	63	24	6	5	9	8	17	36	3	1	18
Supervisors, electricians and power transmission installers	37	94	66	13	16	9	34	16	52	18	0	9
Supervisors, plumber, pipefitters, and steamfitters	22	89	23	0	14	23	0	35	46	9	0	21
Supervisors, n.e.c.	332	60	22	6	4	9	6	17	35	2	1	18
Construction trades, except supervisors	2,513	61	13	5	3	5	2	19	38	3	1	14
Brickmasons and stonemasons	104	68	21	13	5	1	3	18	36	2	1	19
Tile setters, hard and soft	32	71	8	0	8	0	0	16	37	0	0	29
Carpet installers	67	65	1	0	1	0	0	9	47	0	0	19
Carpenters	721	59	12	6	1	4	2	11	42	1	1	15
Drywall installers	58	56	4	1	3	0	0	11	48	0	0	11
Electricians	559	80	29	10	9	12	4	39	40	13	4	9
Electrician apprentices	23	92	45	5	31	19	9	53	52	10	0	32
Electrical power installers and repairers	92	66	18	1	6	7	7	42	29	4	3	5
Painters, construction and maintenance	200	41	1	–	–	–	0	5	32	1	1	13
Plumbers, pipefitters, and steamfitters	319	73	17	5	3	9	1	24	36	4	3	17
Concrete and terrazzo finishers	28	50	0	0	0	0	0	6	32	0	0	25
Glaziers	12	35	0	0	0	0	0	13	22	0	0	0
Insulation workers	30	68	8	0	0	8	0	10	48	0	0	14
Roofers	80	49	1	1	0	0	0	4	37	0	0	12
Sheetmetal duct installers	23	47	15	4	0	11	0	28	34	0	0	13
Structural metal workers	41	81	6	0	0	2	4	67	14	0	0	0
Drillers, earth	12	56	0	0	0	0	0	8	33	0	0	14
Construction trades, n.e.c.	76	36	7	0	1	7	0	8	23	3	1	12
Extractive occupations	71	43	12	0	0	5	6	12	33	–	0	2
Supervisors, extractive occupations	23	54	17	0	0	0	17	16	49	1	0	7
Drillers, oil well	6	17	0	0	0	0	0	1	16	0	0	0
Mining machine operators	20	50	25	0	0	17	7	9	32	0	0	1
Mining occupations, n.e.c.	17	42	5	0	0	5	0	15	27	0	0	0
Precision production occupations	2,073	55	18	5	3	7	5	18	32	4	2	7
Supervisors, production occupations	666	54	22	4	2	7	11	20	35	4	3	5
Precision metal working occupations	616	66	20	7	4	9	3	26	34	4	1	8
Tool and die makers	92	68	26	10	3	11	9	54	22	0	0	6
Machinists	367	67	21	8	4	9	2	21	38	6	1	7
Precious stones and metals workers (jewelers)	28	56	13	0	1	11	3	7	32	1	7	25
Engravers, metal	12	51	10	0	10	0	0	25	26	0	0	0
Sheet metal workers	67	65	9	5	1	3	0	27	35	6	2	9
Precision woodworking occupations	58	61	21	9	0	1	8	17	40	0	0	16
Cabinet makers and bench carpenters	42	72	34	15	0	2	13	15	44	0	0	18
Furniture and wood finishers	16	47	0	0	0	0	0	22	38	0	0	12
Precision textile, apparel, and furnishings machine workers	107	50	8	6	4	1	–	2	26	0	0	19
Dressmakers	47	44	4	2	0	1	1	2	16	0	0	26
Tailors	19	45	9	7	2	0	0	6	22	0	0	21
Upholsterers	36	63	13	12	13	0	0	1	45	0	0	4
Precision workers, assorted materials	205	41	12	3	3	6	2	9	24	2	–	5
Patternmakers, layout workers, and cutters	18	89	41	21	21	10	0	27	21	0	0	59
Optical goods workers	28	57	13	0	4	4	5	15	36	4	1	1
Dental laboratory and medical appliance technicians	46	84	34	3	3	27	0	9	44	7	0	12
Bookbinders	9	34	10	0	0	10	0	2	33	0	0	0
Electrical and electronic equipment assemblers	89	29	6	3	2	2	1	8	17	1	0	1
Miscellaneous precision workers, n.e.c.	10	41	5	0	0	5	0	5	31	5	5	0
Precision food production occupations	150	38	5	2	0	3	1	6	26	1	–	5
Butchers and meat cutters	77	33	3	0	0	3	0	7	23	0	1	1
Bakers	50	44	6	5	0	1	0	5	27	2	0	13
Food batchmakers	23	54	13	2	0	6	5	3	39	0	0	13
Precision inspectors, testers, and related workers	83	58	25	8	3	12	4	17	32	6	2	6
Inspectors, testers, and graders	74	55	26	9	3	13	4	15	31	7	2	7
Plant and system operators	189	70	31	3	4	16	8	23	42	11	2	12
Water and sewage treatment plant operators	53	69	31	0	4	13	8	31	48	8	3	6
Power plant operators	28	65	17	8	3	0	5	13	44	8	0	8
Stationary engineers	89	77	42	3	5	25	11	26	39	17	3	19

Table A-1. Qualifying training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who needed training		Source of training (percent of total employment in occupation)									
			School									
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friends or relatives or other nonwork-related training
Miscellaneous plant and system operators	18	57	14	2	0	12	0	3	35	0	0	11
Machine operators, assemblers and inspectors	2,940	38	8	3	2	3	1	9	25	1	–	5
Machine operators and tenders except precision	1,867	36	6	2	1	2	1	8	25	–	–	5
Metalworking and plastic working machine operators	147	33	7	4	1	2	1	11	24	–	–	2
Lathe and turning machine setup operators	8	31	18	10	0	8	0	8	23	0	0	0
Lathe and turning machine operators	21	56	27	10	7	11	0	15	33	0	0	0
Milling and planing machine operators	9	46	14	14	0	0	0	22	33	0	0	0
Punching and stamping press machine operators	31	24	2	2	0	0	0	10	17	0	0	3
Drilling and boring machine operators	10	48	7	7	0	0	0	13	34	0	7	0
Grinding, abrading, buffing, and polishing machine operators	32	28	6	2	0	2	2	8	21	0	0	4
Forging machine operators	8	26	7	0	0	0	0	4	18	4	0	0
Miscellaneous metal, plastic, stone, and glass working machine operators	13	41	0	0	0	0	0	9	41	0	0	0
Metal and plastic processing machine operators	61	35	12	3	6	6	4	16	20	0	1	1
Molding and casting machine operators	43	36	14	4	7	7	5	17	24	0	1	2
Metal plating machine operators	13	39	15	0	6	8	0	9	15	0	0	0
Woodworking machine operators	46	34	4	2	1	1	0	6	30	0	0	7
Wood lathe, routing, and planing machine operators	3	13	7	0	0	7	0	0	13	0	0	0
Sawing machine operators	25	34	0	0	0	0	0	8	32	0	0	7
Miscellaneous woodworking machine operators	16	65	18	11	8	0	0	9	56	0	0	8
Printing machine operators	313	64	17	7	3	6	3	20	39	2	1	8
Printing machine operators	196	58	12	7	3	3	2	21	34	3	0	7
Photoengravers and lithographers	35	73	28	8	0	15	5	24	51	0	6	5
Typesetters and compositors	53	78	36	11	8	16	1	15	46	0	0	15
Miscellaneous printing machine operators	29	75	17	0	0	7	9	11	61	0	0	7
Textile, apparel, and furnishings machine operators	374	31	1	1	0	0	–	2	20	0	0	11
Winding and twisting machine operators	19	22	0	0	0	0	0	2	19	0	0	4
Knitting, looping, taping, and weaving machine operators	17	36	5	5	0	0	0	5	36	0	0	0
Textile sewing machine operators	239	37	2	2	0	0	–	2	20	0	0	15
Shoe machine operators	13	36	0	0	0	0	0	0	24	0	0	12
Pressing machine operators	14	15	0	0	0	0	0	2	10	0	0	2
Laundering and dry cleaning machine operators	42	20	0	0	0	0	0	1	13	0	0	8
Miscellaneous textile machine operators	26	39	0	0	0	0	0	2	37	0	0	6
Machine operators, assorted materials	924	34	5	2	1	2	1	8	24	–	–	3
Cementing and gluing machine operators	11	35	0	0	0	0	0	11	35	0	0	8
Packaging and filling machine operators	99	23	2	1	0	1	0	3	17	0	0	2
Extruding and forming machine operators	12	34	8	0	0	8	0	4	26	0	0	0
Mixing and blending machine operators	25	38	7	3	0	0	3	6	28	0	0	0
Separating, filtering, and clarifying machine operators	25	31	0	0	0	0	0	5	26	0	0	0
Compressing and compacting machine operators	3	13	0	0	0	0	0	0	13	0	0	0
Painting and paint spraying machine operators	82	46	13	5	3	8	0	6	28	1	2	8
Washing, cleaning, and pickling machine operators	1	4	0	0	0	0	0	4	4	0	0	0
Furnace, kiln, and oven operators except food	41	43	4	2	0	1	1	10	32	2	0	3
Crushing and grinding machine operators	6	14	–	0	0	–	0	–	14	0	0	0
Slicing and cutting machine operators	49	27	1	0	1	0	0	6	16	0	0	4
Photographic process machine operators	75	71	25	5	5	7	7	12	45	0	0	15
Miscellaneous machine operators, n.e.c.	356	35	5	2	1	2	–	9	27	–	–	2
Machine operators, not specified	127	34	5	2	–	2	–	11	20	0	–	3
Fabricators, assemblers, and handworking occupations	732	40	12	5	3	5	1	8	24	1	–	5
Welders and cutters	361	66	30	13	8	9	2	12	36	2	0	10
Solderers and brazers	26	59	5	0	5	0	0	27	34	0	0	0
Assemblers	277	26	5	2	1	3	–	6	18	1	–	2
Hand cutting and trimming occupations	5	19	5	0	0	5	0	0	13	0	0	0
Hand molding, casting, and forming occupations	10	46	12	0	0	9	2	6	18	0	0	12
Hand painting, coating, and decorating occupations	10	42	19	19	0	6	0	9	27	0	0	6
Hand engraving and printing occupations	10	27	0	0	0	0	0	0	27	0	0	0
Miscellaneous hand working occupations	31	41	6	0	0	0	6	0	17	0	0	26
Production inspectors, testers, samplers and weighers	341	45	9	1	1	4	3	18	30	3	0	3
Production inspectors, checkers, and examiners	293	49	9	1	1	4	2	21	32	3	0	3
Production testers	27	51	18	0	1	7	9	21	38	0	0	7
Graders and sorters except agricultural	17	18	0	0	0	0	0	5	14	0	0	1
Transportation and material moving occupations	1,842	41	4	1	1	2	–	11	23	2	–	10
Motor vehicle operators	1,328	41	5	1	1	2	1	11	21	2	–	11
Supervisors, motor vehicle operators	36	43	8	0	0	7	3	26	31	0	0	1
Truckdrivers, heavy	671	42	6	1	1	3	1	7	23	3	–	14
Truckdrivers, light	164	25	3	2	–	1	1	6	14	1	–	9
Driver-sales workers	79	37	4	1	0	3	0	9	29	0	0	2
Bus drivers	343	67	6	1	1	3	1	32	27	3	0	11
Taxi cab drivers and chauffeurs	27	18	2	0	0	2	0	1	6	1	0	8
Parking lot attendants	6	13	0	0	0	0	0	6	0	0	0	7
Transportation occupations except motor vehicle	100	61	2	0	2	1	0	28	35	3	2	7
Rail transportation occupations	76	58	1	0	1	1	0	30	36	1	0	4
Railroad conductors and yardmasters	26	59	0	0	0	0	0	27	37	0	0	0
Locomotive operating occupations	39	80	3	0	3	3	0	46	46	3	0	11
Railroad brake, signal, and switch operators	9	26	0	0	0	0	0	7	18	0	0	0
Water transportation occupations	24	72	8	0	7	1	0	23	32	9	7	21
Material moving equipment operators	414	40	2	1	1	1	0	9	27	1	0	8
Operating engineers	131	55	3	0	3	1	0	15	38	2	0	11
Crane and tower operators	46	64	4	0	0	4	0	27	49	0	0	20

Table A-1. Qualifying training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who needed training		Source of training (percent of total employment in occupation)									
			School									
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Armed Forces	Correspondence course	Friends or relatives or other nonwork-related training
Excavating and loading machine operators	24	31	0	0	0	0	0	4	30	0	0	3
Grader, dozer, and scraper operators	41	58	0	0	0	0	0	1	30	4	0	24
Industrial truck and tractor equipment operators	145	30	2	1	1	1	0	6	19	1	0	4
Miscellaneous material moving equipment operators	20	30	4	0	3	0	0	2	20	0	0	8
Handlers, equipment cleaners, helpers and laborers	839	20	3	1	–	1	1	3	14	–	–	3
Helpers, construction and extractive occupations	27	25	5	5	3	3	0	6	20	0	0	9
Helpers, construction trades	27	26	5	5	3	3	0	6	20	0	0	9
Construction laborers	151	31	3	2	1	0	–	8	21	–	–	9
Production helpers	22	32	7	7	0	0	0	3	22	0	0	0
Freight, stock, and material movers, hand	249	15	1	–	–	–	–	2	12	1	–	1
Garbage collectors	14	30	5	0	0	0	5	9	5	0	0	12
Stock handlers and baggers	83	10	0	0	0	0	0	1	9	0	–	1
Machine feeders and offbearers	22	20	4	2	0	2	0	0	20	0	0	0
Freight, stock, and material movers, hand, n.e.c.	123	20	2	0	--	1	1	4	14	1	0	1
Garage and service station related occupations	51	21	7	5	0	1	1	3	10	1	0	9
Vehicle washers and equipment cleaners	29	16	0	0	0	0	0	5	13	0	0	2
Hand packers and packagers	56	22	4	2	0	2	0	1	16	0	0	2
Laborers, except construction	240	19	3	1	–	1	1	2	13	–	–	3

[1] Occupations with less than 20,000 employed are excluded.
– Value too small to display.

Table A-2. Skill improvement training: Sources of training by detailed occupation, 1991

Occupation[1]	Workers who took training		Source of training (percent of total employment in occupation)							
			School							
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Other types of training
Total employed, age 16 and over	46,814	41	13	–	1	4	5	16	15	7
Executive, administrative, and managerial occupations	7,853	53	18	–	1	5	7	25	18	12
Officials and administrators, public administration	400	70	19	–	2	6	8	40	22	15
Chief executives/general administrators, public administration	23	74	25	0	0	20	0	39	11	18
Administrators and officials, public administration	371	70	19	1	2	6	8	41	23	15
Executives, officials, and managers, except public administration	5,257	51	18	–	1	5	7	23	17	12
Administrators, protective services	39	85	53	0	9	13	11	17	18	14
Financial managers	318	63	23	1	1	5	10	35	17	16
Personnel and labor relations managers	84	73	17	–	–	3	8	26	26	28
Purchasing managers	59	62	19	0	0	6	6	32	30	22
Managers, marketing, advertising, and public relations	331	63	21	0	2	5	10	33	24	11
Administrators, education and related fields	395	70	42	–	0	3	26	22	17	14
Managers, medicine and health	143	72	31	–	0	4	22	34	20	18
Managers, properties and real estate	203	42	18	1	3	7	4	14	9	12
Postmasters and mail superintendents	24	76	5	0	3	2	3	41	51	4
Funeral directors	18	39	27	0	9	17	0	0	10	18
Managers and administrators, n.e.c.	3,643	48	15	–	1	5	5	21	17	11
Management related occupations	2,197	57	19	–	1	6	7	28	20	11
Accountants and auditors	803	55	24	–	2	6	10	23	17	12
Underwriters	74	68	6	0	0	2	2	29	25	17
Other financial officers	433	65	18	–	–	7	7	35	22	11
Management analysts	115	51	18	0	0	5	10	26	22	10
Personnel, training, and labor relations specialists	229	63	17	0	1	4	7	36	21	14
Buyers, wholesale and retail trade, except farm products	87	39	10	–	4	8	–	16	17	6
Purchasing agents and buyers, n.e.c.	115	48	15	0	0	3	8	28	19	3
Construction inspectors	40	75	15	0	2	13	0	32	9	31
Inspectors and compliance officers, except construction	129	66	21	1	2	8	6	37	24	11
Management related occupations, n.e.c.	172	52	12	1	1	5	4	30	23	8
Professional specialty occupations	10,847	67	34	–	1	5	20	20	17	15
Engineers, architects, and surveyors	1,297	65	28	–	1	8	14	36	21	8
Architects	59	45	15	0	0	9	5	16	20	11
Engineers	1,213	66	29	–	1	8	14	38	22	8
Aerospace engineers	73	70	26	0	0	4	20	39	26	6
Metallurgical and materials engineers	13	57	37	18	18	21	16	38	21	19
Chemical engineers	39	55	13	0	0	8	1	40	22	2
Civil engineers	172	62	25	0	2	4	7	38	18	6
Electrical and electronic engineers	378	70	36	–	1	11	20	42	27	7
Industrial engineers	120	70	26	0	0	10	11	39	25	15
Mechanical engineers	215	68	33	1	2	8	19	34	20	8
Marine engineers and naval architects	4	19	1	0	0	0	0	0	0	1
Engineers, n.e.c.	171	63	24	0	0	5	10	36	14	10
Surveyors and mapping scientists	25	67	32	0	9	8	9	14	17	12
Mathematical and computer scientists	670	69	26	–	2	6	14	43	21	9
Computer systems analysts and scientists	495	68	25	–	2	7	12	42	20	8
Operations and systems researchers and analysts	129	68	29	0	1	5	20	45	26	7
Actuaries	21	88	13	0	0	0	7	29	38	40
Statisticians	25	80	29	0	0	0	11	47	14	25
Natural scientists	282	63	27	0	1	3	15	26	26	11
Physicists and astronomers	25	73	45	0	0	3	37	25	45	10
Chemists, except biochemists	76	60	23	0	0	5	8	29	14	15
Geologists and geodesists	41	65	24	0	0	5	16	39	30	2
Physical scientists, n.e.c.	11	57	28	0	0	0	28	19	23	8
Agricultural and food scientists	20	89	36	0	14	0	28	47	61	9
Biological and life scientists	39	48	26	0	0	–	17	11	16	17
Forestry and conservation scientists	26	78	20	0	0	0	12	36	45	9
Medical scientists	31	54	24	0	0	2	11	16	22	10
Health diagnosing occupations	655	82	38	0	–	3	24	10	11	38
Physicians	420	80	34	0	1	1	21	12	13	36
Dentists	111	77	45	0	0	8	30	8	5	39
Veterinarians	57	97	50	0	0	9	38	11	3	41
Optometrists	27	94	43	0	0	0	35	7	17	55
Health diagnosing practitioners, n.e.c.	33	84	42	0	0	14	13	0	7	36
Health assessment and treating occupations	1,685	72	25	–	1	6	11	26	23	19
Registered nurses	1,222	73	26	–	2	6	11	29	24	17
Pharmacists	119	65	22	0	0	3	13	15	22	24
Dietitians	43	58	16	0	0	3	13	28	18	15
Therapists	249	75	23	0	1	8	12	22	20	27
Inhalation therapists	47	63	21	0	0	21	3	30	12	3
Occupational therapists	26	82	13	0	0	6	7	24	35	40
Physical therapists	76	78	21	0	0	5	8	20	21	37
Speech therapists	43	79	17	0	0	0	15	28	14	50
Therapists, n.e.c.	56	80	38	0	2	5	28	13	25	15
Physicians assistants	52	76	43	3	3	14	6	23	20	16
Teachers, college and university	446	57	38	0	–	3	26	7	11	13
Biological science teachers	16	43	25	0	0	0	25	0	0	18
Psychology teachers	10	44	34	0	0	11	22	0	24	22
Engineering teachers	9	36	17	0	0	8	8	14	0	5
Mathematical science teachers	34	63	53	0	0	2	34	3	7	0
Computer science teachers	14	48	3	0	0	0	3	22	4	19
Health specialties teachers	39	80	41	0	0	5	36	17	32	21

Table A-2. Skill improvement training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who took training		Source of training (percent of total employment in occupation)							
			School							
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Other types of training
Business, commerce, and marketing teachers	17	68	68	0	0	0	37	0	0	5
Art, drama, and music teachers	22	55	35	0	0	0	22	0	5	20
English teachers	36	63	52	0	0	0	38	0	16	0
Foreign language teachers	12	58	36	0	0	0	22	0	2	21
Postsecondary teachers, subject not specified	150	58	38	0	1	6	25	10	14	13
Teachers, except college and university	3,262	75	55	1	2	6	36	13	11	12
Teachers, prekindergarten and kindergarten	314	68	41	0	2	12	17	11	13	17
Teachers, elementary school	1,302	80	63	1	1	4	43	12	11	11
Teachers, secondary school	1,126	77	63	1	2	6	41	11	9	13
Teachers, special education	206	74	60	0	3	5	37	11	7	8
Teachers, n.e.c.	315	58	21	1	3	5	13	22	21	14
Counselors, educational and vocational	124	67	46	0	2	2	35	22	7	14
Librarians, archivists, and curators	151	67	43	0	1	9	31	13	22	10
Libranans	148	69	45	0	1	8	33	14	23	10
Social scientists and urban planners	252	65	23	1	–	–	17	21	18	19
Economists	68	55	10	0	0	0	3	31	22	7
Psychologists	163	73	34	1	–	0	28	18	18	25
Social scientists, n.e.c.	11	33	3	0	0	0	3	7	12	14
Social, recreation, and religious workers	77c	66	25	0	1	4	14	21	23	17
Social workers	451	69	19	0	1	4	10	28	29	19
Recreation workers	35	51	17	0	3	5	6	18	14	10
Clergy	239	68	40	0	2	4	25	10	15	17
Religious workers, n.e.c.	53	53	17	0	0	2	9	13	20	17
Lawyers and judges	448	67	20	0	0	2	11	11	14	38
Lawyers	439	67	19	0	0	1	11	11	14	38
Writers, artists, entertainers, and athletes	799	43	16	1	1	5	6	10	16	12
Authors	27	27	12	0	0	0	5	3	4	13
Technical writers	46	64	30	0	0	7	20	29	11	0
Designers	232	47	19	0	0	7	6	12	20	10
Musicians and composers	56	41	10	3	0	–	5	0	15	19
Actors and directors	46	53	18	0	3	2	3	11	29	17
Painters, sculptors, craft-artists, and artist printmakers	77	38	20	1	2	10	6	5	11	8
Photographers	65	46	17	1	1	3	3	9	22	18
Artists, performers, and related workers, n.e.c.	26	42	10	0	0	4	1	6	9	24
Editors and reporters	100	36	13	0	1	3	7	12	15	6
Public relations specialists	76	52	11	0	1	3	6	20	18	15
Announcers	14	27	9	3	0	6	0	6	7	3
Athletes	33	48	21	0	0	2	15	4	14	19
Technicians and related support occupations	2,365	59	20	1	2	8	6	26	22	9
Health technologists and technicians	862	61	20	1	2	8	4	20	18	13
Clinical laboratory technologists and technicians	186	55	16	–	3	2	5	19	16	13
Dental hygienists	63	81	49	0	0	24	21	5	5	36
Health record technologists and technicians	34	70	30	0	4	27	0	32	27	4
Radiological technicians	76	52	13	0	–	7	3	17	17	10
Licensed practical nurses	303	66	24	2	4	10	2	23	21	9
Health technologists and technicians, n.e.c.	200	59	13	0	1	5	3	22	20	16
Technologists and technicians, except health	1,504	58	21	1	1	8	6	29	23	7
Engineering and related technologists and technicians	581	57	22	1	3	11	6	27	24	5
Electrical and electronic technicians	239	55	24	–	3	13	5	35	27	5
Engineering technicians, n.e.c.	153	62	20	0	1	12	9	31	28	6
Drafting occupations	138	43	22	2	3	8	7	18	16	4
Surveying and mapping technicians	39	54	21	0	7	9	2	9	23	7
Science technicians	141	5[illegible]	15	1	1	8	3	26	25	6
Biological technicians	29	49	19	4	0	12	2	26	27	3
Chemical technicians	64	61	18	0	1	10	2	30	26	8
Science technicians, n.e.c.	47	59	10	0	0	2	6	22	24	7
Technicians, except health, engineering, and science	782	60	21	–	1	6	7	31	23	9
Airplane pilots and navigators	96	82	17	0	2	2	1	43	21	18
Air traffic controllers	31	64	16	0	0	2	13	34	22	7
Broadcast equipment operators	26	77	8	0	0	0	8	49	28	2
Computer programmers	379	62	23	–	–	10	7	34	27	9
Legal assistants	87	44	15	0	2	4	3	14	16	11
Technicians, n.e.c.	162	54	23	1	0	2	13	27	19	7
Sales occupations	4,809	35	7	–	1	3	2	16	15	6
Supervisors and proprietors, sales occupations	1,438	39	9	–	1	3	3	18	15	7
Sales representatives, finance and business services	1,383	62	17	1	1	7	3	31	21	12
Insurance sales occupations	420	71	14	1	0	6	2	40	30	14
Real estate sales occupations	485	71	30	1	3	15	5	27	13	18
Securities and financial services sales occupations	181	60	13	0	1	2	3	33	27	8
Advertising and related sales occupations	55	41	8	3	2	2	0	16	24	10
Sales occupations, other business services	242	47	7	1	–	1	1	27	17	6
Sales representatives, commodities except retail (including sales engineers)	679	42	9	–	–	3	3	23	17	7
Sales engineers	17	61	9	0	0	0	0	36	26	24
Sales representatives, mining, manufacturing, and wholesale	662	41	9	–	–	3	3	23	17	7
Sales workers, retail and personal services	1,297	22	2	–	–	1	–	8	12	2
Sales workers, motor vehicles and boats	116	43	3	0	0	–	1	20	18	8
Sales workers, apparel	74	16	1	1	1	1	0	3	11	–
Sales workers, shoes	8	8	1	0	0	0	1	1	6	0
Sales workers, furniture and home furnishings	45	26	4	0	0	3	–	11	11	3
Sales workers, radio, television, hi-fi, and appliances	63	37	2	0	0	1	1	14	20	4
Sales workers, hardware and building supplies	61	29	7	1	1	3	0	14	7	9

Table A-2. Skill improvement training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who took training		Source of training (percent of total employment in occupation)							
			School							
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Other types of training
Sales workers, parts	52	34	5	1	–	4	2	18	13	6
Sales workers, other commodities	274	20	3	–	–	1	1	7	9	3
Sales counter clerks	35	19	0	0	0	0	0	8	13	0
Cashiers	444	18	1	–	–	1	–	5	13	1
Street and door-to-door sales workers	120	35	1	0	0	1	–	19	14	5
News vendors	4	3	0	0	0	0	0	3	0	0
Sales related occupations	12	19	10	0	0	0	10	6	5	5
Demonstrators, promoters and models, sales	0	0	0	0	0	0	0	0	0	0
Sales support occupations, n.e.c.	8	34	16	0	0	0	16	17	14	14
Administrative support occupations, including clerical	7,342	40	12	1	1	5	2	16	16	4
Supervisors, administrative support occupations	522	64	17	0	1	10	3	38	26	6
Supervisors, general office	328	69	20	0	1	12	3	41	26	7
Supervisors, computer equipment operators	18	78	10	0	0	1	8	68	3	10
Supervisors, financial records processing	59	55	13	0	0	10	3	37	27	10
Supervisors, distribution, scheduling, and adjusting clerks	112	52	15	0	2	7	1	31	30	3
Computer equipment operators	347	48	19	1	2	10	2	19	19	4
Computer operators	343	48	19	1	2	11	2	19	19	4
Secretaries, stenographers, and typists	1,810	42	17	1	3	8	2	15	16	4
Secretaries	1,597	44	18	1	3	8	2	16	16	4
Stenographers	12	46	24	0	8	7	0	0	15	15
Typists	201	33	11	–	1	4	1	12	15	1
Information clerks	425	30	7	–	1	3	1	13	12	4
Interviewers	54	38	5	1	0	2	0	14	17	7
Hotel clerks	20	21	7	0	0	4	0	6	12	1
Transportation ticket and reservation agents	65	53	8	0	0	7	0	38	27	3
Receptionists	210	25	7	–	1	3	1	9	10	3
Information clerks, n.e.c.	75	31	7	0	0	3	1	17	6	4
Records processing occupations, except financial	354	41	12	1	1	7	2	15	18	4
Order clerks	115	59	11	2	0	6	0	33	28	–
Personnel clerks, except payroll and timekeeping	34	61	37	1	4	9	10	32	20	4
Library clerks	35	27	11	0	0	4	4	1	14	5
File clerks	90	28	8	1	1	7	0	6	14	4
Records clerks	72	47	17	0	3	10	4	14	19	8
Financial records processing occupations	922	36	15	1	2	7	3	10	13	4
Bookkeepers, accounting, and auditing clerks	709	35	16	1	2	7	3	8	13	4
Payroll and timekeeping clerks	78	43	13	1	3	4	4	19	16	4
Billing clerks	73	32	14	0	1	7	1	10	13	4
Cost and rate clerks	50	50	3	0	0	0	0	25	22	3
Billing, posting, and calculating machine operators	12	26	8	0	0	0	2	7	14	0
Duplicating, mail and other office machine operators	16	23	0	0	0	0	0	6	20	0
Duplicating machine operators	6	16	0	0	0	0	0	0	16	0
Office machine operators, n.e.c.	5	20	0	0	0	0	0	15	10	0
Communications equipment operators	75	40	7	0	0	3	1	15	26	1
Telephone operators	71	40	7	0	0	3	1	15	25	1
Mail and message distributing occupations	302	29	2	–	0	–	–	13	15	2
Postal clerks, except mail carriers	146	43	2	0	0	1	1	23	23	1
Mail carriers, postal service	102	25	1	0	0	1	0	11	15	3
Mail clerks, except postal service	36	22	6	2	0	0	0	5	10	3
Messengers	19	12	3	0	0	0	0	6	2	–
Material recording, scheduling, and distributing clerks n.e.c.	590	30	5	0	1	2	1	12	14	4
Dispatchers	97	44	5	0	0	5	1	20	16	6
Production coordinators	91	46	16	0	1	8	7	19	20	8
Traffic, shipping, and receiving clerks	124	20	1	0	1	–	0	7	10	4
Stock and inventory clerks	192	31	4	0	0	3	1	13	15	3
Meter readers	20	41	0	0	0	0	0	25	14	5
Weighers, measurers, and checkers	11	18	3	0	3	0	0	4	11	0
Expediters	45	32	7	0	0	–	1	8	19	1
Material recording, scheduling, and distributing	11	34	17	0	0	0	12	17	0	0
Adjusters and investigators	550	45	9	–	1	2	3	25	18	5
Insurance adjusters, examiners, and investigators	211	59	14	1	–	1	6	37	22	6
Investigators and adjusters, except insurance	267	45	8	–	–	3	2	23	19	5
Eligibility clerks, social welfare	36	38	17	0	4	3	0	19	13	4
Bill and account collectors	36	21	2	0	0	0	0	12	8	0
Miscellaneous administrative support occupations	1,430	45	13	1	1	5	3	18	18	5
General office clerks	255	37	14	1	2	5	4	12	12	3
Bank tellers	266	53	8	1	1	4	1	29	23	5
Proofreaders	8	40	18	8	0	0	10	0	10	12
Data-entry keyers	195	42	13	1	1	6	3	16	17	4
Statistical clerks	40	66	21	0	0	3	0	32	35	16
Teachers aides	211	42	18	2	2	6	3	10	12	7
Administrative support occupations, n.e.c.	454	47	11	–	–	4	4	21	21	4
Private household occupations	39	6	2	–	0	–	–	0	1	3
Launderers, cooks, housekeepers, and butlers	1	4	0	0	0	0	0	0	0	4
Housekeepers and butlers	1	6	0	0	0	0	0	0	0	6
Child care workers, private household	24	8	4	1	0	1	1	0	2	3
Private household cleaners and servants	14	4	1	0	0	0	0	0	1	2
Service workers, except private household	4,339	29	7	–	1	3	1	9	13	5
Protective service occupations	1,270	61	18	–	3	8	4	34	25	7
Supervisors, protective service occupations	154	87	32	1	1	17	12	68	34	6
Supervisors, firefighting and fire prevention occupations	53	96	33	0	0	13	20	73	41	5
Supervisors, police and detectives	69	95	44	3	2	23	14	77	43	5
Supervisors, guards	32	66	13	0	0	12	0	50	13	7
Firefighting and fire prevention occupations	162	79	30	1	3	15	10	47	29	15

Table A-2. Skill improvement training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who took training		Source of training (percent of total employment in occupation)							
			School							
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4 year or longer college program	Formal company training	Informal on-the-job training	Other types of training
Firefighting occupations	147	77	29	0	4	14	9	45	30	15
Police and detectives	682	78	23	1	5	10	4	42	33	7
Police and detectives, public service	391	83	28	1	4	12	7	50	34	7
Sheriffs, bailiffs, and other law enforcement officers	94	71	22	0	6	11	1	38	29	10
Correctional institution officers	196	71	15	0	4	7	1	31	33	6
Guards	272	34	7	0	2	3	1	15	12	6
Crossing guards	2	7	0	0	0	0	0	0	0	7
Guards and police, except public service	243	33	6	0	2	3	1	16	13	5
Protective service occupations, n.e.c.	27	61	15	0	0	10	5	8	10	16
Food preparation and service occupations	804	16	2	1	–	1	–	3	10	1
Supervisors, food preparation and service occupations	104	32	5	0	0	5	0	10	15	4
Bartenders	37	13	3	0	1	–	1	2	7	2
Waiters and waitresses	152	13	2	0	0	1	0	3	9	–
Cooks, except short order	305	18	3	1	1	1	–	2	10	2
Short order cooks	22	27	0	0	0	0	0	–	24	3
Food counter, fountain and related occupations	33	12	0	0	0	0	0	2	11	0
Kitchen workers, food preparation	12	9	0	0	0	0	0	0	9	0
Waiters/waitresses assistants	43	11	1	1	0	0	0	1	8	0
Miscellaneous food preparation occupations	97	14	2	1	0	1	–	3	9	–
Health service occupations	982	46	11	–	1	5	2	14	22	6
Dental assistants	103	56	18	0	2	12	1	10	26	10
Health aides, except nursing	233	47	12	0	0	6	4	14	24	6
Nursing aides, orderlies, and attendants	646	45	9	–	1	4	1	15	21	5
Cleaning and building service occupations, except private household	447	14	2	–	–	1	–	3	7	2
Supervisors, cleaning and building service workers	52	30	6	0	0	6	2	11	14	9
Maids and housemen	92	13	–	0	0	0	–	2	8	2
Janitors and cleaners	276	12	2	1	–	1	–	2	6	2
Pest control occupations	27	75	10	0	0	10	0	31	38	13
Personal service occupations	836	34	9	1	2	3	1	7	9	12
Supervisors, personal service occupations	31	48	15	0	0	8	0	11	22	21
Barbers	38	34	13	2	2	4	2	5	2	17
Hairdressers and cosmetologists	337	50	11	–	4	2	0	9	10	23
Attendants, amusement and recreation facilities	20	15	4	0	2	2	0	5	7	0
Guides	7	24	0	0	0	0	0	18	24	0
Public transportation attendants	31	54	4	0	0	0	0	49	11	4
Baggage porters and bellhops	12	32	9	0	0	9	0	12	29	0
Welfare service aides	22	23	1	0	0	1	0	10	16	3
Child care workers, except private household	272	26	10	1	2	3	2	3	7	9
Personal service occupations, n.e.c.	64	32	3	0	1	1	0	8	12	7
Farming, forestry, and fishing occupations	602	21	7	1	1	3	2	3	7	7
Farm operators and managers	314	25	10	1	2	4	3	2	6	12
Farmers, except horticultural	265	24	9	1	2	3	2	2	5	13
Horticultural specialty farmers	11	54	54	0	0	13	33	0	0	0
Managers, farms, except horticultural	35	24	9	1	0	6	3	3	10	7
Farm occupations, except managerial	85	11	4	1	1	1	1	2	4	2
Supervisors, farm workers	11	23	6	0	0	0	6	10	1	4
Farm workers	73	10	4	1	1	1	1	2	4	2
Nursery workers	2	5	0	0	0	0	0	0	5	0
Related agricultural occupations	177	25	6	0	1	4	2	7	12	5
Supervisors, related agricultural occupations	31	61	7	0	3	3	0	27	26	19
Groundskeepers and gardeners, except farm	96	19	5	0	1	4	1	6	10	2
Animal caretakers, except farm	47	37	7	0	0	4	6	4	15	11
Forestry and logging occupations	24	23	7	0	0	3	–	3	13	0
Forestry workers, except logging	12	39	6	0	0	0	2	11	22	0
Timber cutting and logging occupations	7	11	1	0	0	1	0	0	9	0
Fishers, hunters, and trappers	2	6	5	2	1	5	0	0	2	0
Fishers	1	3	2	0	0	2	0	0	1	0
Precision production, craft, and repair occupations	4,949	38	9	1	2	4	1	17	16	4
Mechanics and repairers	2,151	48	10	1	2	5	1	24	19	6
Supervisors, mechanics and repairers	118	58	15	1	3	4	3	35	18	11
Mechanics and repairers, except supervisors	2,032	48	9	1	2	5	–	23	19	6
Vehicle and mobile equipment mechanics and repairers	749	42	8	1	2	4	–	19	17	5
Automobile mechanics	367	44	8	1	2	5	0	21	19	6
Bus, truck, and stationary engine mechanics	108	35	7	2	1	3	0	15	14	3
Aircraft engine mechanics	78	64	13	1	1	3	2	40	22	9
Small engine repairers	30	47	5	0	0	0	0	15	21	10
Automobile body and related repairers	66	34	6	0	2	4	0	4	20	6
Aircraft mechanics, except engine	19	41	6	0	0	6	0	19	16	2
Heavy equipment mechanics	70	43	5	0	2	3	0	26	14	4
Farm equipment mechanics	10	24	10	0	0	10	0	14	8	0
Industrial machinery repairers	255	46	11	1	3	5	–	19	19	7
Machinery maintenance occupations	4	19	0	0	0	0	0	4	19	0
Electrical and electronic equipment repairers	510	70	12	–	3	5	2	42	30	6
Electronic repairers, commercial and industrial equipment	119	61	7	0	5	2	0	38	24	9
Data processing equipment repairers	124	74	11	1	1	6	0	42	42	11
Household appliance and power tool repairers	22	48	26	0	0	12	8	24	6	10
Telephone line installers and repairers	54	68	6	0	0	6	0	57	25	2
Telephone installers and repairers	154	79	13	0	4	3	3	49	32	2
Miscellaneous electrical and electronic equipment repairers	37	83	28	0	0	22	5	24	34	2
Heating, air conditioning, and refrigeration mechanics	113	49	22	1	7	9	–	22	13	7
Miscellaneous mechanics and repairers	401	41	7	–	1	4	1	18	17	5

Table A-2. Skill improvement training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who took training		Source of training (percent of total employment in occupation)							
			School							
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Other types of training
Camera, watch, and musical instrument repairers	22	65	4	0	0	4	0	31	29	4
Office machine repairers	61	77	8	0	0	6	0	41	21	19
Mechanical controls and valve repairers	16	60	39	0	0	8	10	17	21	4
Elevator installers and repairers	19	48	3	0	0	0	3	24	19	1
Millwrights	31	38	2	0	0	0	0	17	16	5
Specified mechanics and repairers, n.e.c.	154	36	5	–	1	2	–	14	18	4
Not specified mechanics and repairers	91	35	10	1	0	7	1	15	13	5
Construction trades	1,281	27	6	1	1	3	–	9	12	4
Supervisors, construction occupations	239	37	11	1	2	2	2	14	15	6
Supervisors, electricians and power transmission installers	27	68	53	12	0	13	6	36	31	0
Supervisors, plumber, pipefitters, and steamfitters	3	14	14	0	0	0	0	0	0	0
Supervisors, n.e.c.	200	36	7	1	2	2	1	13	15	7
Construction trades, except supervisors	1,042	25	6	1	1	3	–	9	12	3
Brickmasons and stonemasons	23	15	4	0	0	2	2	2	12	1
Tile setters, hard and soft	13	29	0	0	0	0	0	5	29	0
Carpet installers	19	18	0	0	0	0	0	6	9	4
Carpenters	189	16	4	1	0	2	–	3	8	2
Drywall installers	16	16	1	0	0	1	0	0	15	0
Electricians	341	49	13	2	2	7	0	21	16	6
Electrician apprentices	17	65	39	0	0	25	0	39	40	21
Electrical power installers and repairers	94	67	10	0	2	5	0	33	35	8
Painters, construction and maintenance	31	6	2	0	1	0	0	2	4	1
Plumbers, pipefitters, and steamfitters	162	37	9	0	1	6	0	12	13	7
Concrete and terrazzo finishers	9	17	0	0	0	0	0	2	5	12
Glaziers	1	3	0	0	0	0	0	0	3	0
Insulation workers	5	12	4	0	0	4	0	8	0	0
Roofers	26	16	0	0	0	0	0	2	13	0
Sheetmetal duct installers	23	49	16	0	0	12	0	7	21	12
Structural metal workers	17	33	5	0	5	0	0	3	25	1
Drillers, earth	3	14	3	0	0	3	0	3	11	0
Construction trades, n.e.c.	42	20	4	1	2	1	0	12	10	1
Extractive occupations	64	39	7	0	2	4	1	23	13	6
Supervisors, extractive occupations	23	53	9	0	7	2	0	29	25	9
Drillers, oil well	12	37	5	0	0	5	0	22	15	0
Mining machine operators	17	45	8	0	0	8	0	19	13	14
Mining occupations, n.e.c.	8	20	0	0	0	0	0	20	0	0
Precision production occupations	1,454	38	11	–	2	5	2	17	17	4
Supervisors, production occupations	617	50	15	–	2	8	4	29	19	5
Precision metal working occupations	336	36	10	1	2	3	1	13	16	4
Tool and die makers	45	34	13	0	2	5	5	16	9	3
Machinists	194	35	9	1	3	2	1	14	17	3
Precious stones and metals workers (jewelers)	15	30	2	0	0	0	0	7	16	14
Engravers, metal	7	31	0	0	0	0	0	0	31	0
Sheet metal workers	34	33	8	0	1	2	0	11	15	4
Precision woodworking occupations	9	9	1	0	0	1	1	1	6	1
Cabinet makers and bench carpenters	4	8	2	0	0	2	2	0	5	1
Furniture and wood finishers	1	3	0	0	0	0	0	3	0	0
Precision textile, apparel, and furnishings machine workers	24	12	6	0	0	3	0	1	5	1
Dressmakers	9	9	6	0	0	6	0	0	2	1
Tailors	4	9	0	0	0	0	0	0	9	0
Upholsterers	9	17	12	0	0	0	0	5	5	0
Precision workers, assorted materials	142	28	6	0	2	2	–	9	17	1
Patternmakers, layout workers, and cutters	12	57	31	0	0	10	10	0	37	0
Optical goods workers	21	43	5	0	0	4	0	19	35	1
Dental laboratory and medical appliance technicians	12	22	6	0	0	6	0	10	8	6
Bookbinders	3	10	0	0	0	0	0	10	0	0
Electrical and electronic equipment assemblers	85	27	5	0	3	1	0	8	15	–
Miscellaneous precision workers, n.e.c.	9	35	0	0	0	0	0	8	30	0
Precision food production occupations	82	21	1	0	0	–	–	3	13	3
Butchers and meat cutters	57	24	1	0	0	1	0	4	19	0
Bakers	16	14	1	0	0	0	1	2	7	7
Food batchmakers	10	22	5	0	0	0	0	4	0	13
Precision inspectors, testers, and related workers	75	52	14	4	0	8	2	21	23	1
Inspectors, testers, and graders	73	55	15	4	0	8	2	21	24	1
Plant and system operators	168	63	22	0	4	14	3	25	21	10
Water and sewage treatment plant operators	50	76	31	0	2	25	5	33	24	18
Power plant operators	18	42	5	0	0	0	0	21	26	1
Stationary engineers	70	61	25	0	7	12	5	21	12	11
Miscellaneous plant and system operators	22	69	12	0	0	12	0	29	37	0
Machine operators, assemblers, and inspectors	1,913	25	4	–	1	2	–	8	15	2
Machine operators and tenders, except precision	1,207	23	3	–	–	2	–	6	15	1
Metalworking and plastic working machine operators	135	31	9	1	2	4	1	8	16	–
Lathe and turning machine setup operators	10	36	8	0	0	0	0	0	28	0
Lathe and turning machine operators	10	27	0	0	0	0	0	11	16	0
Milling and planing machine operators	5	23	23	10	0	13	0	10	0	0
Punching and stamping press machine operators	38	29	6	2	4	3	0	7	13	0
Drilling and boring machine operators	6	30	13	0	0	0	0	0	17	0
Grinding, abrading, buffing, and polishing machine operators	31	27	7	0	2	5	0	6	15	1
Forging machine operators	16	52	14	7	0	6	0	4	35	0
Miscellaneous metal, plastic, stone, and glass working machine operators	5	15	6	0	0	6	0	6	15	0
Metal and plastic processing machine operators	61	35	4	0	1	1	0	12	22	1

Table A-2. Skill improvement training: Sources of training by detailed occupation, 1991 — Continued

Occupation[1]	Workers who took training		Source of training (percent of total employment in occupation)							
			School							
	Number (thousands)	Percent of total employment in occupation	Total with school training	High school vocational training	Post-high school vocational training	Junior college or technical institute	4-year or longer college program	Formal company training	Informal on-the-job training	Other types of training
Molding and casting machine operators	39	33	5	0	1	2	0	13	18	1
Metal plating machine operators	7	21	0	0	0	0	0	0	21	0
Woodworking machine operators	13	10	2	2	0	0	0	3	7	0
Wood lathe, routing, and planing machine operators	3	12	0	0	0	0	0	0	12	0
Sawing machine operators	8	11	0	0	0	0	0	5	6	0
Miscellaneous woodworking machine operators	3	11	11	11	0	0	0	0	11	0
Printing machine operators	153	31	5	0	1	3	1	5	19	5
Printing machine operators	96	28	2	0	1	1	0	5	17	5
Photoengravers and lithographers	14	30	0	0	0	0	0	7	30	4
Typesetters and compositors	30	44	25	0	6	19	8	4	23	10
Miscellaneous printing machine operators	12	32	0	0	0	0	0	7	18	0
Textile, apparel, and furnishings machine operators	154	13	1	–	–	–	0	1	10	1
Winding and twisting machine operators	24	27	0	0	0	0	0	5	22	0
Knitting, looping, taping, and weaving machine operators	11	23	0	0	0	0	0	5	21	0
Textile sewing machine operators	65	10	1	–	–	0	0	1	7	1
Shoe machine operators	9	24	0	0	0	0	0	3	21	0
Pressing machine operators	3	4	0	0	0	0	0	1	3	0
Laundering and dry cleaning machine operators	24	11	2	0	0	2	0	–	4	4
Miscellaneous textile machine operators	14	22	3	0	0	0	0	0	22	0
Machine operators, assorted materials	688	25	3	–	–	2	–	8	16	1
Cementing and gluing machine operators	8	24	0	0	0	0	0	11	24	0
Packaging and filling machine operators	61	14	0	0	0	0	0	7	6	–
Extruding and forming machine operators	10	28	0	0	0	0	0	3	23	4
Mixing and blending machine operators	18	27	7	0	0	4	0	3	21	0
Separating, filtering, and clarifying machine operators	41	51	4	0	0	2	1	24	34	1
Compressing and compacting machine operators	4	19	0	0	0	0	0	0	19	0
Painting and paint spraying machine operators	35	20	3	0	0	3	0	8	9	2
Washing, cleaning, and pickling machine operators	12	57	0	0	0	0	0	4	57	0
Furnace, kiln, and oven operators, except food	36	37	3	0	0	1	0	13	21	4
Crushing and grinding machine operators	8	18	0	0	0	0	0	9	9	0
Slicing and cutting machine operators	33	18	2	0	0	2	0	–	16	0
Photographic process machine operators	39	37	8	0	0	8	0	8	24	4
Miscellaneous machine operators, n e c	277	27	5	–	1	2	0	9	16	1
Machine operators, not specified	97	26	4	1	–	3	0	7	16	–
Fabricators, assemblers, and handworking occupations	431	23	4	1	1	2	–	8	13	2
Welders and cutters	124	23	7	1	2	3	1	6	12	1
Solderers and brazers	10	22	5	0	0	0	0	12	5	0
Assemblers	252	24	2	1	–	1	0	9	14	2
Hand cutting and trimming occupations	3	10	0	0	0	0	0	0	10	3
Hand molding, casting, and forming occupations	12	56	18	0	9	18	0	0	34	12
Hand painting, coating, and decorating occupations	3	11	6	0	0	0	0	5	5	0
Hand engraving and printing occupations	13	34	0	0	0	0	0	0	34	0
Miscellaneous hand working occupations	15	20	6	0	0	0	0	3	11	4
Production inspectors, testers, samplers, and weighers	274	36	7	0	1	4	1	18	19	3
Production inspectors, checkers, and examiners	221	37	7	0	1	4	1	18	19	3
Production testers	40	73	22	0	1	16	5	43	39	0
Graders and sorters, except agricultural	14	14	1	0	0	0	0	3	5	5
Transportation and material moving occupations	1,112	25	2	–	–	1	–	10	11	3
Motor vehicle operators	766	24	2	–	–	1	–	10	9	4
Supervisors, motor vehicle operators	43	50	10	0	3	4	0	31	11	1
Truckdrivers, heavy	296	19	2	–	–	1	–	6	9	3
Truckdrivers, light	113	17	–	0	0	–	0	6	8	3
Driver-sales workers	66	31	2	0	0	2	0	14	18	1
Bus drivers	232	45	3	0	1	1	0	24	12	9
Taxi cab drivers and chauffeurs	17	11	4	0	0	2	0	3	2	2
Parking lot attendants	0	0	0	0	0	0	0	0	0	0
Transportation occupations, except motor vehicle	94	57	10	0	0	2	4	28	32	3
Rail transportation occupations	72	55	9	0	0	1	5	29	30	2
Railroad conductors and yardmasters	31	70	18	0	0	4	14	39	34	2
Locomotive operating occupations	22	45	8	0	0	0	0	26	19	3
Railroad brake, signal, and switch operators	16	46	0	0	0	0	0	20	31	1
Water transportation occupations	21	63	14	0	0	5	0	24	41	7
Material moving equipment operators	253	24	2	0	–	1	0	9	14	2
Operating engineers	68	29	3	0	–	2	0	10	16	3
Crane and tower operators	21	30	4	0	0	4	0	20	6	7
Excavating and loading machine operators	18	23	2	0	0	2	0	12	7	5
Grader, dozer, and scraper operators	13	19	4	0	0	4	0	4	17	0
Industrial truck and tractor equipment operators	104	22	1	0	–	0	0	6	14	1
Miscellaneous material moving equipment operators	24	36	0	0	0	0	0	15	21	0
Handlers, equipment cleaners, helpers and laborers	643	15	1	–	–	1	–	5	9	1
Helpers, construction and extractive occupations	21	19	5	2	0	0	0	2	15	0
Helpers, construction trades	20	19	5	2	0	0	0	2	14	0
Construction laborers	97	20	1	0	0	1	0	6	10	5
Production helpers	13	18	0	0	0	0	0	0	18	0
Freight, stock, and material movers, hand	247	15	1	0	–	1	–	6	10	1
Garbage collectors	7	14	5	0	0	5	0	0	14	0
Stock handlers and baggers	109	13	1	0	–	–	–	4	9	–
Machine feeders and offbearers	18	16	0	0	0	0	0	–	14	0
Freight, stock, and material movers, hand, n e c	109	18	1	0	–	0	0	10	10	1
Garage and service station related occupations	41	17	3	2	0	1	0	9	7	1
Vehicle washers and equipment cleaners	23	12	0	0	0	0	0	3	6	0
Hand packers and packagers	27	10	2	0	0	0	0	5	8	0
Laborers, except construction	167	13	2	–	–	1	–	3	9	–

[1] Occupations with less than 20 000 employed are excluded
– Value too small to display.

Appendix B. Sources and Limitations of the Data

This publication reports the responses of employed persons to questions about having needed training or skills to obtain their current jobs and about whether they have taken training to improve skills since obtaining their current jobs. As such, the responses represent the perceptions of individuals. Users of these data must be aware that the perceptions of individuals as to whether training was needed to obtain or to improve skills required for their jobs may differ, perhaps substantially, from those of their employers.

Source of data

The January 1991 Current Population Survey (CPS) provided the training data presented in this report. Similar data from the January 1983 CPS are used to compare information for an earlier period.[1] The CPS is a household survey that uses a scientifically selected sample designed to represent the civilian noninstitutional population. The Bureau of the Census conducts this survey each month for the Bureau of Labor Statistics. Trained interviewers collect information about individuals from a sample of about 60,000 households to obtain comprehensive data on the labor force, the employed, and the unemployed, including such characteristics as age, sex, race, occupation, and industry of employment. A detailed description of the survey appears in *Concepts and Methods Used in Labor Force Statistics Derived from the Current Population Survey*, BLS Report 463 (1976).

In January 1991 and January 1983, the questionnaire used to obtain the basic labor force information was supplemented with questions about training. (See questionnaire.) Although this bulletin only presents data about employed persons, the supplemental questions were asked of all employed and unemployed persons. In contrast with the earlier survey, interviewers conducting the January 1991 survey were instructed to obtain the information from each individual directly; proxy responses were not permitted.

Primarily because individuals could not answer by proxy, a high proportion of eligible persons in the sample did not respond to the January 1991 training questions. In order to obtain data about the population based only on information provided by respondents, the sample weight originally assigned each respondent was adjusted based on factors for specific age, sex, race, employment status, and occupational groups. The adjusted weights were used to prepare all January 1991 data in this report.

Limitations of the data

Like data from any sample, those presented in this report are subject to nonsampling and sampling errors. The former result because individuals may not have understood the question, may have remembered the past incorrectly, or may have simply made a mistake in choosing the answer. The magnitude of these types of errors is impossible to quantify but, because of the size and complexity of the questionnaire, is probably greater than that for many other surveys.

The data are also subject to sampling variability. Sampling variability means that the sample surveyed may not accurately represent the entire population. The standard error formulas presented below measure sampling variability for numbers and percentages. Equation A is intended to determine the standard error of the number needing qualifying training. Equation B is for use in finding the standard error of the number taking skill improvement training. The equations allow readers to insert the number needing training or taking training in an occupation of interest in order to compute the standard error.

Standard Errors of Estimated Numbers

Equation A : $S_x = \sqrt{(0.000049*X + 5439*X)}$

Equation B : $S_x = \sqrt{(-0.000016*X + 2864*X)}$

where x = the number needing qualifying training or the number taking skill improvement training.

Standard Errors of Estimated Percentages

Equation A : $S_{x,p} = \sqrt{(5439*P(100-P))/X}$

Equation B : $S_{x,p} = \sqrt{(2864*P(100-P))/X}$

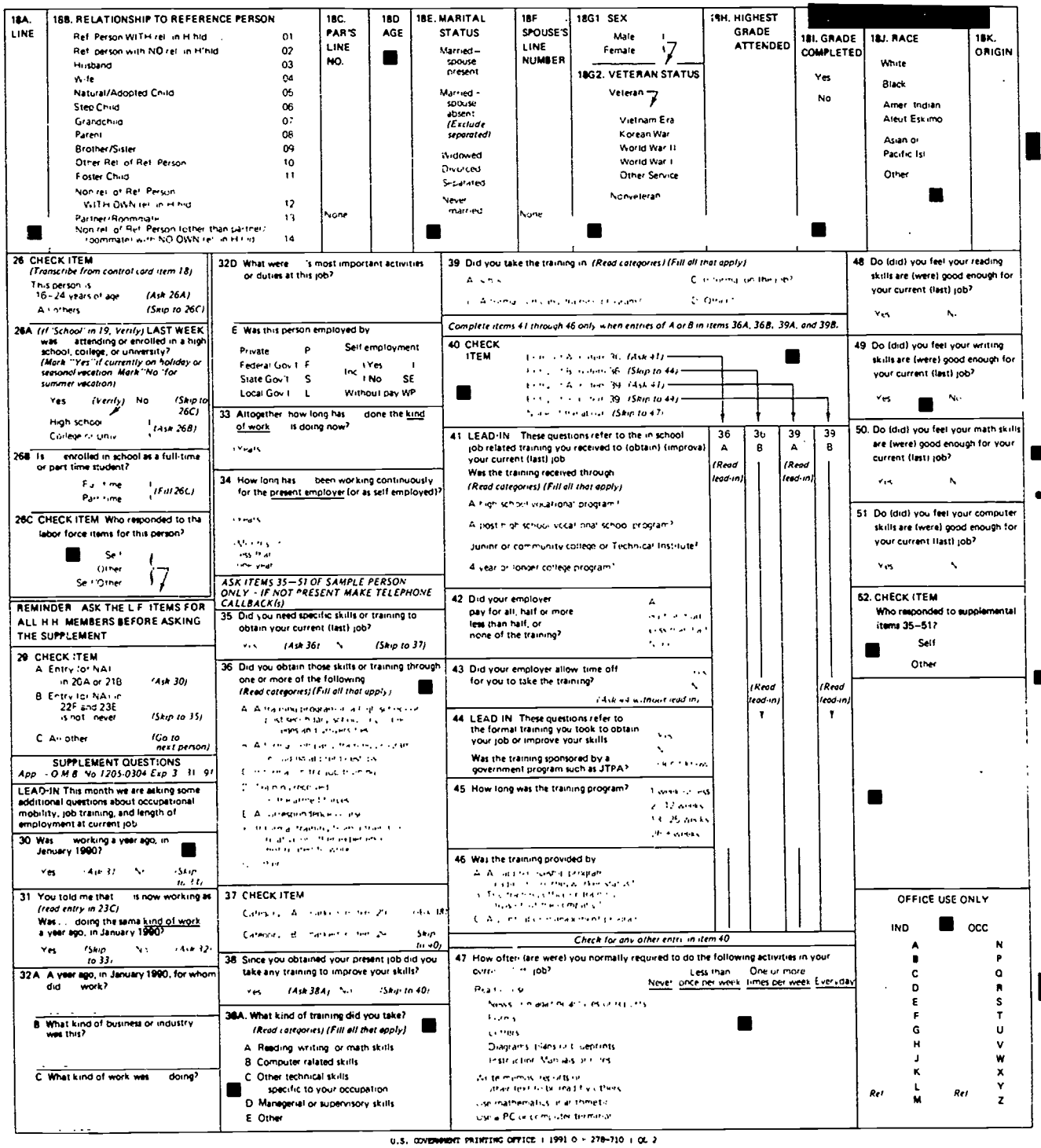
where x = the number needing qualifying training or the number taking skill improvement training, and p = the estimated percentage to be examined.

[1] *How Workers Get Their Training*, Bulletin 2226, (Bureau of Labor Statistics, February 1985) Some information not presented in the 1985 bulletin was obtained from unpublished tabulations of January 1983 CPS data.

Occupational employment size

For all tables listing information about detailed occupations, occupations with less than 20,000 employed were not included to minimize the chance of sampling error in the analysis.

Supplement to January 1991 Current Population Survey



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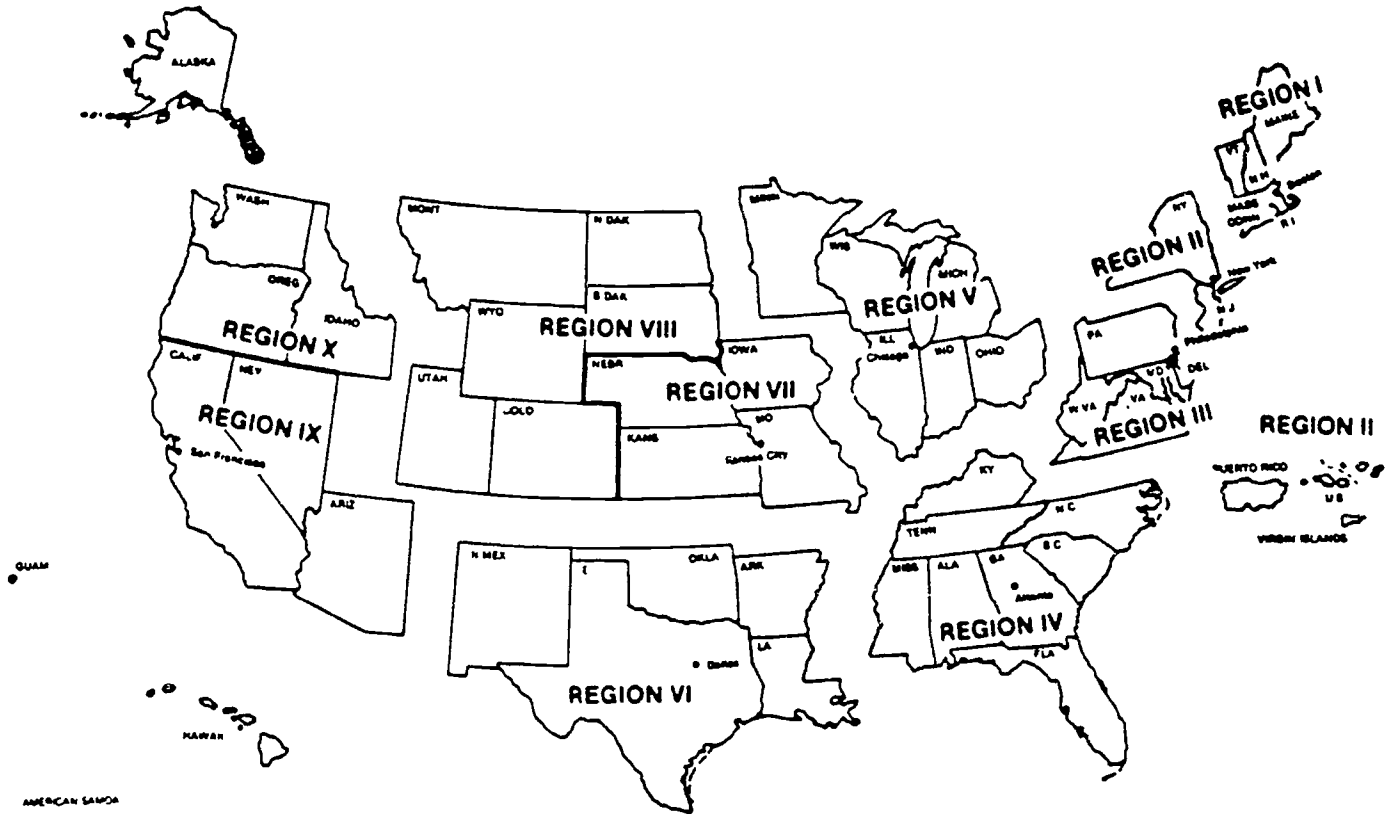

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