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Labor Force Participation in Formal Work-Related Education in 2000–01

Statistical Analysis Report

U.S. Department of Education
Institute of Education Sciences
NCES 2005-048

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September 2005

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Executive Summary

Of the many purposes education serves in society, one of the most important is to prepare people for work. In today's economy, education is important not just to help adults enter the labor market, but also to ensure that adults remain marketable throughout their working lives. This report examines how adults in the labor force use formal education and training to acquire and maintain their workforce skills. The report is based on data from the Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001) conducted by the National Center for Education Statistics (NCES). The report describes participation in work-related education among 25- to 64-year-old civilian, noninstitutionalized labor force members (employed and unemployed adults) over a 12-month period in 2000–01. (The age restriction and the restriction to labor force members make this population different from that used in past NCES reports of NHES data.) The comparisons made in the text were tested using the Student's *t* statistic; all differences cited are statistically significant at the .05 level.

Work-related education is defined here to include six types of formal learning activities: all apprenticeship programs; all postsecondary education programs; all credential training programs (programs that award solely nonpostsecondary credentials, such as real estate licensing programs); all adult basic education classes reported as taken for work-related reasons; all postsecondary courses (outside of postsecondary programs) taken for work-related reasons; and all other courses taken for work-related reasons (referred to as "training courses").

Labor Force Participation in Work-Related Education

Consistent with past research on adult learning, this analysis found that participation in work-related education was fairly common among adults in the labor force: 47 percent of these adults were engaged in some form of work-related education in 2000–01. Of the six types of learning activities, the most common was training courses, with almost 80 percent of participants engaging in at least one training course. Postsecondary courses and postsecondary programs were the next most common (with 16–19 percent of participants engaged in each of these activities), while no more than 3 percent of participants took any one of basic education classes, apprenticeship programs, or credential training programs.

Instructional Providers

Business and industry was the most common instructional provider for labor force members' work-related education (46 percent of participants), followed by postsecondary institutions (30 percent of participants). Fewer participants were engaged in an activity for which the instructional provider was a professional organization, government agency, or school or school district.

Topics Studied

Business was the topic area most often studied by participants in work-related education, followed by health, then computer science. The social sciences and education were the least commonly pursued topics, with science and vocational trades falling between the most and least often studied areas. The predominance of business, health, and computer science likely reflects both the prevalence of jobs in these areas within the labor market (particularly for business) and the fast-paced growth of knowledge and technology in these areas (particularly for health and computer science).

Reasons for Participation

Most participants in work-related education were seeking skill enhancement, including both the acquisition of new skills (85 percent) and the maintenance of existing skills (83 percent). About two-thirds of participants were also motivated by what this report calls *employment-related inducements* to participation—seeking an occupational credential, earning continuing education units (CEUs), or meeting an employer requirement for participation. Among these inducements, meeting an employer requirement for participation was the most common, with almost half of participants having this inducement. More than one-third of participants reported seeking an occupational credential, and more than one-quarter reported earning CEUs.

Who Participates

The findings from this study on which labor force members are more likely to participate in work-related education are generally consistent with those from previous research. Participation rates were higher among females than males, among labor force members ages 25–54 than among those ages 55–64, and among Whites than among Blacks and Hispanics. Participation rates increased with labor force members' level of educational attainment, their occupational status, and the size of their employer. Participation rates also were higher among employed adults than among the unemployed, as well as higher for adults who were in occupations with continuing education requirements than for adults in occupations without these requirements.

The Role of Postsecondary Education

The AELL–NHES:2001 provides the opportunity to examine the role of postsecondary education within the larger work-related education enterprise. This report shows that one-third of all work-related adult education participants were involved in some type of postsecondary activity (either a program or course) in 2000–01. As mentioned above, postsecondary institutions were the instructional providers for 30 percent of participants in work-related learning activities, second to business and industry as a provider source. While postsecondary institutions provided the bulk of instruction for postsecondary programs and courses, they also provided instruction for 17 percent of participants in basic education classes and about 13 percent of those in apprenticeships.

Participants in postsecondary learning activities pursued a range of activities within postsecondary education, with no one type of activity predominating. About half of postsecondary participants were in postsecondary programs, and almost 60 percent were in postsecondary courses taken outside of programs (some were in both). Associate's, bachelor's, and master's degree programs were the most common postsecondary programs pursued, with each enrolling one-fifth or

more of all postsecondary program participants. Among postsecondary course participants, both for-credit and noncredit coursetaking was common (at least 40 percent took each type), although noncredit coursetaking was more common than for-credit coursetaking.

Employer Support for Work-Related Education

Work-related education was largely an employer-supported enterprise: overall, 80 percent of participants were in an activity that received some form of employer support; among participants who were working at the time of their participation, 88 percent were in an employer-supported activity. Participation was also often accompanied by employer involvement of another kind: almost 70 percent of participants reported that their employer required, suggested, or encouraged their participation. Much of this employer support and involvement might be due to employers sponsoring instruction for their employees (typically referred to in the literature as *employer-provided instruction* or *formal on-the-job training*). About 60 percent of participants reported that they were in employer-sponsored training; one-third were in activities that were not employer sponsored but did receive some other form of employer support.

Aside from participants in apprenticeship programs (who were all defined here as receiving employer support), employer support was most common among participants in credential training programs, postsecondary courses, and training courses; those in postsecondary programs and basic education classes were less likely to receive employer support. Employer support was also relatively common among participants studying business, among full-time workers, and among those with higher levels of educational attainment and with larger employers.

Employment-Related Inducements to Participation

This report examined three employment-related inducements to participation: seeking an occupational credential, earning continuing education units, and meeting employer requirements for participation. Although employment-related inducements to participation were common overall, their prevalence among learners varied by activity type. Participants in apprenticeship programs were the most likely to have any of the employment-related inducements because they were all defined for this analysis as seeking an occupational credential. Participants in basic education courses rarely had these inducements, with only 8 percent reporting an employment-related inducement. Between these extremes, training activities were more likely than comparable postsecondary activities to involve employment-related inducements. About three-quarters of participants in credential training programs had an employment-related inducement, compared with 29 percent of participants in postsecondary programs. Similarly, about three-quarters of training course participants, compared with 65 percent of postsecondary course participants, had an employment-related inducement.

In general, the labor force members who were more likely to have these employment-related inducements tended to be those who were more likely to participate in work-related education.* These labor force members include those with more rather than less education, with larger rather than smaller employers, with higher rather than lower status occupations, and with stronger rather than weaker connections to the labor market (based on employment status). But these same patterns of participation were evident (at least on

* The findings in this paragraph are based on the assumption that nonparticipants did not have any employment-related inducements to participation.

these four variables) among those who did not have employment-related inducements, suggesting that these inducements might account for some, but not all, of the patterns of participation in work-related education.

Foreword

In 1987, the National Center for Education Statistics (NCES) instituted a new approach to collecting and reporting data on vocational education. Under the new approach, vocational education data are collected primarily through general purpose surveys rather than separate vocational education questionnaires or studies. In 1998, a Technical Review Panel was formed to provide NCES, through its contractors, with regular input on its Data on Vocational Education (DOVE) program, including surveys and reports.

One consequence of these activities is that NCES has expanded its vocational education focus to include adult learning for work. To examine this topic, the DOVE program relies primarily on the NCES National Household Education Surveys (NHES) Program's series of surveys on adult education. This report is based on the NHES 2001 Adult Education and Lifelong Learning Survey, which provides information on adults' participation in formal learning activities over a 12-month period in 2000–01. The 2000–01 NHES survey was used rather than the more recent 2002–03 survey because the former covers a broader range of work-related learning activities and collects more extensive information on these learning activities, allowing for a more in-depth examination of work-related education.

Information on NCES's DOVE program and publications may be found at the following website: http://nces.ed.gov/surveys/dove. Your comments about NCES vocational education publications are welcome and may be sent to Lisa Hudson, NCES, 1990 K Street NW, Suite 900, Washington, DC 20006 or lisa.hudson@ed.gov.

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Chapter 1: Introduction

Of the many purposes that education serves in society, one of the most important is to prepare people for work. In today's economy, education is important not just to help adults enter the labor market but also to help workers remain competitive after they have done so (Bishop 1997). This report examines the ways in which adults use formal education and training to acquire and maintain their workforce skills. As discussed below, the report is based on data from the Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001) conducted by the National Center for Education Statistics (NCES).

Importance of Lifelong Learning

One indication of the growing importance of continual learning throughout a person's life is that this concept has been given a name: *lifelong learning*. Underlying the concern about lifelong learning is the expectation that most adults will need further education or retraining periodically over their lifetimes to keep up with changing job skill requirements. For some, this education or training consists of professional development to upgrade the skills needed in one's chosen occupation. For others, it may mean periodic retooling for a different occupation or industry. Rather than training for a single occupation—often with the expectation of working for a single employer—many adults now anticipate having multiple jobs (or even multiple careers) with multiple employers over their lifetimes.

The importance of lifelong learning is also reflected in the renaming and remaking of junior colleges—whose primary purpose was initially to provide high school graduates with a stepping stone to a 4-year college or university—as community colleges. These latter institutions now serve a broad swath of education and training needs, providing occupational training leading to an associate's degree or vocational/technical certificate, customized training for business and industry, remedial education, and a variety of noncredit courses (including both skills-based and recreational courses), as well as the traditional academic preparation for transfer to a 4-year institution. Other postsecondary institutions are also increasing the range of education and training opportunities they offer adult learners (Graham and Stacey 2002).

Changes in the workplace have also fueled the need for lifelong learning. Some employers have responded to increasing international competition and changing technologies by transforming their managerial practices. In particular, businesses have adopted "high-performance workplaces," in which such practices as total quality management or reengineering, performance benchmarking, job rotation, and self-managed teams are commonly used. Some analysts argue that such workplaces demand greater skills of employees, including flexibility, problem solving, responsibility, teamwork, and initiative (Shaiken, Herzenberk, and Kuhn 1986).

Demographic trends also underscore the importance of work-related education. First, women's participation in the labor force has increased, boosting the number of workers. Women are now more likely than men to participate in adult education (Creighton and Hudson 2002; Kim et al. 2004), in part because of their tendency to re-enter schooling after taking time out for family responsibilities. Second, the ethnic and racial composition of the U.S. population continues to become increasingly diverse. Thus, demographic and economic trends make it necessary to provide additional skills—through compulsory, postsecondary, and adult education—to historically undereducated minority populations.

The confluence of these economic, social, and demographic trends in recent decades has increased the importance of continual work-related learning for the economic competitiveness of both individuals and society. But despite the growing importance of work-related learning for adults, not much is known about adults' participation in such activities and the factors that influence their participation. Most research on adult education has either focused on adult education in general, regardless of whether the learning was pursued for personal or work-related reasons, or has used a narrow definition of what constitutes work-related education (e.g., leaving out some or all college programs). To fill the gap in what is known about work-related adult education, this report provides a national portrait of both the extent to which the American labor force participates in this form of learning and the nature of this participation.

Previous Research on Participation in Adult Education

Varying definitions of adult education in the research literature reflect the diversity of the educational and learning activities that constitute this form of learning. While some researchers view adult education as including all informal and unstructured forms of learning, most research on participation in adult education has focused on more formal, structured activities that typically involve a classroom-based pedagogy, an organized curriculum, and/or some form of learner assessment (Belanger and Tuijnman 1997; Cervero 1989). These learning activities range from instruction in basic skills, to episodic learning in the form of work-related or personal interest courses, to highly structured and sustained programs of study such as college and university

programs. As can be expected, these different definitions of what constitutes adult learning result in varying estimates of adult education participation rates (Collins et al. 1997).

Although there is considerable variation in how adult education and lifelong learning are viewed and defined, there is relatively less variation in the data used to examine these concepts, with most research relying on the following sources of data: (1) surveys of adults, typically using either adults in general or employees; (2) surveys of participants in specific adult education programs; and (3) surveys of employers, one of the most common providers of work-related education (Creighton and Hudson 2002). The analytical approach used often depends on the policy perspective of the sponsoring agency. For example, over the years, the U.S. Department of Labor has sponsored surveys of employees and employers (Frazis et al. 1997), while the U.S. Department of Education has sponsored surveys of adults in general and of participants in (federally funded) adult basic education programs[1] (Development Associates 1993; Kim et al. 1995, 2004; Korb, Chandler, and West 1991).

The basic results from these various surveys (and other studies) show that a substantial and growing proportion of adults engage in formal learning activities. Data from the precursor to the NHES adult education surveys showed that participation rates increased from 10 percent to 14 percent between 1969 and 1984 (Hill 1987).[2] Data from the NHES Adult Education Surveys showed continuing increases in the 1990s, with 38 percent of adults participating in 1991, 40 percent in 1995–96, and 46 percent in 2000–01 (Korb, Chandler, and West 1991; Kim et al. 2004).[3]

Work-related learning comprises a substantial part of all formal adult learning (Valentine 1997; Kim et al. 2004), and participation in work-related learning also seems to be increasing. The 1995 NHES Adult Education Survey found a work-related participation rate of 22 percent, while previous analyses of the 2001 NHES survey found a participation rate of 30 percent (Creighton and Hudson 2002; Kim et al. 2004).

[1] During the 1990s, the U.S. Department of Education also funded a series of surveys of employers; these surveys provided some basic statistics on workplace training, but largely focused on such topics as the workforce preparation of new hires and employer involvement in school-to-work transition programs (Zemsky et al. 1996; Lynch and Black 1996a; Institute for Research on Higher Education 1997).

[2] The estimates from Hill (1987) are not directly comparable to the later NHES estimates due to differences in survey structure (e.g., the former did not have separate sections for specific types of activities, and collected data on only four activities), activities counted as adult learning (e.g., the former excludes apprenticeships and full-time GED study), and survey methods (e.g., the former allowed the use of proxy respondents).

[3] The 1991 NHES estimate is an overestimate relative to the later estimates because it includes full-time college attendance; the later NHES survey estimates exclude this activity. As described later in this chapter, all NHES statistics reported in this paragraph used a broader population and narrower definition of work-related education than is used in this report, thus estimates from other NHES reports are not directly comparable to the estimates in this report.

The prevalence of work-related adult learning is also evident in data from employers. Two national surveys of employers conducted in the 1990s found that about 80 to 90 percent of employers provided formal training for their employees (Frazis et al. 1997; Lynch and Black 1996a).[4] According to a 1995 survey of employees, not all employees participated in these employer-provided training opportunities, but a majority did; about 70 percent of employees participated in employer-provided training over the course of a year (Frazis et al. 1997). Surveys of college students have also shown that employers sometimes support their employees' college education: in 1995–96, 25 percent of undergraduates who described themselves as employees going to school reported that they had received employer financial aid (Lee and Clery 1999).

This report builds on the findings of these studies by providing a more comprehensive look at work-related education than has been possible with past national studies, using a broader population (not just employees) and a broader definition of work-related education (not just employer-provided training or one section of the NHES survey) than has typically been used. The following section of this report highlights how the current study differs from and contributes to existing research, both in its definitions of key concepts and its methodological approach. A more detailed review of the research literature on each substantive topic covered in this report is included in subsequent chapters. Technical and methodological issues are discussed in detail in appendix B.

The Current Study

This study uses data from the Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001). This survey collected information from a representative sample of the U.S. civilian, noninstitutionalized population age 16 or older who were not enrolled in secondary school at the time of the survey. The AELL–NHES:2001 provides a rich source of information from which to examine work-related education. In addition to demographic information, education background, and recent work history, the survey also asks respondents a number of questions about specific courses taken in the past 12 months,[5] reasons for taking these courses, course providers, and employer support and other inducements for participation. Although more recent data on work-related adult education are available from an NHES survey conducted in 2002–03 (see Kleiner et al. forthcoming), the 2000–01 survey covers a broader range of adult learning activities and provides more detailed

[4] One reason these surveys provide different estimates is that they differ in the minimum size of employment establishments surveyed; surveys with smaller establishments tend to find lower training rates because smaller employers are less likely than larger employers to offer training (Frazis et al. 1997).

[5] The AELL–NHES:2001 reflects the educational activities of adults in the United States from early January 2000 to mid-April 2001. In this report, these data are referred to as describing participation in 2000–01.

coverage of some topics (e.g., noncredit coursetaking), making the 2000–01 dataset preferable for this analysis. The technical appendix of this report (appendix B) provides more information on the structure of the AELL–NHES:2001; detailed information on the administration of the AELL–NHES:2001 is available in the data user's manuals (U.S. Department of Education 2003b, 2003c).

This study was launched as part of the NCES Data on Vocational Education (DOVE) program. Within this context, the report is designed to focus on the education and training of the U.S. civilian labor force, rather than on adults in general, as is typical in most NCES reports using NHES data. Given this focus, the report examines participation in learning activities among adults ages 25–64 who were in the labor market (employed or looking for work); this age restriction matches that often used by other organizations to describe the labor force (Organization of Economic Cooperation and Development [OECD] 2003; U.S. Department of Commerce 2002, table 564). It is important to note that this sample is more restricted in terms of both age and employment status than are samples typically analyzed in NCES reports on the NHES Adult Education Surveys.[6] The analysis sample used in this report represents about 62 percent of the total AELL–NHES:2001 full survey sample.

As in most past studies of adult learning, this report focuses on participation in *formal* learning activities (i.e., courses and programs that involve an instructor), and excludes informal learning. Informal work-related learning is fairly common (Bruce, Aring, and Brand 1998; Merriam and Caffarella 1999),[7] but is excluded here because it is more difficult to measure and is less amenable to policy intervention; there is also less information available on this type of learning within the NHES surveys. Given this restriction to formal education, the current report also uses a broader definition of work-related education than has typically been used in past studies, which have focused on either employer-sponsored training or specific sections of the NHES Adult Education Surveys. To understand the difference between the current analysis and previous ones, it is useful to review the structure of the AELL–NHES:2001 survey instrument. The

[6] It should be noted that the groups omitted from this analysis typically participate in work-related learning at different rates than the groups included in the analysis. For example, using the 2003 NHES Adult Education for Work-Related Reasons Survey, Kleiner et al. (forthcoming) found that those who had not worked in the past year participated at a rate of 11 percent, versus 52 percent for those who had worked. In addition, adults ages 65 or older participated at lower rates than other adults, while adults ages 24 or younger participated at higher rates (due to relatively high enrollments in postsecondary education). However, because traditionally aged postsecondary students, those over age 64, and those not in the labor force are not typically of policy interest for work-related learning, these groups were excluded from this analysis. See appendix B for definitions of the labor force categories.

[7] A previous analysis of the AELL–NHES:2001 found that 63 percent of adults ages 16 or older participated in informal work-related learning (Kim et al. 2004). A Bureau of Labor Statistics study found that 96 percent of all workers in establishments with 50 or more employees received informal training over a 1-year period (Frazis et al. 1998).

AELL–NHES:2001 asks adults about their participation in the following formal education activities in the 12 months before the interview:[8]

- *English as a Second Language (ESL)*: Classes for adults whose main language is not English to develop the English language skills necessary to pursue further education, to enter or advance in the job market, to enrich their personal and family lives, or to better adapt to American society;[9]
- *Adult basic education, General Educational Development (GED) preparation classes, and adult high school programs*: Programs or classes to help adults improve basic reading, writing, and mathematics skills or to prepare for a high school diploma or its equivalent;
- *Credential programs*: Formal education programs leading to a college or university degree (one survey section), or a vocational or technical diploma or certificate (another survey section);
- *Apprenticeship programs*: Formal on-the-job training and other related instruction leading to journeyman status in a skilled trade or craft; and
- *Formal courses*: Courses that are not part of a degree or diploma program, including career-related courses, seminars, or workshops, and courses related to personal interests and hobbies, such as first aid or CPR, religion, or health.

In the AELL–NHES:2001, respondents in the "formal courses" section were asked to list their courses and then to indicate whether each course was taken mainly for work-related reasons, mainly for personal interest, or for both reasons equally. This procedure for tabulating courses is different from that used in previous NHES Adult Education Surveys. In the 1991, 1995, and 1999 surveys, respondents were first asked to describe the courses they took that were related to a job or career and were then asked about all other courses taken. As noted in Kim et al. (2004), the latter procedure may have resulted in an undercounting of work-related courses because some respondents seem to have included in the "other courses" section work-related courses that they forgot to list in the previous section.

Most NCES reports using NHES adult education data have focused on the prevalence and nature of adult education activities in general or on activities reported in the section of the survey devoted to job- or career-related courses (Darkenwald, Kim, and Stowe 1998; Kim et al. 1995, 2004; Kim and Creighton 1999; Kopka, Schantz, and Korb 1998; Kopka and Peng 1993, 1994; Korb, Chandler, and West 1991). Another recent NCES report (Creighton and Hudson 2002)

[8] The AELL–NHES:2001 also includes (for the first time in the NHES) a section on informal work-related learning activities, such as brown-bags and conference meetings. These informal learning activities are not analyzed in this report. Kim et al. (2004) includes an examination of participation in this type of learning.

[9] In the AELL–NHES:2001, interviews were conducted only in English and Spanish. As a result, the survey underestimates participation in English as a Second language (ESL) programs among adults who do not speak English or Spanish.

used previous NHES Adult Education Surveys (AE–NHES:1991, 1995, and 1999) to examine participation trends, counting as "work related" all courses within both the "job related" and "other" course sections for which respondents indicated that their main reason for participation was work related.

Defining Work-Related Education

While past reports summarizing data from NHES Adult Education Surveys typically describe work-related coursetaking based on the course section of the survey, it is clear that other activities—most notably apprenticeship programs but also postsecondary and other credential programs, ESL, and other basic skills classes—can also be taken for work-related reasons. This report includes all such activities under the umbrella of work-related education.

The following logic was used to define work-related education for this report. First, all apprenticeship programs were considered work related. Second, because of the (1) large financial investment made in postsecondary credential programs by students, their families, and society in general, (2) large proportion of college degree recipients who enter the labor force,[10] and (3) economic returns to postsecondary education,[11] all college and vocational programs were considered work related. Third, all credential training programs (any program in the AELL–NHES:2001 credential section that was taken from an organization other than a postsecondary institution; see appendix B for further detail) were considered work related. For other learning activities, however, investments and outcomes are less clear; in these cases (ESL, adult basic education, and formal courses), the respondent's report on the main reason for participating in the activity was used to classify activities as work related. Activities that the respondent listed as taken mainly for work-related reasons or equally for work-related reasons and personal interest were considered work related; activities taken mainly for personal interest were considered not to be related to work and are not included in the analysis.[12]

Thus, this report defines *work-related education* as including the following AELL–NHES:2001 formal learning activities: (1) all postsecondary (college and vocational) credential programs; (2) all credential training programs; (3) all apprenticeship programs; and (4) all activities reported in the following sections of the survey as taken mainly for work-related reasons or

[10] Based on analyses of the 1999 Current Population Survey, the National Education Longitudinal Study of 1988 (NELS:88/2000), "Fourth Follow-up, 2000," and the 1993/94 Baccalaureate and Beyond Longitudinal Study (B&B:93/94), the proportion of college graduates who entered the labor force was estimated to be 90–95 percent of males and more than 80 percent of females.

[11] See, for example, U.S. Department of Education (2002, indicator 16).

[12] See Bills (2003) for an examination of participation in personal development learning that is not related to work, using AELL–NHES:2001.

equally for work-related and personal reasons: classes reported in the ESL and basic skills sections, and courses reported in the formal courses section. Work-related learning activities included in the informal learning section of the survey (e.g., on-the-job training, self-paced study, or conference attendance) were not counted as work-related education.

Analytic Questions

To provide a comprehensive look at adults' participation in work-related education, this report examines a number of questions that fall within four key topic areas. Each topic area is addressed in a subsequent chapter.

Labor Force Participation in Work-Related Education

As discussed above, the current study offers a broader perspective on work-related education than past studies by including all formal learning activities taken for work-related reasons, employer-provided or otherwise. Little is known about participation in this wider range of work-related education. Thus, one set of questions addresses basic issues of who (among those in the labor force) participates in these activities and the nature of the activities taken. Specifically, the report explores the following questions:

- How prevalent is participation in work-related education among adults in the labor force?
- In what types of activities do labor force members participate, and which organizations provide instruction?
- What are participants' reasons for engaging in these activities?
- What are the main topics of instruction labor force members pursue?
- Which labor force members participate in work-related education?

The Role of Postsecondary Education in Work-Related Education

Within the general framework of learning for work, policy interest also focuses on the role of postsecondary education as an instructional source (Graham and Stacey 2002). This report therefore explores the role that postsecondary education plays in adult learning for work by examining the specific postsecondary providers involved in work-related education, the employer support and incentives involved in labor force members' postsecondary education, and the topics covered by this type of instruction. The report addresses the following questions:

- To what extent do postsecondary institutions provide various types of work-related education for labor force members?
- What types of postsecondary education (e.g., degree programs, for-credit courses) do labor force members use for work-related education?
- Which instructional topics are most likely to be pursued through postsecondary education?
- To what extent does labor force members' postsecondary education involve employer support, employer requirements, or other inducements for participation?

Employer Support for Work-Related Education

Because employers provide an important source of instruction and assistance for work-related adult education, this report examines the extent to which and ways in which employers support work-related education. The literature on employer involvement generally focuses on employer-provided training, with information typically gathered from employers. In contrast, the AELL–NHES:2001 offers a picture of several types of employer support from the employee's perspective, making it possible to compare employer involvement in work-related education taken for different purposes (e.g., to meet a continuing education requirement), from different sponsors, and for different types of activities. Because the survey captures all educational activities, not just those that are employer sponsored, it is also possible to examine the share of all labor force members' work-related education that is supported by employers. Questions addressed concerning employer support include the following:

- What proportion of work-related education is employer sponsored or receives other employer support?
- What types of support do employers provide for work-related education?
- Which labor force members and which activities are most likely to receive employer support?
- How involved are employers in motivating participation in work-related education?

The Role of Employment-Related Inducements to Participation

Participation in work-related education is not always voluntary, and even voluntary participation is likely to be motivated by strong inducements because formal learning typically involves a significant commitment of time and/or effort. Requirements and other inducements to participation are likely to have a significant influence on overall participation levels, on who participates in work-related education, and on who receives employer support. This report focuses on three types of inducements collectively referred to as *employment-related inducements*: seeking a

state, industry, or company certificate or license (hereafter referred to as seeking an occupational credential); earning continuing education units (CEUs); and meeting employer requirements for participation. The report addresses the following questions:

- How extensive are employment-related inducements among labor force members who participate in work-related education?
- Which inducements are most common?
- Which activities and which labor force members are most likely to have these inducements?
- What is the relationship between participation levels and employment-related inducements?

Definitions of Key Constructs

To answer the questions above, this report operationally defines a number of concepts and typologies to describe work-related education. This section provides a brief description of these constructs. Detailed information about specific variables used to measure each construct is available in appendix B.

Types of Learning Activities

Unlike previous NHES surveys, the AELL–NHES:2001 includes information that allows analysts to identify postsecondary education courses. To take advantage of this new information, this report uses a classification scheme that starts with the basic survey structure, modified to provide additional detail on postsecondary education. The basic survey structure provides information on (in order) ESL classes, adult basic education classes, apprenticeship programs, college/university programs (excluding individual college courses), vocational/technical education programs (excluding individual vocational/technical education courses), and formal courses (including college and vocational/technical education courses). The classification results in the following six basic types of work-related learning activities:

- Basic education classes: All ESL and adult basic education classes reported in these two sections of the survey;
- Apprenticeship programs: All apprenticeship programs reported in the apprenticeship section of the survey;
- Postsecondary programs: All activities reported in the college/university and vocational/technical sections of the survey that were taken from a postsecondary institution;

- Credential training programs: All programs reported in the college/university or vocational/technical sections of the survey that were taken from an organization other than a postsecondary institution;[13]
- Postsecondary courses: All courses in the formal courses section of the survey for which the instructional provider was a postsecondary institution or for which college credit was received; and
- Training courses: All courses in the formal courses section of the survey for which the instructional provider was not a postsecondary institution and for which no college credit was received.

These six types of work-related learning activities are further organized using two classification schemes, as illustrated in table 1.1. First, largely following the structure of the AELL–NHES:2001, activities were classified into work-related programs (basic education, apprenticeship, postsecondary, and credential training programs) and work-related courses (postsecondary and training). Second, to examine the role of postsecondary education in adult learning for work, activities were also divided into postsecondary activities (postsecondary programs and postsecondary courses) and other activities (basic education programs, apprenticeship programs, credential training programs, and training courses). Postsecondary courses were further classified into for-credit and noncredit courses.

Table 1.1. Classification schemes for work-related learning activities

Classification scheme 1: **Programs vs. courses**	**Classification scheme 2:** **Postsecondary vs. other (nonpostsecondary) activities**
Programs	Postsecondary activities
Basic education classes	Postsecondary programs
Apprenticeship programs	Postsecondary courses
Postsecondary programs	For-credit postsecondary courses
Credential training programs	Noncredit postsecondary courses
Courses	Other activities
Postsecondary courses	Basic education classes
Training courses	Apprenticeship programs
	Credential training programs
	Training courses

[13] This category of activities includes programs that offer professional credentials awarded by organizations other than postsecondary institutions, such as a real estate licensing program.

Classifying Activities by Topic of Instruction

The AELL–NHES:2001 also includes information on the topic of instruction for each activity, which was used in this report to classify work-related learning activities into the following eight topic areas: business, computer science, education, health, science, social sciences and services, vocational trades, and "other" areas. The seven specific topic areas were those areas found during preliminary analysis to have the highest levels of participation. Appendix B provides more detail on how activities in each section of the survey were collapsed into these topic areas.

Instructional Providers

The AELL–NHES:2001 asks respondents about the sources of instruction for their adult education activities. It is important to note that the instructional provider may or may not be the same as the sponsor of the course.[14] Based on the AELL–NHES:2001 provider categories, this report uses the following classification of instructional providers: business and industry, postsecondary institution, other school or school district, government agency, professional association/organization, and other provider (combining elementary/secondary school, adult learning center, public library and "other"). In addition to these providers, the survey question that asks respondents if the instructional provider was also their employer was used to separate employers from other instructional providers.

Employer Support

Types of Employer Support and Involvement

The AELL–NHES:2001 asks whether participation in each instructional activity was required, suggested, or encouraged by the employer (considered here as measures of employer involvement). The survey also asks about different types of support that employers can provide for their employees' learning: employer paid tuition and fees; employer paid for books and materials; employer paid work time for instruction; employer provided workplace space; and (as mentioned above) employer provided instruction. As used in this report, the term *employer involvement and support* includes all forms of involvement listed above; employer support excludes employer suggestion, encouragement, or requirement for participation, but includes all other forms of employer support listed above. These employer-support activities are divided into direct financial support (employer paid for tuition and fees or books and materials) and indirect financial support

[14] For example, an employer (the sponsor) offering a course to its employees may hire to teach the course (the instructional provider) a representative from a software company, an instructor from a local community college, or staff from a professional or trade organization.

(employer paid work hours during instruction, provided workplace space, or provided instruction). Activities were also divided into those that were employer sponsored (see below) and those that were not employer sponsored.

Employer-Sponsored Instruction

An employer often makes learning activities available exclusively to its employees at the employer's expense; this type of activity is commonly referred to as *employer-provided instruction*. To avoid confusion with the AELL–NHES:2001 questions on instructional providers, this report refers to this type of activity as *employer-sponsored instruction*. While the typical survey of employers asks directly about this type of learning activity, employer-sponsored instruction is more difficult to identify in a survey of adults, since adults are sometimes unaware of their employers' role in sponsoring instructional activities. The AELL–NHES:2001 does, however, include items that allow for a reasonable approximation of employer-sponsored instruction.

To derive a measure of employer-sponsored instruction, it was first decided that all postsecondary activities (postsecondary programs and postsecondary courses) should not be counted as employer sponsored.[15] Then, among nonpostsecondary activities, employer-sponsored instruction was defined to include (1) all apprenticeship programs and (2) all nonpostsecondary activities for which the employer provides instruction and does so at no charge to the employee. However, there are employer-sponsored activities for which someone other than the employer (e.g., an equipment vendor) provides the instruction. To capture these activities, the report also counts as employer sponsored any nonpostsecondary activity that occurs during paid work hours for which the employer pays the instructional costs while the employee does not. Finally, some respondents may have indicated that their employer-sponsored training had no tuition or fees, which would have been coded as "employer did not pay tuition or fees." To account for this group of employer-sponsored activities, the report also counts as employer sponsored those nonpostsecondary activities that are taken during paid work hours, at the workplace, and for which the employee does not pay instructional costs. The last part of the definition does not count employer-sponsored training taken off-site, but may count as employer sponsored some activities sponsored by other groups, such as labor union or professional organization training paid for by

[15] College programs and courses are sometimes paid for by employers through tuition reimbursements and may be taken during paid work hours. In addition, graduate students sometimes work as teaching assistants, making them employees of the postsecondary institution as well as trainees. However, because these learning activities do not encompass what is typically meant by employer-provided or employer-sponsored instruction, all college programs and courses are excluded from the definition of employer-sponsored activities. This decision may misclassify courses taken by postsecondary employees at their institution. These activities are, however, counted as receiving employer support (e.g., time off for instruction, paid tuition or fees) in the chapter on employer support if the respondent indicated that his or her employer had provided such support.

membership dues. This imprecision in the definition of employer-sponsored training is unavoidable, but is assumed to create minimal bias.

Imputations

The AELL–NHES:2001 distinguishes respondents who were and were not employed at the time they participated in a learning activity. Respondents who were not concurrently employed at the time of their participation were not asked the set of questions about employer involvement and support. For these respondents, "no employer involvement or support" was imputed. These imputations are quite straightforward in most cases (e.g., a worker could not get paid time off for courses when she was not employed). However, the imputations do assume that employers do not pay for workers to take courses when the workers are not employed by the firm. There may be cases where this assumption is false (e.g., an employer may grant a worker a leave of absence to finish a degree program for which the employer provides tuition support); however, such situations are almost certainly rare. Workers who were self-employed only (with no other job) during the past 12 months were also imputed to have received no employer involvement or support.[16]

Measuring Participation

Some of the respondents in the AELL–NHES:2001 participated in more than one learning activity during the 12-month period covered by the survey. For example, a respondent could have participated in one basic education class and two work-related training courses, each of which may have had different providers, levels of support, and instructional topics. In this analysis, respondents who participated in more than one activity were counted as participants in each type of activity. As a result, the percentages in this report represent participation in *at least one activity* of a given type. So the respondent in the example above would be counted as a basic education participant and as a training course participant, and if any of this person's learning activities included employer support, for example, the respondent would be counted as a recipient of employer support. For the sake of simplicity, this report will not typically use the phrase "at least one" to qualify the percentages, but the reader should bear in mind that the percentages do represent at least one instance of the activity in question, rather than *only* one instance.

In addition, the reader should note that when work-related education is disaggregated (e.g., into the different topics of instruction), the percentages cannot meaningfully be summed because the groups are not mutually exclusive. For example, the sum of the percentages participating in

[16] These self-employed-only respondents were considered not eligible for receipt of employer support (and thus also not eligible for employer-sponsored instruction). This assumption seemed preferable to one that defines the self-employed as employers providing themselves as workers with support for their own skill enhancement.

postsecondary courses and in postsecondary programs is greater than the total percentage participating in all postsecondary activities because some adults participated in both postsecondary courses and postsecondary programs.

For readers who wish to convert the percentages listed in the tables to numbers of adults, appendix B includes the weighted counts for the two main analysis populations (labor force members ages 25–64 and participants among this group). For example, table 2.1 shows that 1.4 percent of labor force members participated in apprenticeship programs in 2000–01; this converts to 123,430,818 x .014 = 172,803 labor force members.

Organization of the Report

As indicated above, the remainder of the report begins with a comprehensive look at adult education for work and then progresses to a detailed examination of the role of postsecondary institutions and employers in providing this education and a discussion of some incentives that may motivate participation.

More specifically, chapter 2 provides an overview of participation in work-related education by looking at both the labor force members who participate and the activities in which they participate. Chapter 3 explores in detail the role of postsecondary institutions in providing work-related adult education. The focus of chapter 4 is employer support for employees' participation in work-related education. Chapter 5 takes a closer look at three employment-related inducements to participation—seeking an occupational credential, earning continuing education units, or meeting an employer requirement for participation—and their relationship to participation in work-related education. The report concludes with chapter 6, which provides a summary of findings. Appendix A lists the standard errors for the percentages presented in tables and figures throughout the report, and appendix B provides technical notes.

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Chapter 2: Labor Force Participation in Work-Related Education

Work-related adult education is of interest to policymakers because it is strongly linked to economic sufficiency for individuals, productivity for employers, and economic growth for the nation (Bishop 1997; Decker, Rice, and Moore 1997; OECD 2003). This chapter provides an overview of the extent and nature of work-related education. Expanding the information presented in past reports, this chapter focuses on *what* work-related education is, *who* the participants are, *why* they participate, and *from whom* the participants receive instruction.

The chapter begins with a review of participation in adult education in general and in work-related adult education in particular. It then summarizes AELL–NHES:2001 data on work-related education, including the types of learning activities in which labor force members participate, the instructional providers of these activities, labor force members' primary reasons for participating, employer support for participants, and the topics of instruction covered in these learning activities. The chapter concludes with an analysis of participation rates among labor force members with different sociodemographic and labor force characteristics.

Participation in Work-Related Education

As discussed in the preceding chapter, the rates at which adults participate in formal learning have been increasing over the last decade (Creighton and Hudson 2002; Kim and Creighton 1999; Kim et al. 2004). Although it has been relatively easy to track the increase of adult education participation rates, tracking changes in *work-related education* is more challenging due to variations in how surveys are designed and work-related education is defined. For example, in their analysis of NHES adult education data collected before 2001, Creighton and Hudson (2002) defined work-related education as courses in the job-related and personal development course sections that individuals took for work-related reasons. This definition differs from the definitions used in other NHES reports, which count only job-related courses. Nonetheless, both Creighton and Hudson and Kim and Creighton (the latter using the traditional job-related course definition) reported that 23 percent of adults participated in work-related courses in 1998–99. Compared with these findings, Kim et al. (2004) found in a more current analysis of AELL–NHES:2001 data that a higher percentage of adults (30 percent) participated in work-

related courses. However, this increase may be due at least partly to a change in the structure of the NHES instrument.[17]

Another perspective on participation in work-related education is provided by surveys of employees. The most recent such survey, conducted for the Bureau of Labor Statistics (BLS) in 1995, found that 70 percent of employees of establishments with at least 50 workers had received formal employer-provided training within the past 12 months. The relatively high rate of participation is likely due to differences in the BLS sample compared with the NHES samples: the BLS sample excludes nonworkers and those employed by small enterprises, both of whom are less likely than others to participate in formal training (Creighton and Hudson 2002; Lynch and Black 1996a, 1996b).

The current study focuses on all adults (ages 25–64) in the labor force and uses a broad definition of work-related education that includes all formal learning activities taken for work-related reasons. Using this sample and this definition of work-related education, this study found that 47 percent of adults ages 25–64 participated in work-related education in 2000–01 (table 2.1). In addition to providing a more inclusive definition of work-related education, the current study may report a higher participation rate than the rates reported in other NHES studies because the analysis population is restricted to labor force participants ages 25–64, an age and employment group that has been shown to participate in learning at relatively high rates (Creighton and Hudson 2002; Kim et al. 2004).[18]

Participation in Different Types of Work-Related Activities

As defined here, work-related education activities cover a broad spectrum of learning needs, ranging from ESL and adult basic education (ABE) classes that typically serve adults with less than a high school education, to degree programs at postsecondary institutions, to training that adults receive at their workplace. Participation rates in these adult education activities vary

[17] Kim et al. (2004) explain the issue as follows: "In the [1995 and 1999 surveys], adults were asked to report their work-related courses in one section of the questionnaire and their personal interest courses in a subsequent section. Data on the main reasons for taking courses suggest that some courses that were reported as personal interest courses [in 1999] were in fact work-related courses remembered by the respondent after the work-related section was completed … In the AELL–NHES:2001, all courses were reported together by the respondents and listed at one time, and the respondent was asked whether each course was taken for work-related reasons, for personal interest, or both" (p. 15). Thus, the 1995 and 1999 surveys may underestimate the extent of work-related coursetaking.

[18] For example, Kleiner et al. (forthcoming) report a work-related participation rate of 33 percent in 2002–03. However, that analysis excluded some types of work-related education that are included here, and included all individuals age 16 and older. Both differences tend to lower the 2002–03 rate compared the 2001 rate calculated in this report.

Table 2.1. Percentage of labor force members ages 25–64 who participated in each type of work-related learning activity, and percentage of participants in each type of work-related learning activity: 2000–01

Type of learning activity	Percent of labor force members	Percent of participants
Total, all activities	47.3	100.0
Postsecondary activities	15.4	32.5
Other (nonpostsecondary) activities	39.3	83.1
Basic education class	0.9	1.8
Apprenticeship program	1.4	3.0
Postsecondary program	7.6	16.0
Credential training program	0.7	1.6
Postsecondary course	8.8	18.7
Training course	37.2	78.7

NOTE: Detail may exceed totals because respondents can participate in multiple activities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

considerably. Previous analyses of NHES Adult Education Surveys have shown that courses[19]—whether taken for work-related or personal reasons—account for a large proportion of adult education; fewer adults participate in college or vocational credential programs, and even fewer participate in ESL, ABE, or apprenticeship programs (Creighton and Hudson 2002; Kim and Creighton 1999). As shown in table 2.1, the findings in this report are largely consistent with those of previous studies.

Across the six major types of activities, work-related learners in the labor force were most likely to participate in training courses in 2000–01: 79 percent of these work-related learners participated in these courses. Participation levels in postsecondary programs and courses were relatively low (16–19 percent of all participants). Even fewer participants took basic education classes (ESL or ABE classes), apprenticeship programs, or credential training programs (2–3 percent each). As pointed out by Creighton and Hudson (2002), the relatively low participation rates in basic education classes are not necessarily indicative of the value of these programs or of adults' (lack of) interest in them. Rather, the low rates likely reflect the fact that these programs typically target a smaller group of adults than some other adult education activities do. The same is also probably true of apprenticeship and credential training programs, which exist for a limited number of occupations.

[19] "Courses" in previous NHES Adult Education Surveys include both postsecondary courses and other courses (training courses in this analysis); these types of courses were not distinguishable in those surveys.

When combining activities across postsecondary programs and courses, one-third of participants (33 percent, not in table) participated in some type of postsecondary activity. These activities are examined in greater detail in chapter 3.

Instructional Providers

Just as adult education in general consists of a range of learning activities, the providers of adult education instruction cover a broad range of organizations (Kim et al. 2004; Kopka, Schantz, and Korb 1998). Typical providers of adult education include more traditional educational providers such as elementary schools, secondary schools, colleges and universities, and vocational and technical schools, as well as other organizations such as businesses, community agencies, government agencies, and private, volunteer, and religious organizations. Past NHES studies have shown that among these various providers, adults are most likely to receive instruction for work-related activities (defined in the job-related course section of the NHES survey) from business and industry, followed by professional organizations and postsecondary institutions (Darkenwald, Kim, and Stowe 1998; Kim et al. 2004).

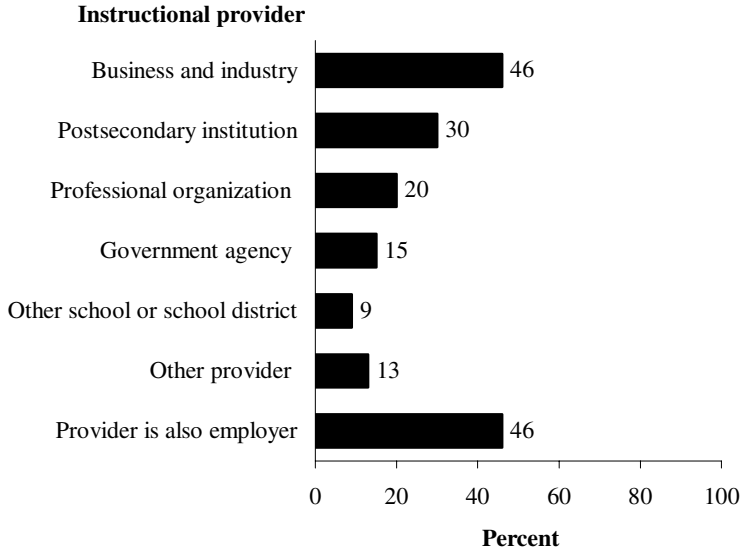
The current study also finds that business and industry is the most common provider of instruction for labor force members' work-related education (more broadly defined), followed by postsecondary institutions.[20] As shown in figure 2.1, almost half of labor force members participating in work-related education received instruction from business and industry (46 percent) in 2000–01. About 30 percent received instruction from a postsecondary institution, and 20 percent or fewer received instruction from a professional organization, government agency, or other school. Employers were also relatively common providers. When asked if their instructional provider was their employer, almost half of all work-related education participants (46 percent) reported that this was the case.

As one might expect, instructional providers varied depending on the type of activity involved (table 2.2).[21] By definition, all participants in postsecondary programs had postsecondary institutions as instructional providers. Among participants in postsecondary courses, 80 percent

[20] Postsecondary institutions may be more common providers in this study than in other NHES studies because this study includes full-time postsecondary education in its definition of adult education, while past NHES studies excluded that activity.

[21] Apprenticeship programs are not listed separately in table 2.2 because the question about providers in the apprenticeship section of the AELL–NHES:2001 is not comparable with the questions in other survey sections. Apprenticeship programs are included in the total row, however. (See appendix B for details on this issue.)

Figure 2.1. Percentage of work-related education participants ages 25–64 with each type of instructional provider, and percentage for whom provider is also the employer: 2000–01



SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

reported that a postsecondary institution was their instructional provider.[22] Among participants in nonpostsecondary activities, those in adult basic education classes most often reported "other schools or school districts" as their instructional provider, and those in training courses most often reported that business and industry was their instructional provider. Participants in credential training programs were more broadly dispersed among providers, with no one provider serving more than one-third of participants.

Employer Support for Work-Related Education

From the literature on employer-provided training, it is clear that at least some work-related education is supported by employers (e.g., Frazis et al. 1997; Lynch and Black 1996a). Studies of college students also show that employers sometimes support the postsecondary education of

[22] The postsecondary courses not provided by a postsecondary institution are courses for which respondents indicated they received college credit, but had an instructional provider other than a postsecondary institution. This seeming inconsistency may result in part from confusion over who the instructional provider is. For example, respondents may not have been aware that a course instructor was an adjunct faculty member when the course was taken at a worksite or other off-campus location. To the extent that respondents made this type of error, these data understate the role of postsecondary institutions as instructional providers.

Table 2.2. Percentage of work-related education participants ages 25–64 served by each type of instructional provider, by type of learning activity: 2000–01

	Type of instructional provider						
Type of learning activity [1]	Business and industry	Post-secondary institution	Professional organization	Government agency	Other school or school district	Other provider	Provider is also employer
Total, all activities	45.6	29.5	19.6	14.8	8.6	12.8	45.8
Basic education class	5.9	17.3	2.5	2.5	67.9	6.7	6.9
Postsecondary program	†	100.0	†	†	†	†	†
Credential training program	29.2	†	20.0	8.0	34.4	8.5	†
Postsecondary course	8.9	79.6	3.9	6.7	2.3	#	21.8
Training course	56.2	†	22.9	16.8	8.3	15.1	50.2

† Not applicable.

Rounds to zero.

[1] Because the NHES provider question for apprenticeships is different from the question in other survey sections, providers are not listed separately for apprenticeship programs in this table. Apprenticeship participants are included in the total row, however.

NOTE: Detail may exceed 100 percent because respondents can participate in multiple activities. In addition, adults in apprenticeships a included only in the total.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the Household Education Surveys Program, 2001 (AELL–NHES:2001).

their employees (Cappelli 2004; Lee and Clery 1999). While employer support for work-related education is examined in detail in chapter 4, this chapter provides a brief overview of the extent of employer support across all work-related education and for each type of learning activity. Because it makes sense to ask only those who are employed about whether they received employer support, this section is restricted to participants who were employed at the time they were involved in the learning activity.

Among participants who were employed while they were in the learning activity, almost 90 percent received some form of employer support (table 2.3). The percentage of participants who received employer support ranged from a high of 100 percent among apprenticeship participants (who were all defined as receiving employer support for this analysis) to a low of 12 percent among basic education participants. Those involved in postsecondary and training activities fell between these extremes. Among participants in both training and postsecondary activities, course participants were more likely to receive employer support than were their corresponding program participants (e.g., 94 percent of training coursetakers vs. 70 percent of credential training program participants). Likewise, for both course and program participants, training participants were more likely to receive support than were their corresponding postsecondary participants (e.g., 94 percent of training coursetakers vs. 81 percent of postsecondary coursetakers).

Table 2.3. Percentage of concurrently employed work-related education participants ages 25–64 who received any employer support, by type of learning activity: 2000–01

Type of learning activity	Any employer support
Total, all activities	88.5
Basic education class	12.1
Apprenticeship program	100.0
Postsecondary program	46.4
Credential training program	69.7
Postsecondary course	80.9
Training course	94.4

NOTE: Concurrently employed participants are those who were employed at the time of their participation. For this report, all apprenticeship program participants were defined as receiving employer support. Detail may exceed total because respondents can participate in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Goals and Inducements for Participation

Numerous studies have explored the social, psychological, and economic reasons for why adults participate in education activities. Studies using NHES and other surveys have consistently shown that adults cite job-related reasons as their main reason for participation in education activities (Kim et al. 1995, 2004; Kopka and Peng 1993; Kopka, Schantz, and Korb 1998; Merriam and Cafferella 1999; Valentine 1997). For example, an analysis of data from the 1995 NHES Adult Education Survey (AE–NHES:1995) found that job improvement was the most frequently cited reason for participation, followed by personal, family, or social reasons, obtaining a diploma or degree, and training for a new job (Kopka and Peng 1994). However, few studies have examined the reasons for participation in work-related education in detail. One survey, the 1995 BLS survey of employers, examined the various types of training that employers offer, which reflect their goals for training; these include various types of skill development (management training, customer relations, etc.), safety training, employee relations, and job orientation (Frazis et al. 1997).

The AELL–NHES:2001 provides a learner's perspective on reasons for participation. Although this survey asked respondents about a number of reasons for participating in adult education, the specific questions asked varied across survey sections. Hence, as table 2.4 indicates, some reasons for participation are available for certain activities but not for others. For example,

Table 2.4. Percentage of work-related education participants ages 25–64 with each goal or inducement for participation, by type of learning activity: 2000–01

					Employment-related inducement			
Type of learning activity	To get a new job with a different employer	To help get a raise or promotion	To maintain or improve existing skills	To learn new skills or methods	Any employment-related inducement	To seek an occupational credential	Continuing education units (CEUs) earned	Employer required participation
Total, all activities	†	†	83.4	85.4	68.0	37.2	28.5	46.7
Basic education class	77.5	73.0	0.0 [1]	100.0 [2]	7.7	0.0 [1]	0.0 [1]	7.7
Apprenticeship program	†	†	0.0 [1]	100.0 [2]	100.0 [2]	100.0 [2]	0.0 [1]	0.0 [1]
Postsecondary program	†	†	0.0 [1]	100.0 [2]	29.2	25.3	0.0 [1]	10.3
Credential training program	†	†	0.0 [1]	100.0 [2]	78.2	67.0	0.0 [1]	29.5
Postsecondary course	10.3	23.8	93.8	83.9	65.1	34.5	45.5	30.0
Training course	9.0	20.6	94.7	83.4	73.7	37.2	29.3	53.2

† Not applicable.

[1] Responses logically imputed to be "no" in every case; see appendix B for details on imputations.

[2] Responses logically imputed to be "yes" in every case; see appendix B for details on imputations.

NOTE: Respondents may have participated in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

questions about whether the activity was taken to get a new job and whether it was taken to obtain a raise or promotion were asked only of adults who participated in basic education classes or in courses.

In cases where data for a particular inducement were unavailable and where an existing body of research and theory supported either the presence or absence of the inducement, data were imputed to reflect expected values.[23] For instance, although the question about whether the activity was taken "to learn new skills or methods" was not asked of participants in apprenticeships, for the purpose of the current analysis, all apprenticeship participants were regarded as having this inducement. The remainder of this section provides an overview of labor force members' reasons for participating in work-related education in general, followed by a comparison of these reasons for specific learning activities.

[23] Details of imputations are included in appendix B.

Goals and Inducements Across Activities

Skill development was a common goal of work-related education in 2000–01 (table 2.4). Most labor force members participated in work-related education to maintain or improve their existing skills (83 percent) and/or to learn new skills (85 percent). The three employment-related inducements (seeking an occupational credential, earning continuing education units [CEUs], and meeting an employer requirement) were also fairly common, with about two-thirds (68 percent) of all work-related participants reporting at least one of these inducements.[24] The most common employment-related inducement was an employer requirement, reported by almost half of participants (47 percent). More than one-third of participants reported seeking an occupational credential through their participation (37 percent), and more than one-quarter reported that they were earning CEUs (29 percent).

Goals and Inducements by Type of Activity

The reasons adults gave for their participation varied across the different types of activities (table 2.4). The AELL–NHES:2001 asked participants in three types of activities (basic education classes, postsecondary courses, and training courses) whether they were in class in order "to get a new job with a different employer" or "to help get a raise or promotion." About three-quarters of participants in basic skills classes said they had each of these goals, compared with one-quarter or fewer participants in postsecondary and training courses.[25] In addition, while participants in postsecondary courses and in training courses were more likely to be seeking a raise or promotion than a new job, participants in basic education classes were no more likely to be seeking a new job than a raise or promotion.[26]

Although basic education participants were more likely than course participants to be seeking new jobs, they were less likely than course participants—or any other participants—to have an employment-related inducement for participation. Eight percent of participants in basic education classes reported that they had any employment-related inducements, compared with 29 percent or more of participants in other types of activities. Participants in apprenticeship programs were the most likely group to have any of these inducements because apprenticeship participants were all defined for this analysis as seeking an occupational credential (apprentices work toward journeyman status in a trade). Aside from those in basic education classes and apprenticeship

[24] In the AELL–NHES:2001, nonparticipants were not asked whether they had employment-related inducements to participation To the extent that nonparticipants did have these inducements, the findings in this report understate the prevalence of employment-related inducements to participation.

[25] No differences were detected in the proportions of postsecondary course and training course participants with each of these goals.

[26] The apparent difference in the proportion of basic skills participants were who seeking a new job and the proportion who were seeking a raise or promotion was not statistically significant.

programs, participants in training activities were more likely than participants in comparable postsecondary activities to have an employment-related inducement. About three-quarters of participants in credential training programs had an employment-related inducement, compared with 29 percent of postsecondary program participants. Similarly, about three-quarters of training course participants had an employment-related inducement, compared with 65 percent of postsecondary course participants. Chapter 5 discusses these employment-related inducements in more detail.

Topics of Instruction

This section describes the various topics (e.g., business, education) studied by participants in work-related education. Information about the topics of instruction covered in adult learning activities has not been analyzed in past NHES reports. While employer training surveys such as the 1997 National Employer Survey (NES) and the 1995 Survey of Employer-Provided Training (SEPT) asked about the different types of skills training employees typically receive, their classifications are not directly comparable to the topics of instruction covered by the AELL–NHES:2001.[27]

This report classifies adult education into the following eight topic areas: business, computer science, education, health, science, social sciences and services, vocational trades, and "other" topic areas.[28] As shown in figure 2.2, across all work-related activities, the three topics that labor force members were most likely to study were business (42 percent), followed by health (25 percent), then computer science (19 percent). The topics pursued the least were the social sciences/services (6 percent) and education (7 percent).

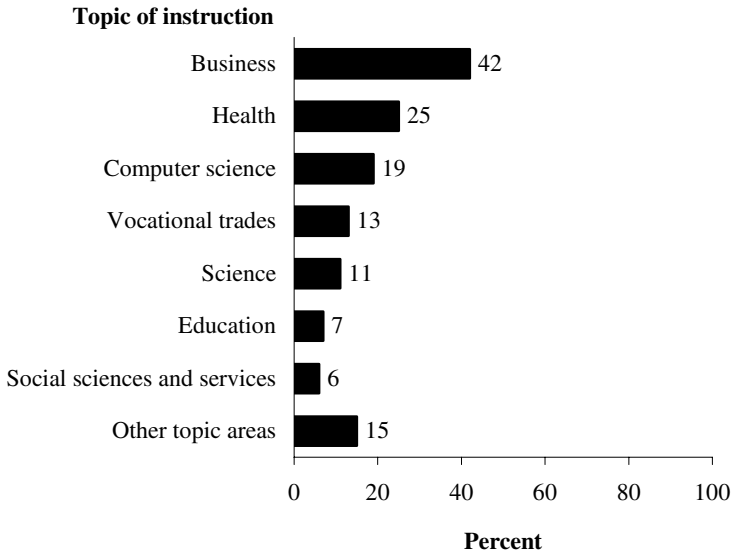
The predominance of business, health, and computer science as topics of instruction likely reflects a combination of factors, including employment-related inducements, other inducements (e.g., links between education and pay), and perhaps most importantly, the occupational structure of the labor market—both the prevalence of jobs[29] and the skill demands within occupations. Thus, the number of occupations in these areas (particularly in business) and rapidly changing

[27] For example, the SEPT covers the following areas: management training, professional and technical skills training, computer training, clerical and administrative support skills training, sales and customer relations training, service-related training, and production- and construction-related training. See Lerman, McKernan, and Reigg (1999) for an analysis of adults' participation in the types of training covered by the SEPT.

[28] This classification scheme is discussed in more detail in appendix B.

[29] For example, in 2000 (the year predominantly covered by the AELL–NHES:2001), business occupations (including management, business and financial operations, and office and administrative support) accounted for 27 percent of all employment; sales jobs added an additional 10 percent (U.S. Department of Labor 2001). In comparison, health care accounted for 7 percent of employment, and education for 6 percent.

Figure 2.2. Percentage of work-related education participants ages 25–64 who studied each topic of instruction: 2000–01



SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

skill demands (particularly in health and computer science) likely contribute to the fact that work-related education participants study these topics at relatively high rates, even though (as will be seen in chapter 5) those studying business and computer science are relatively unlikely to have employment-related inducements for participation.

Topic of Instruction by Type of Activity

The topics that work-related learners studied also varied from one activity type to another, although business, health, and computer science remained the most frequently studied topics among both postsecondary course participants and training course participants (table 2.5). As one might expect, the most commonly studied topic area among apprenticeship participants was vocational trades**,** taken by about two-thirds of these participants. Those in postsecondary programs and in credential training programs tended to study a more varied mix of topics, but with business again topping the list for postsecondary program participants. (Basic education participants all studied "other" topics, by definition.)

Table 2.5. Percentage of work-related education participants ages 25–64 who studied each topic of instruction, by type of learning activity: 2000–01

Type of learning activity	Business	Computer science	Education	Health	Science	Social sciences and services	Vocational trades	Other topic areas
Apprenticeship program	20.4	#	1.8	1.7	3.8	0.5	68.4	3.4
Postsecondary program	23.6	10.8	10.8	14.9	9.5	11.2	6.5	16.0
Credential training program	18.4	22.8	0.4	14.9	12.2	0.8	19.6	11.8
Postsecondary course	33.6	18.5	9.7	18.4	8.5	4.7	9.0	11.3
Training course	44.3	17.8	6.1	27.6	10.1	4.9	10.6	11.6

Rounds to zero.

NOTE: Detail may exceed 100 percent because respondents can participate in multiple activities. Basic education classes are excluded from this table because their instructional topics are all "other" by definition.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Who Participates

A substantial body of research suggests that, with few exceptions, the demographic and labor force profile of adult education participants has remained fairly stable over time. Studies have documented consistent relationships between participation in adult education and the following characteristics of adults: age, education level, employment status, type of employment, size of employer, and occupation.

More specifically, studies have shown that older adults (typically mid-50s and older) participate in learning and in *work-related education* at lower rates than younger adults (Creighton and Hudson 2002; Frazis et al. 1997; Kim et al. 2004; Valentine 1997)[30] and that more educated adults participate at higher rates than less educated adults (Creighton and Hudson 2002; Kim and Creighton 1999; Kim et al. 1995, 2004; Lee and Clery 1999). Participants tend to be employed either part time or full time rather than to be unemployed or not in the labor force (Creighton and Hudson 2002; Darkenwald, Kim, and Stowe 1998; Kopka, Schantz, and Korb 1998). Among employed adults, participation rates are higher among those in professional or managerial jobs, followed by those in service, sales, or support jobs and then those in the trades (Bishop 1997; Creighton and Hudson 2002; Darkenwald, Kim, and Stowe 1998; Kim et al. 2004). Although the relationship between employer size and participation has not been examined in previous analyses

[30] Using a narrower definition of work-related education than is used in this report, studies have typically found that both older adults and younger adults (e.g., under age 25) are less likely to participate in work-related education than their middle-aged peers (Darkenwald, Kim, and Stowe 1998; Frazis et al. 1997; Kim et al. 2004). Young adults under age 25 are not included in this report, however.

of NHES data, research on employer-provided job training suggests that adults working for large employers are more likely to participate in training than those working for small employers (Bishop 1997; Lerman, McKernan, and Riegg 1999; Lynch and Black 1998).

Gender differences in participation in work-related education seem to have changed over time. While some earlier studies found that men participated in work-related education at higher rates than women (see review in Bishop 1997), more recent studies found that women participated at similar or higher rates than men (Creighton and Hudson 2002; Frazis et al. 1997; Veum 1993). For example, in an analysis of the 1999 NHES Adult Education Survey (AE–NHES:1999), Creighton and Hudson (2002) found that there was no detectable difference between the rates at which men and women participated in work-related courses overall, but that when labor force status was controlled for, women participated at higher rates than men.

The relationship between race/ethnicity and participation in work-related education is less clear. In their analysis of a 1995 survey of employer-provided training, Frazis et al. (1997) found no difference in participation rates by race/ethnicity. Past analyses of NHES data have typically found higher participation rates for Whites than Hispanics[31] (Creighton and Hudson 2002; Darkenwald, Kim, and Stowe 1998; Kim et al. 2004), and for Whites than Blacks (Darkenwald, Kim, and Stowe 1998; Kim et al. 2004). However, in an analysis of the 1999 NHES Adult Education Survey (AE–NHES:1999), Creighton and Hudson (2002) found that Whites did not participate at a higher rate than Blacks. These differences in findings may be attributed to many factors, including variations in adult education definitions, analyses samples, and analytic techniques.

The current analysis of labor force participation in work-related adult education in 2000–01 is largely consistent with the existing body of literature, particularly with findings from more recent studies of work-related education.

Sociodemographic Characteristics

In the current analysis, more women (who are in the labor force) participated in work-related education than men (51 percent vs. 44 percent, table 2.6). While the participation rates for labor force members between the ages of 25 and 54 was 49–50 percent, participation declined to 35 percent in the 55- to 64-year-old age group. Age differences in participation rates can be

[31] Throughout this report, "White" is used to refer to non-Hispanic Whites, "Black" to non-Hispanic Blacks, and "other race/ethnicity" to non-Hispanics of other racial backgrounds. Hispanics include individuals of any race.

Table 2.6. Percentage of labor force members ages 25–64 who participated in work-related education, by sociodemographic and educational characteristics: 2000–01

Characteristic	Percent participating
Total, all labor force members	47.3
Sex	
Female	51.0
Male	43.9
Race/ethnicity	
White, non-Hispanic	50.1
Black, non-Hispanic	38.1
Other non-Hispanic	51.2
Hispanic	36.9
Age	
25–34	49.7
35–44	48.7
45–54	49.0
55–64	35.3
Level of educational attainment	
Less than high school	14.3
High school or equivalent	31.3
Some college, no degree	56.5
Vocational/technical diploma or associate's degree	57.6
Bachelor's degree	62.7
Degree above bachelor's	73.5

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

difficult to interpret in cross-sectional data such as the NHES because they can be confounded by the presence of a cohort effect. But the consistent negative relationship between age and participation across several studies over the past decade suggests that the finding that older adults are less likely to participate is a legitimate age effect, rather than a cohort effect.

Participation in 2000–01 also varied among labor force participants in different racial/ethnic groups and with different levels of educational attainment. Whites and those in the "other" category had higher participation rates than either Blacks or Hispanics. About half of White and "other race/ethnicity" labor force members participated in work-related education,

compared with 38 percent of Blacks and 37 percent of Hispanics.[32] As was found in past studies of adult learning, this analysis found that labor force participation in work-related education increases with level of educational attainment. For instance, 14 percent of labor force members with less than a high school diploma participated, compared with 74 percent of those who had more than a bachelor's degree.

Because this analysis was restricted to adults who are in the labor force, the participation differences described above are not attributable to variations in labor force participation rates among groups of adults. Thus, the lower participation rates in work-related education seen among older adults, Whites (compared with Blacks and Hispanics), and more highly educated adults are not due to these groups being more likely than others to be in the labor force (although this could be a contributing factor in other studies that include those who do not participate in the labor force). Other factors, particularly those related to employment within the labor market (e.g., unemployment, type of occupation, size of employer, etc.), are potential explanations for the differences observed here.

Labor Force Characteristics

As in past studies, this study found that employment status was related to participation in work-related education (table 2.7). Adults who were employed either full time or part time were more likely to participate than adults who were unemployed in the 12 months preceding the administration of the survey. In addition, adults employed in professional and managerial occupations had the highest rate of participation (68 percent), followed by those in sales, service, and support occupations (44 percent) and those in the trades (28 percent).

This study is also consistent with studies of employer-provided training that have shown that those working for larger employers are more likely to participate in work-related education than those working for smaller employers. For example, in the current study, 57 percent of adults whose employers had 500 or more employees participated in work-related education, compared with 36 percent whose employers had fewer than 25 employees.

Finally, the AELL–NHES:2001 also allows one to examine participation among adults who do and do not have continuing education requirements for their occupation. As one might expect,

[32] One factor that may affect Hispanic participation rates in the NHES is the administration of the survey in Spanish to non-English-speakers. Although this procedure helps ensure better data on ESL participation, it may lower Hispanics' participation levels in other learning activities relative to other groups, since Hispanics who do not speak English appear to be less likely than English-speaking Hispanics to participate in formal education activities. For example, Hudson and Shafer (2003) found that when the AELL–NHES:2001 sample was restricted to English-speaking adults, the participation rate of Hispanics (in all formal learning activities) increased.

Table 2.7. Percentage of labor force members ages 25–64 who participated in work-related education, by labor force characteristics: 2000–01

Characteristic	Percent participating
Total, all labor force members	47.3
Employment status	
Employed full time	48.8
Employed part time	43.6
Unemployed	17.0
Occupation	
Professional	68.4
Sales, service, and support	43.7
Trades	28.0
Size of employer	
Fewer than 25 employees	35.8
25–99 employees	45.1
100–499 employees	48.6
500 or more employees	56.9
Whether have continuing education requirement	
Yes	64.0
No	39.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

labor force members who had these requirements were more likely to participate in work-related education than those who did not have these requirements. Sixty-four percent of adults in the labor force with continuing education requirements participated in work-related education in 2000–01, compared with 40 percent of those who did not have continuing education requirements.

Chapter 3: The Role of Postsecondary Education in Work-Related Education

As discussed in the previous chapter, about one-third of labor force members who participated in work-related education were in a postsecondary activity (postsecondary program or course) in 2000–01, and postsecondary institutions provided the instruction for almost one-third of work-related education participants. This chapter explores in further detail the ways in which labor force members use postsecondary education to meet their work-related educational needs.

Using data from the AELL–NHES:2001, the role of postsecondary education in work-related education can be examined from two perspectives. First, one can examine the types of postsecondary activities pursued, regardless of provider. Second, one can examine the activities that are provided by postsecondary institutions. Because most postsecondary activities are provided by postsecondary institutions, these perspectives overlap.[33] Nonetheless, each provides a unique lens with which to view the role of postsecondary education in adult work-related education, so both perspectives are presented in this chapter. The first section of the chapter focuses on postsecondary activities, examining the specific types of postsecondary programs and courses taken, the instructional providers for these activities, the topics studied, and the employer support and incentives that underlie participation in these activities. The second section of the chapter examines participation in activities for which postsecondary institutions are the instructional providers; this section looks at the types of activities taken from these providers, and (paralleling the previous section) the topics studied and employer support and incentives received. The chapter ends with a comparison of the work-related education activities taken from the two main types of postsecondary providers (4-year institutions and community colleges).

There is little literature on the role of postsecondary education *within* the larger enterprise of work-related education. Most research on postsecondary education and learning for work focuses exclusively on the role of postsecondary institutions, particularly community colleges, in workforce development (e.g., Grubb 1996, 1999a; Levin 2001). It is generally acknowledged that

[33] There are two major differences between "postsecondary activities" and "activities with postsecondary institutions as the instructional provider." First, as discussed in chapter 1, a few participants in courses that earned college credit (counted in this report as postsecondary courses) reported that their instructional provider was an organization other than a postsecondary institution. Second, as seen in chapter 2, 17 percent of participants in basic education classes reported that a postsecondary institution was their instructional provider. As a result, 90 percent of participants in postsecondary activities had a postsecondary institution as their instructional provider, and 99 percent of those in activities with a postsecondary institution as the instructional provider were in postsecondary activities (not in tables).

postsecondary education has become more occupationally oriented over time (Bledstein 1976; Grubb and Lazerson 2005; Sullivan 2001), and numerous examples exist of the ways in which postsecondary education and employers collaborate to provide workforce training (Curtis et al. 2004; Gennett, Johnston, and Wilson 2001; Knudson 2004; Nespoli, Lam, and Farbman 2004; Orr 2001; Riggert et al. 2004; Russell 2001). Other studies have looked at postsecondary students who define themselves as "employees who study" (Berker and Horn 2003; Hudson and Hurst 2002). Both lines of research suggest that postsecondary education plays an important role in workforce development, but neither shows how large that role is within the context of all work-related education pursued by adults nor the variety of ways in which adults use postsecondary education for this purpose (including, e.g., for-credit and noncredit coursetaking). The AELL–NHES:2001 provides data that can address these more contextual issues. The reader should bear in mind, however, that the analysis conducted for this report includes only postsecondary students ages 25–64 who are also in the labor force. Thus, this analysis does not describe all postsecondary students, although it does capture the older students who are most likely to define themselves as "employees who study" (Horn, Peter, and Rooney 2002).

Postsecondary Activities Pursued

As was true for work-related education overall, labor force members participating in work-related postsecondary activities were more likely to be taking postsecondary courses than postsecondary programs (table 3.1). Overall, 58 percent of postsecondary participants took at least one postsecondary course, while 49 percent were enrolled in at least one postsecondary program (not in tables). Postsecondary programs can be further divided based on the level of the credential sought, and postsecondary courses can be divided into for-credit and noncredit courses. Using this classification system, the three most common credentials sought by postsecondary program participants were the associate's, bachelor's, and master's degree, each of which was sought by at least one-fifth of these participants.[34] Postsecondary course participants were more likely to have taken noncredit courses (60 percent of these participants) than for-credit courses (43 percent).

Providers of Postsecondary Activities

By definition, all participants in postsecondary programs had postsecondary institutions as their instructional provider. About 80 percent of participants in postsecondary courses and 90 percent of those in postsecondary activities reported having a postsecondary institution as the

[34] No difference was detected in the percentage of postsecondary program participants seeking a vocational/technical diploma and the percentage seeking either an associate's degree or a master's degree.

Table 3.1. Percentage of work-related education participants ages 25–64 who participated in each type of postsecondary activity, for all participants, postsecondary program participants, and postsecondary course participants: 2000–01

Type of postsecondary activity	All participants	Postsecondary program participants	Postsecondary course participants
Total, any postsecondary activity	32.5	100.0	100.0
Postsecondary program	16.0	100.0	†
Vocational/technical diploma program	2.4	15.2	†
Associate's degree program	3.4	21.3	†
Bachelor's degree program	4.5	28.0	†
Master's degree program	3.4	21.1	†
Ph.D. or professional degree program	1.4	8.7	†
Postbachelor's, postmaster's, or postdoctoral certificate	2.1	13.0	†
Other degree program	0.9	5.8	†
Postsecondary course	18.7	†	100.0
For-credit course	8.0	†	42.6
Noncredit course	11.1	†	59.6

† Not applicable.

NOTE: Detail may exceed totals because respondents can participate in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

instructional provider (table 3.2). The following analysis assumes that nonpostsecondary providers are legitimate alternative providers for postsecondary courses; however, the reader is cautioned that at least some of these cases probably should have been reported as postsecondary providers.[35]

Of the various providers for postsecondary activities, 4-year institutions were the most common, followed by public 2-year institutions (hereafter, community colleges), other less-than-4-year institutions, and business and industry. Overall, 57 percent of participants in postsecondary activities had a 4-year institution as their instructional provider, 32 percent had a community college provider, and no more than 6 percent had another less-than-4-year institution or business/industry provider.[36] The distribution of participants among the three types of postsecondary institutions reflects the distribution of all students among postsecondary institutions. In fall 2000, 60 percent of all postsecondary students were in 4-year institutions, 36 percent were in

[35] See footnote 22 in chapter 2.

[36] As shown in table 3.2, an additional 7 percent of participants in postsecondary activities reported that they had an "other" provider, a category that includes many types of providers.

Table 3.2. Percentage of work-related education participants ages 25–64 with each type of instructional provider, by type of postsecondary activity: 2000–01

	Postsecondary institution					
Type of postsecondary activity	Total, all post-secondary institutions	4-year post-secondary institution	Community college (2-year public institution)	Other less-than-4-year institution[1]	Business or industry	Other provider[2]
Total, any postsecondary activity	89.9	56.9	32.4	6.1	5.1	7.0
Postsecondary program	100.0	66.9	28.3	5.3	†	†
Postsecondary course	79.6	46.1	35.0	6.0	8.9	12.1

† Not applicable. By definition, all postsecondary programs had postsecondary institutions as their instructional providers.

[1] Includes for-profit and private not-for-profit 2-year institutions and all less-than-2-year institutions.

[2] Includes school districts, government agencies, professional organizations, and other (unspecified) providers.

NOTE: Detail may exceed totals because respondents can participate in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

community colleges, and 4 percent were in other less-than-4-year institutions (U.S. Department of Education 2003a, table 170).[37]

Although 4-year institutions were the most common provider for participants in both postsecondary programs and postsecondary courses, program participants were more likely than course participants to have this instructional provider. Two-thirds of participants in postsecondary programs (67 percent) had 4-year-institution providers, compared with 46 percent of postsecondary course participants.

Instructional Topics Studied in Postsecondary Activities

This section compares the instructional topics studied by labor force members participating in postsecondary activities versus other activities, in different types of postsecondary activities, and in postsecondary courses versus other (training) courses. Chapter 2 showed that business, health, and computer science were the most common topics studied by labor force members in general; these are also the most common topics studied by labor force members participating in postsecondary activities (table 3.3). However, two of these topics are less commonly studied in postsecondary education than elsewhere. Thirty percent of participants in postsecondary activities studied business, compared with 43 percent of those in other activities; similarly, 17 percent of

[37] The U.S. Department of Education (2003a) data represent the distribution of students among postsecondary institutions participating in the Title IV federal financial aid program.

Table 3.3. Percentage of work-related education participants ages 25–64 who studied each topic of instruction, by type of learning activity: 2000–01

Type of learning activity	Business	Computer science	Education	Health	Science	Social sciences and services	Vocational trades	Other topic areas
Nonpostsecondary activity	42.8	17.3	5.8	26.3	9.9	4.7	12.7	13.4
Postsecondary activity (total)	30.4	15.4	10.3	17.4	9.3	8.0	8.2	14.2
Postsecondary program	23.6	10.8	10.8	14.9	9.5	11.2	6.5	16.0
Postsecondary course	33.6	18.5	9.7	18.4	8.5	4.7	9.0	11.3

NOTE: Detail may exceed 100 percent because respondents can participate in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

participants in postsecondary activities studied health, compared with 26 percent of those in other activities. Vocational trades were also less likely to be studied by participants in postsecondary activities than by those in other activities, while social sciences/services and education were more likely to be studied by those in postsecondary activities than by those in other activities.[38]

Comparing the topics studied by labor force members who participated in postsecondary programs and in postsecondary courses reveals that business and computer science were more likely to be studied by those in postsecondary courses than by those in postsecondary programs, while social sciences/services were more likely to be studied by those in postsecondary programs than by those in postsecondary courses (table 3.3).

Postsecondary Versus Training Courses

The AELL–NHES:2001 allows for a more detailed examination of business and health topics for course participants. Thus, this section compares participants in postsecondary courses with those in training courses. Beginning with the general topics, findings were largely similar to those for postsecondary courses versus training activities overall: labor force members in postsecondary courses were less likely than those in training courses to have studied business and health (table 3.4). For health courses, the more detailed data on topics studied show that the difference in participation rates arose because labor force members in training courses were more likely than those in postsecondary courses to study personal health; no difference was detected in the rates at which both groups studied the more occupationally oriented health sciences and allied

[38] For these comparisons and the remaining comparisons in this section, no differences were detected in participation rates for the topics that are not discussed in the comparisons.

Table 3.4. Percentage of work-related education course participants ages 25–64 who studied specific topics of instruction in business and in health, by type of course: 2000–01

	Business topics				Health topics				
Type of course	Total, all business	Business management	Business support	Other business	Total, all health	Health sciences	Allied health	Personal health	Other health
Postsecondary course	33.6	16.0	15.3	4.6	18.4	2.3	7.1	8.4	1.4
Training course	44.3	21.7	16.1	13.6	27.6	4.0	8.2	17.3	1.8

NOTE: Detail may exceed totals because respondents can participate in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

health topics (as well as "other" health). For business, the difference in participation arose from the greater propensity of labor force members in training courses (versus those in postsecondary courses) to study business topics other than business support; the percentage of participants in postsecondary and training courses who studied business support topics was statistically equivalent.

Employer Support for Postsecondary Activities

A detailed analysis of employer aid for postsecondary education, using both the 1995 NHES Adult Education Survey (AE–NHES:1995) and the 1995–96 National Postsecondary Student Aid Study (NPSAS:96), was done by Lee and Clery (1999). That report found, for example, that 57 percent of adults age 16 or older who were enrolled in a postsecondary credential program received some form of employer assistance, with 24 percent receiving financial assistance. Because that report provides a thorough examination of employer assistance for postsecondary education, this chapter focuses on a comparison of employer support for work-related postsecondary education versus other work-related learning activities.

As seen in chapter 2 (and discussed in further detail in chapter 4), most labor force members who were employed when they were enrolled in an education activity received some type of employer support for their participation.[39] However, participants in postsecondary activities were relatively unlikely to receive employer support. Although almost half of postsecondary program participants (46 percent) received employer support, this proportion is lower than that for all other work-related learning activities except basic education classes. In addition, although 81 percent of postsecondary course participants received employer support, this represents a lower

[39] Because it makes sense to ask only those who are employed about employer support, the analysis of employer support in this section is restricted to adults who were employed at the time they participated in the learning activity.

rate of support than that received by participants in training courses (94 percent of whom received support) (see table 2.3).

Inducements for Postsecondary Activities

As described in chapter 1, three inducements to participation (seeking an occupational credential, earning CEUs, and meeting employer requirements) are examined in this report, both separately and as a combined measure of employment-related inducements. Chapter 2 showed that those in postsecondary activities were less likely than those in corresponding training activities (courses and programs) to have employment-related inducements to participation. This section examines the prevalence of these inducements among labor force members participating in postsecondary work-related education activities. As will be seen below, a minority of postsecondary program participants had these inducements, while a majority of postsecondary course-takers had them. Chapter 5 provides more detail on the specific inducements to participation among those in postsecondary activities compared with those in other activities.

Two of the three employment-related inducements are commonly associated with postsecondary education—postsecondary education is widely regarded as the route to an occupational credential in many fields (e.g., education, nursing, cosmetology), and postsecondary courses are a recognized route for receiving continuing education credits. Table 3.5 shows that 25 percent of labor force members who participated in postsecondary programs were seeking an occupational credential in 2000–01, as were 35 percent of those enrolled in postsecondary courses (a higher

Table 3.5. Percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by type of postsecondary activity: 2000–01

Type of postsecondary activity	Total, any employment-related inducement	Seek occupational credential	Earn continuing education units	Employer required participation
Postsecondary program	29.2	25.3	0.0 [1]	10.3
Postsecondary course (total)	65.1	34.5	45.5	30.3
For-credit course	71.4	38.5	55.3	37.6
Noncredit course	59.8	31.3	37.5	23.7

[1] Responses logically imputed to be "no" in every case; see appendix B for details on imputations.

NOTE: Detail may exceed totals because respondents can participate in multiple activities and can have more than one inducement for a given activity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

percentage among the latter than the former). Among postsecondary program participants, seeking an occupational credential was less common among those enrolled in bachelor's degree programs than among those enrolled in other degree programs (table 3.6). Eleven percent of bachelor's degree students were seeking an occupational credential, compared with 25–33 percent of other degree-seeking students. There was no detectable difference in the percentage of for-credit and noncredit course participants who were seeking an occupational credential (table 3.5).[40]

Table 3.6. Percentage of work-related education participants ages 25–64 in postsecondary programs who were seeking an occupational credential, by type of postsecondary program: 2000–01

Type of postsecondary program	Percent seeking occupational credential
Total, all postsecondary programs	25.3
Vocational/technical diploma or associate's degree program	33.3
Bachelor's degree program	11.4
Master's, Ph.D., or professional degree program	25.3
Other degree, diploma, or certificate program	29.3

NOTE: Respondents may have participated in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

In the AELL–NHES:2001, only coursetakers were asked about earning CEUs; postsecondary program participants were assumed to *not* be earning CEUs as part of their credential program. Almost half (46 percent) of all postsecondary coursetakers reported that they were earning CEUs (table 3.5). Those in for-credit postsecondary courses were more likely than those in noncredit postsecondary courses to be earning CEUs (55 vs. 38 percent).

An employer requirement for participation is the third type of employment-related inducement included in this analysis. Like the two other inducements, an employer requirement is more common among postsecondary coursetakers than among postsecondary program participants: 30 percent of course participants had an employer requirement for participation, compared with 10 percent of program participants (table 3.5). Finally, an employer requirement is also more common among participants in for-credit courses than among those in noncredit courses (38 vs. 24 percent).

[40] These estimates had relatively large standard errors, which could be why the apparently large difference between them was not statistically significant.

Because postsecondary program participants were less likely than postsecondary course participants to be seeking an occupational credential, to be earning CEUs, or to have an employer requirement, it follows that postsecondary program participants were less likely than postsecondary course participants to have any employment-related inducement (table 3.5). Almost one-third of postsecondary program participants (29 percent) had any of these employment-related inducements to participation, compared with about two-thirds (65 percent) of postsecondary coursetakers. Similarly, for-credit coursetakers (due to their higher rates of earning CEUs and having employer requirements) were more likely than noncredit coursetakers to have any employment-related inducement to participation (71 vs. 60 percent).

Postsecondary program and postsecondary course participants also differed in which inducement they were most likely to have. Among postsecondary program participants, the most frequent inducement was the seeking of an occupational credential; among postsecondary course participants, it was earning CEUs.

Postsecondary Providers for Work-Related Education

The chapter now turns to an examination of participation in learning activities that had postsecondary institutions as the instructional provider.[41] This section examines the topics of instruction studied by participants with postsecondary providers, looks at the employment-related incentives for these participants, and provides a comparison of the activities pursued by those in 4-year institutions and those in community colleges.

Overall, postsecondary institutions were the instructional providers for 30 percent of participants in work-related learning activities and for 17 percent of work-related course participants (this does not include basic education class participants) (table 3.7). This frequency of provision is due in large part to labor force members' participation in postsecondary programs (all of which were provided by postsecondary institutions) and in postsecondary courses (80 percent of which were provided by postsecondary institutions). But postsecondary institutions serve other labor force members as well. As shown in table 3.7, 17 percent of participants in basic education classes had a postsecondary instructional provider, as did 13 percent of apprenticeship participants.

[41] The AELL–NHES:2001 did not include postsecondary institutions in the question about instructional providers for apprenticeship programs; thus, apprenticeship programs are generally not counted in this section as having a postsecondary provider. However, in table 3.7, which looks at the providers for different types of learning activities, apprenticeship participants who reported that their apprenticeship involved courses taken for college credit were counted as having a postsecondary provider.

Table 3.7. Percentage of work-related education participants ages 25–64 who had a postsecondary institution as their provider, by type of learning activity: 2000–01

Type of learning activity	Percent with postsecondary provider
Total, all activities	29.8
Basic education class	17.3
Apprenticeship program	12.5
Postsecondary program	100.0 [1]
Credential training program	0.0 [2]
Course (any type)	17.0
Postsecondary course	79.6
Training course	0.0 [2]

[1] By definition, all postsecondary programs had postsecondary providers.

[2] By definition, all credential training programs and training courses did not have postsecondary providers.

NOTE: Apprenticeship participants who reported that their apprenticeship involved courses taken for college credit were counted as having a postsecondary provider.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Topics of Instruction for Postsecondary Providers

As was found for labor force members overall, the most common topics of instruction among work-related participants with a postsecondary provider were business, health, and computer science[42] (table 3.8). However, participants with postsecondary providers were less likely than those with other providers to have studied business, while they were more likely to have studied social sciences/services and education.

Incentives for Activities With Postsecondary Providers

As one might expect, labor force members participating in activities provided by postsecondary institutions fall between those who took postsecondary programs and those who took postsecondary courses in the extent to which their learning is motivated by employment-related inducements. Overall, almost half (45 percent) of participants in activities provided by postsecondary institutions had an employment-related inducement, compared with about one-third of those in postsecondary programs and about two-thirds of those in postsecondary courses (tables 3.9 and 2.4).

[42] There was one exception to this finding: no difference was detected in the percentage of adults studying computer science and education.

Table 3.8. Percentage of work-related education participants ages 25–64 who studied each topic of instruction, by instructional provider: 2000–01

Instructional provider	Business	Computer science	Education	Health	Science	Social sciences and services	Vocational trades	Other topic areas
Postsecondary provider	29.0	15.5	10.5	17.2	9.3	8.3	7.7	14.9
Other provider	40.2	16.7	5.3	20.8	9.5	3.6	10.3	11.7

NOTE: Detail may exceed 100 percent because respondents can participate in multiple activities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table 3.9. Percentage of work-related education participants ages 25–64 who had each type of employment-related inducement to participation, by instructional provider: 2000–01

Instructional provider	Total, any employment-related inducement	Seek occupational credential	Earn continuing education units	Employer required participation
Postsecondary provider	45.0	29.4	19.8	18.0
Other provider	74.2	38.8	29.5	52.9

NOTE: Detail may exceed totals because respondents can participate in multiple activities and can have more than one inducement.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

However, participants with postsecondary instructional providers were less likely than participants with other providers to have an employment-related inducement (table 3.9). While 45 percent of those in activities with postsecondary instructional providers had an employment-related inducement, 74 percent of those with other instructional providers had such an inducement. This difference also exists for each type of inducement: 29 percent of labor force members with postsecondary providers were seeking an occupational credential versus 39 percent of those with other providers; 20 percent of those with postsecondary providers were earning CEUs versus 30 percent of those with other providers; and 18 percent of those with postsecondary providers had an employer requirement versus 53 percent of those with other providers. Among labor force members with postsecondary providers, the most common employment-related inducement was the seeking of an occupational credential; among those with other providers, it was an employer requirement for participation.

Work-Related Education in Different Postsecondary Institutions

Different types of postsecondary institutions serve labor force members in different ways. Community colleges, for example, often explicitly target workforce development as part of their mission. (See Bailey 2002 for a discussion of the varied and changing missions of community colleges.) This section of the report examines labor force members who were participants at 4-year postsecondary institutions and at community colleges, based on the type of activity they pursued, the instructional topics they studied, and the inducements they had, then provides a comparison of the two.[43] Table 3.10 summarizes these findings.

Table 3.10. Percentage of work-related education participants ages 25–64 in 4-year institutions and in community colleges (public 2-year institutions) who participated in each type of activity, studied each topic, and had each employment-related inducement to participation: 2000–01

Instructional characteristic	4-year institution	Community college
Type of learning activity		
Basic education class	0.1	5.1
Postsecondary program	58.0	42.0
Postsecondary course	46.6	60.4
Topic of instruction		
Business	29.1	26.8
Computer science	10.9	21.0
Education	15.4	3.4
Health	16.3	18.1
Science	10.4	6.8
Social sciences and services	12.0	2.8
Vocational trades	2.9	14.6
Other topic areas	12.3	19.5
Employment-related inducement		
Seek occupational credential	28.2	30.3
Earn continuing education units	20.6	22.3
Employer requirement	16.1	23.9

NOTE: Detail may exceed totals because respondents can participate in multiple activities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

[43] The third category of "other less-than-4-year institutions" is not included here because small cell sizes and large standard errors for participants in these institutions resulted in the data being too unreliable to analyze.

Participants at 4-Year Institutions

Most labor force learners at these institutions participated in postsecondary programs, although almost half took courses (58 vs. 47 percent). Fewer than 1 percent of these students took basic education classes. Business was the most common topic of instruction, with 29 percent of 4-year institution participants studying this topic. Other listed topics were studied by 10–16 percent of these students, with the exception of vocational trades, studied by 3 percent of participants. The most common employment-related inducement among labor force learners at 4-year institutions was the seeking of an occupational credential (28 percent); fewer were seeking to earn CEUs (21 percent) or meet an employer requirement (16 percent).

Participants at Community Colleges

Most labor force learners at community colleges took courses (60 percent), although about 4 out of 10 participants were enrolled in a postsecondary program. About 5 percent of these community college students took basic education classes. Business, computer science, and health were the most common of the listed topics studied by labor force learners in these institutions, with between 18 and 27 percent of students studying each topic. Participants were less likely to study sciences, social sciences/services, and education (3–7 percent of participants).[44] Finally, no differences were detected in the likelihood that labor force learners in community colleges had each of the three employment-related inducements, with 22–30 percent of these students having each inducement.[45]

Comparisons Across Institutions

Examining the above findings across institution types shows that the labor force members served by 4-year institutions and community colleges sometimes—but not always—differ in the types of work-related learning they pursue and in their inducements for learning. For example, participants at 4-year institutions were more likely than those at community colleges to have been enrolled in a program and were less likely to have been enrolled in a course or a basic education class. Participants at 4-year institutions also were more likely than those at community colleges to have studied social sciences/services and education; those at community colleges were more likely to have studied computer science and vocational trades. However, no differences were detected in the percentages who studied the two most common topics, business and health, or sciences.

[44] Vocational trades (studied by 18 percent of participants at community colleges) generally fell in between these topics. Vocational trades were studied less often than business and more often than education and social sciences/services, but no differences were detected in the percentage who studied vocational trades and other specific topics.

[45] Relatively large standard errors may account for the lack of statistical difference among these estimates (see table A-3.10).

Finally, participants at 4-year institutions were less likely than participants at community colleges to have an employer requirement for their participation, but no differences were detected in the likelihood of participants at 4-year institutions versus those at community colleges seeking an occupational credential or earning CEUs.

Chapter 4: Employer Support for Work-Related Education

Employers, as well as working adults, stand to benefit from a more skilled and highly prepared workforce. For that reason, employers often provide opportunities and support for their employees to participate in work-related education. This chapter examines the extent to which labor force members' participation in work-related education involves employer support. The focus in this chapter is on the level and distribution of employer support that is received by working adults who participate in work-related learning.

Unlike such sources as the Survey of Employer Provided Training (SEPT) or the National Employers Survey (NES), AELL–NHES:2001 offers the perspective of the employee rather than the employer concerning employer involvement and support. Data collected from employees provide a distinct advantage. They afford an opportunity to compare employer involvement in work-related education taken for different purposes (e.g., to meet a continuing education requirement), from different sponsors, and for different types of activities. Little of this information would be available in an employer survey. However, these data do have one disadvantage—they can only tell us who received employer support, not who had employer support available to them (but may have chosen not to take advantage of it). Thus, these findings do not directly address the issue of access to employer support.

This chapter first reviews the literature on employer support of work-related education. The chapter then examines the extent to which labor force members in work-related education receive different types of employer support, the relationship between employer support and employment-related inducements to participation, and the distribution of employer support among different types of learning activities and among different groups of adults.

Background on Employer Support

Almost all of the literature on employer involvement in work-related education comes from research on fairly narrowly defined job training programs.[46] Less is known about employers' willingness to support learning opportunities of other types or in other settings, such as

[46] "Narrowly defined" by no means implies "inconsequential." American employers invest billions of dollars each year in formal job training. Frazis, Herz, and Horrigan (1995) have shown, however, that over twice the volume of formal job training is provided by employers through informal on-the-job training.

postsecondary academic degree programs (but see Cappelli 2004; Lee and Clery 1999) or basic education classes.

Arriving at dependable estimates of how much money American employers spend on training is difficult. There are substantial differences across surveys in defining what counts as training. Further, analysts delineate the populations of potential trainees in different ways, often focusing on particular age groups or categories of workers (Lerman, McKernan, and Riegg 1999). Because of these and other differences, estimates of how much training takes place differ widely. An analysis by Marquardt et al. (2000) reported that American employers spent $55.3 billion on formal training in 1995. According to *Training Magazine* (Galvin 2003), U.S. employers planned to spend $51.3 billion on training in 2003. This apparent decline may be due to the economic slowdown of this period. On the other hand, employer expenditures on training show an upward trend over the long term (Galvin 2003).

The over $50 billion spent on training by employers may seem like a large amount of money, but seems somewhat less so when one considers that it represents about 2 percent of the payroll of American firms (Bassi et al. 2000). However, this figure may be nearer to 10 percent of total payroll when indirect and opportunity costs are taken into account (Bassi et al. 2000). The extent of training also varies across industrial sectors. As a percentage of payroll, training expenditures are highest in the information and technology sector and lowest in the health care sector (Bassi et al. 2000).

There is some debate as to whether American firms have either the incentives or the perceived need to provide adequate learning opportunities for their employees (Streeck 1989; Bishop 1993; Bassi et al. 2000). Moreover, in the American system of training, responsibility for skill development and upgrading is divided among employers, governments at all levels, and the workers themselves. Some analysts have argued that this results in a polarized training system, in which a relatively small number of advantaged workers receive ample training and a larger number of more marginal workers receive little or no training (Lindbeck and Snower 1989; Bartik and Hollenbeck 2000). Perhaps most pointedly, Grubb (1999b) defined the distinctly American system of public and private sector training as "a complex and ill-defined system, often charged with overlap, duplication, waste, and sheer confusion." However, as noted in chapter 3, employers appear to be collaborating with postsecondary institutions in a growing number of ways to improve opportunities for initial and continuing education of workers, including customized training programs, tuition reimbursement programs, and other collaborative efforts for funding and instructional delivery (e.g., Benson, Finegold, and Mohrman 2004; Curtis et al. 2004; Knudson 2004).

Whatever the extent of training, the evidence is clear that some workers receive more training than do others (Bishop 1997; Lynch and Black 1998; see also Bills 2005, who used AE–NHES:1995). In particular, workers with more education, those in higher status occupational positions, White workers as opposed to Black and Hispanic ones, and workers in their prime working years (generally 25–55) versus younger or older workers are most likely to receive training. The evidence on gender is more mixed, although the most secure conclusion is probably that any advantages that males once held over females have been eroded and in some cases reversed over the past generation (Knoke and Ishio 1998).

These same relationships tend to hold for employer-provided training more narrowly as well as for work-related education more broadly. In a comprehensive review of the research literature, Bishop (1997) concluded that the likelihood that workers receive employer-provided training is related to a broad range of variables. These include job characteristics (e.g., regular nontemporary jobs, full-time jobs, jobs using primarily nontransferable skills); firm characteristics (e.g., larger establishments, non-Southern establishments, rapidly growing establishments); and worker characteristics (e.g., White, highly educated, recently hired). Lynch and Black (1998), using the NES, and Frazis and associates (1995, 1998), using the SEPT, both reported similar results (see also Lerman, McKernan, and Riegg 1999).

Less is known about employer support of work-related education in general than about *employee* participation in work-related education. Bills and Wacker (2003) used AE–NHES:1995 to examine employer support of workers who were pursuing postsecondary vocational programs. They reported that employers were reasonably likely to provide support to adults who were seeking vocational degrees, although the availability of support was not equal for all kinds of vocational education. Employers seemed to support vocational education participants in technical areas more than in nontechnical areas (i.e., areas often thought to represent "soft skills"). Bishop (1997), in a summary of the literature, has shown that employers provide more training to higher status workers (on virtually any measure) than to lower status workers.

Cappelli (2004) reported that employers are generally quite likely to provide tuition support to workers who are pursuing postsecondary academic degrees. Because postsecondary institutions offer general skills that are presumably transferable to any employer, Cappelli finds it surprising that employers are willing to risk subsidizing the potential human capital development of their competitors. He concludes, however, that the support of postsecondary academic degrees is a good investment for employers, permitting them to select better quality employees who are likely to stay with the firm.

Conceptualization and Measurement Issues

Although the AELL–NHES:2001 does provide some advantages for examining employer support, using a household survey for this purpose also has limitations. The AELL–NHES:2001 asks respondents about employer support only if they had already reported that they had participated in an educational activity. Thus, the analysis here examines the incidence of employer support of work-related education *conditional* on that education having been provided. The most direct implication of this is that this analysis examines the correlates of employer support among participants, not the correlates of participation (a question examined in other chapters of this report and other NCES reports). The analysis in this chapter is thus related to, but conceptually and empirically distinct from, the analyses reported in earlier chapters and raises its own set of conceptual and measurement issues.

Conceptual Issues

Employer surveys, the most common source of data on skill enhancement, provide good data on employer support for employer-sponsored activities but will underestimate the overall level of work-related education. Many adults pursue work-related education opportunities from sources other than their employers, and these episodes will not be captured in an employer survey. At the same time, although a household survey captures a broader range of learning activities and permits one to observe how much support employees *received*, one cannot observe how much support employers *offered*. Thus, an employer survey will underestimate the extent of work-related education while providing good estimates of the extent of (available) employer support for that instruction, but a household survey will underestimate the extent of (available) employer support while providing a better estimate of the extent of work-related education. Beyond this, using data from a household survey affords an opportunity to examine the *share* of all work-related education that is supported by employers relative to other institutions and organizations. This type of analysis is not possible with an employer-based survey.

Dickerson and Wilson (2004) observed that the difficulty in estimating the distribution of workplace training in the workforce is that such training is ultimately a two-step process. That is, the distribution of training is a function of both the likelihood of employers providing it and the conditional likelihood of workers participating in training programs that are available to them. Dickerson and Wilson believe, however, that processes on the employer side (employers' derived demand for skills) are far more consequential determinants of the distribution of participation than are decisions by workers to accept or refuse the training offered by their employers. Thus, a focus on the receipt of employer support of work-related education likely captures most of the "action" in the distribution of training.

Dickerson and Wilson's (2004) hypothesis suggests that inequalities in access to employer support should not be as large as the earlier reported inequalities in the likelihood of work-related education. That is, *among participants*, employer support should be relatively evenly distributed. To the extent that it is not (i.e., to the extent that individuals from groups who are less likely to receive training are also less likely to receive support when they do participate), this suggests a source of double inequity in the training system that may merit further attention.

Measurement Issues

The AELL–NHES:2001 includes a number of questions related to employer involvement in and support of work-related education. As discussed previously, the survey asks whether the activity was encouraged or required by the employer, which is considered here as a form of employer involvement. The AELL–NHES:2001 also asks whether the employer provided various supports for learning, including various types of direct and indirect financial support. The definition of employer support for learning used here combines these types of support:[47]

- Any employer support, includes the following:
  - Direct financial support:
    - Employer paid tuition and fees; or
    - Employer paid for books and materials.
  - Indirect financial support:
    - Employer paid work hours during instruction;
    - Employer provided workplace space; or
    - Employer provided instruction.

Employer-Sponsored Instruction

This chapter also examines the provision of employer-sponsored instruction, a term that requires some clarification. The term *employer-provided instruction* is typically used to refer to learning activities offered by the employer only to company employees. Learning activities open to all adults (e.g., postsecondary courses with employer tuition reimbursements) do not count as employer provided, even if they are in some way supported by the employer. Employer-provided instruction is relatively easy to identify in a survey of employers, but is more difficult to measure from a household survey of adults. The AELL–NHES:2001, however, includes several items that allow for a reasonable approximation of employer-provided instruction. To acknowledge that the

[47] See appendix B for details on the assumptions made on these items for participants in apprenticeship programs.

NHES data can only approximate employer-provided instruction, this report uses the term *employer-sponsored instruction* in place of employer-provided instruction.

As defined here, employer-sponsored instruction includes all nonpostsecondary learning activities for which the employer is the instructor and all nonpostsecondary activities provided by other instructors but for which employers give employees paid time off and cover instructional costs. All apprenticeship programs have been imputed to be employer sponsored. (See chapter 1 and appendix B for more detailed discussions of the definition of employer-sponsored instruction.)

Analysis Population

The analysis population for this chapter is in many cases the same as that for other chapters in this report—all adults ages 25–64 who are in the labor force, including both the employed and the unemployed. However, since employer support is typically available only to those who are working, some of the analyses in this chapter are restricted to those who were employed at the time they participated in a learning activity. This group is referred to as *concurrently employed* adults.[48]

As discussed in chapter 1, labor force members who were self-employed only (with no other job) during the past 12 months were imputed to have received no employer involvement or support

The Extent of Employer Involvement and Support

Table 4.1 summarizes the AELL–NHES:2001 data on the extent to which labor force members participated in work-related learning activities for which their employer was involved (by suggesting, encouraging, or requiring participation) or provided support. Results are presented both for all participants and for the somewhat smaller subsample of those who were employed at the time of their participation (the concurrently employed). As would be expected, the estimates of employer involvement for concurrently employed participants are a few percentage points higher than those for all participants. Because they tend to follow the same pattern, each column is not discussed in detail.

[48] Concurrently employed participants comprise 89 percent of all participants in work-related learning.

Table 4.1. Percentage of all work-related education participants ages 25–64 and of concurrently employed participants who received each type of employer involvement or support: 2000–01

Type of employer involvement or support	Percent of all participants	Percent of concurrently employed participants
Any employer involvement or support	83.7	93.2
Employer involvement:		
Employer required, suggested, or encouraged participation	69.1	76.9
Employer support:		
Employer provided any support	79.8	88.4
Employer provided direct financial support	74.1	82.4
Paid tuition and fees	72.8	81.0
Paid for books and materials	67.6	75.2
Employer provided indirect financial support	73.8	84.9
Paid work hours	62.8	69.8
Provided workplace space	49.3	54.8
Provided instruction	45.8	63.4

NOTE: Concurrently employed participants are those who were employed at the time of their participation.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

The central finding in table 4.1 is that about four out of every five labor force participants in work-related education (84 percent) have some form of employer involvement or support.[49] For concurrently employed participants, this is true for about 9 out of 10 participants (93 percent). Thus, given that labor force members are participating in work-related education of some sort, the odds are high that their employer is in some way involved. Separating employer involvement from other more tangible material and financial support shows that although participants are more likely to receive support than to receive employer encouragement for participation, both forms of employer involvement were reported by the majority of participants. Overall, 80 percent of participants received employer support, and 69 percent had employers who were involved in motivating their participation. The employer support provided to participants included both direct financial support (e.g., tuition payments) and indirect financial support (e.g., paid time off), with about three-fourths of participants receiving each type of support.

One reason for the relatively high levels of various types of employer support is that many labor force members in work-related education were receiving employer-sponsored instruction. Table 4.2 shows that among those eligible for employer support (concurrently employed

[49] It is worth repeating that these estimates pertain only to the recipients of work-related training. They say nothing about those who did not participate. Thus, these results cannot be interpreted as indicating either generosity or underinvestment on the part of employers in the skill development of their workforces.

participants), 67 percent were in at least one employer-sponsored activity. The data in this table show that for concurrently employed participants who are not in activities that are sponsored by their employer, employer support is not the norm, although about one-third of these participants received either direct or indirect employer support for their participation. Employers provided *direct* financial support for almost one-third of concurrently employed participants who were in work-related education that was not employer sponsored and provided *indirect* support for about one-quarter of these participants.

Table 4.2. Percentage of all work-related education participants ages 25–64 and of concurrently employed participants who received employer-sponsored instruction or other forms of employer support: 2000–01

Type of employer instruction or support	Percent of all participants	Percent of concurrently employed participants
Employer sponsored instruction	60.9	67.4
Employer did not sponsor instruction, but:		
Provided direct financial support	27.2	30.3
Paid tuition and fees	26.6	29.6
Paid for books and materials	22.9	25.5
Provided indirect financial support	21.4	23.7
Paid work hours	14.4	16.0
Provided workplace space	11.0	12.2
Provided instruction	6.8	7.5
Provided direct or indirect support	32.6	36.2

NOTE: Concurrently employed participants are those who were employed at the time of their participation. Employer-sponsored instruction includes all nonpostsecondary learning activities for which the employer is the instructor and all nonpostsecondary activities provided by other instructors but for which employers provide paid time off and cover instructional costs (see appendix B for more detail).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Employer Support for Activities With Employment-Related Inducements

One might expect that employer support would be particularly forthcoming for activities that adults take to meet some type of employment requirement, such as an employer requirement for participation, an occupational credentialing requirement, or a continuing education requirement (i.e., the three employment-related inducements). For example, the Fair Labor Standards Act requires that employers compensate employees for the time they spend in employer-required

training.[50] Table 4.1 showed that 88 percent of concurrently employed participants in work-related education received some form of employer support; the chances of support were greater yet for those with employment-related inducements, among whom 93 percent received employer support (not in tables). To investigate this issue in more detail, data on the percentage of participants who received different types of employer support are presented in table 4.3, for those with and without each of the three employment-related inducements.

Table 4.3. Percentage of concurrently employed work-related education participants ages 25–64 who had each type of employer support, by whether participant had each employment-related inducement to participation: 2000–01

	Sought occupational credential		Earned continuing education units		Employer required participation	
Type of employer support	Yes	No	Yes	No	Yes	No
Employer sponsored instruction	60.8	66.1	58.2	66.5	79.3	53.8
Employer did not sponsor instruction but provided direct or indirect support	34.2	32.8	44.0	31.0	25.1	37.1
Employer sponsored or provided other support	87.1	87.1	90.4	86.3	96.7	80.4

NOTE: Concurrently employed participants are those who were employed at the time of their participation. Employer-sponsored instruction includes all nonpostsecondary learning activities for which the employer is the instructor and all nonpostsecondary activities provided by other instructors but for which employers provide paid time off and cover instructional costs (see appendix B for more detail). Direct support includes employer pay for tuition and fees, or for books and materials. Indirect support includes paid work hours during instruction, employer provision of workplace space, or employer provision of instruction.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

The table shows, first, that the likelihood of receiving employer support was relatively high (87 percent or higher) for participants in activities with each inducement and was highest for those in employer-required activities, 97 percent of whom received employer support. However, the extent to which those with and without an inducement received employer support varied across inducements. Concurrently employed adults who were required by their employers to participate received employer support more often than those who participated without an employer requirement (97 vs. 80 percent), mainly because of their greater likelihood of receiving employer-sponsored instruction (79 vs. 54 percent). Concurrently employed participants who have continuing education requirements were also more likely than those without these requirements to receive employer support (90 vs. 86 percent), but in this case, the difference results from those with continuing education requirements being more likely to receive employer support outside of

[50] 29 CFR §785.27. There are a few exceptions to this requirement, such as if the training is also required for a state license.

employer-sponsored instruction. Finally, having an occupational credentialing requirement was not related to the likelihood that concurrently employed participants received employer support; the same percentage of employed adults in each group (87 percent) did so.

Employer Support for Different Work-Related Learning Activities

Employers may be more willing to support some types of learning activities than others. Such differential support would be likely to manifest itself in both higher levels of participation among activities that employers support (because this support should make participation more attractive to prospective learners) and, possibly, in higher levels of employer support among the activities in which workers choose to participate. For example, chapter 2 showed that only 2 percent of work-related education participants were enrolled in basic skills classes and that only 12 percent of participants in these classes received employer support. These data suggest that labor force members are more likely to participate in this type of activity at their own expense and on their own time than they are for other activities. This may result from employers being less willing to support basic education classes or from labor force members' greater willingness to participate in this activity without employer support. However, given that this participation is among a group of labor force members (those with lower levels of educational attainment) who are less likely to participate in learning overall (Creighton and Hudson 2002), the latter explanation seems less warranted; at least for this activity, relatively low levels of employer support seem a likely contributing factor to low rates of participation in work-related education. (As noted in chapter 2, relatively low demand for such learning also may be a factor.)

The next section examines the extent to which participants in different work-related learning activities received employer support; to remove the effects of employment status on the receipt of employer support, only concurrently employed participants are examined. The section first reviews employer support by type of activity (also discussed in chapter 2), then by provider, and finally by topic of instruction. The data for this section are summarized in table 4.4 below, which includes findings for employer support and employer sponsorship; however, the discussion below focuses on the findings for employer support.

Employer Support by Type of Activity, Instructional Provider, and Topic of Instruction

Table 2.3 showed that concurrently employed participants in basic education classes were less likely than those in other activities to have employer support, while those in apprenticeship programs (who all had employer support by definition) were the most likely. Between these extremes, almost half of those in postsecondary programs had employer support (46 percent), while

Table 4.4. Percentage of concurrently employed work-related education participants ages 25–64 who received each type of employer support, by characteristic of activity: 2000–01

Characteristic of activity	Any employer support	Employer sponsored	Not employer sponsored, other support
Total, concurrently employed participants	88.5	67.4	36.3
Type of learning activity			
Basic education class	12.1	3.9	12.1
Apprenticeship program	100.0 [1]	100.0 [1]	0.0 [2]
Postsecondary program	46.4	0.0 [2]	46.4
Credential training program	69.7	40.3	29.4
Postsecondary course	80.9	0.0 [2]	80.9
Training course	94.4	80.3	21.7
Provider of instruction			
Business and industry	96.0	82.5	17.5
Postsecondary institution	62.4	0.0 [2]	62.4
Professional organization	87.5	58.9	31.8
Government agency	95.4	77.7	24.1
Other provider	35.6	28.8	8.0
Topic of instruction			
Business	95.1	89.7	25.9
Computer science	86.1	65.4	23.9
Education	92.1	87.8	42.4
Health	89.0	66.9	36.9
Science	85.0	71.5	27.0
Social sciences/services	60.4	45.3	36.0
Vocational trades	92.9	83.8	26.0
Other topic areas	65.2	48.2	30.2

[1] Responses logically imputed to be "yes" in every case; see appendix B for details on imputations.

[2] Responses logically imputed to be "no" in every case; see appendix B for details on imputations.

NOTE: Concurrently employed participants are those who were employed at the time of their participation. Employer-sponsored instruction includes all nonpostsecondary learning activities for which the employer is the instructor and all nonpostsecondary activities provided by other instructors but for which employers provide paid time off and cover instructional costs (see appendix B for more detail). Other employer support includes pay for tuition and fees, pay for books and materials, paid work hours during instruction, employer provision of workplace space, or employer provision of instruction.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

higher percentages—about 70 to 90 percent—of those in credential training programs, postsecondary courses, and training courses had employer support for their participation.

The percentage of concurrently employed participants who had employer support also varied depending on the instructional provider. Those with business and industry providers and with

government providers were the most likely to have employer support, followed by those with professional organizations as the provider and then postsecondary institutions. (Adults whose providers were in the catch-all "other provider" category were the least likely to have employer support.)

Compared with all concurrently employed participants, those studying business topics were more likely to have employer support for their learning. Those studying social science/services and "other" topics were generally less likely than concurrently employed participants in general to have employer support for their learning.

Distribution of Employer Support Among Participants

As discussed earlier, the likelihood of participating in work-related education differs among individuals with different sociodemographic and labor force characteristics. For example, the more highly educated and those in higher status occupations participate at higher rates than do those in less advantaged positions. The issue examined here is the extent to which participants (who are themselves differentially selected across different social statuses) are further sorted in the receipt of employer support. That is, are all participants equally likely to receive employer support, or are there differences in the receipt of this support even among those who have selected to participate (i.e., among participants)? This section reverts back to an analysis of all adults in the labor force, rather than just concurrently employed adults, so that the results are indicative of the distribution of employer support among work-related education participants in the labor force.

Table 4.5 presents data on employer support across several characteristics of participants in work-related education. Specifically, the analysis looks at participants by level of educational attainment, employment status, size of employer, and occupation. These variables were selected because of their strong and consistent relationship to participation in work-related education in past research. Several of the differences in the table are noteworthy. As discussed previously, labor force members with lower levels of educational attainment were less likely to participate in employer-sponsored job training than were those with more schooling; they were also less likely to receive employer support when they did participate. For example, 63 percent of participants who had not completed high school received employer support, compared with 84 percent of participants with a bachelor's degree. Many of the participants with no high school education may be pursuing basic skills education, which (as noted above) appears to be relatively unsupported by employers.

Table 4.5. Percentage of work-related education participants ages 25–64 who received each type of employer support, by participants' educational and labor force characteristics: 2000–01

Characteristic	Any employer support	Employer sponsored	Not employer sponsored, other support
Total, all participants	79.8	60.9	32.6
Level of education attainment			
Less than high school	63.0	47.4	18.1
High school or equivalent	77.0	59.5	27.4
Some college, no degree	79.0	60.3	31.5
Vocational/technical diploma or associate's degree	86.2	62.2	41.8
Bachelor's degree	84.2	68.3	32.2
Degree above bachelor's	75.8	53.6	37.1
Employment status			
Employed full time	82.5	63.1	33.8
Employed part time	60.3	43.9	23.6
Unemployed	2.9	2.9	#
Size of employer			
Fewer than 25 employees	54.3	34.2	28.9
25–99 employees	82.3	52.8	42.6
100–499 employees	86.5	67.1	34.1
500 or more employees	88.8	72.6	32.0
Occupation			
Professional	83.0	62.6	36.7
Sales, service, and support	76.6	58.0	29.7
Trades	81.6	65.9	28.3

Rounds to zero.

NOTE: Detail may exceed totals because respondents can participate in multiple activities. Employer-sponsored instruction includes all nonpostsecondary learning activities for which the employer is the instructor and all nonpostsecondary activities provided by other instructors but for which employers provide paid time off and cover instructional costs (see appendix B for more detail). Other employer support includes pay for tuition and fees, pay for books and materials, paid work hours during instruction, employer provision of workplace space, or employer provision of instruction.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

As also noted earlier, full-time and part-time workers were more likely to participate in work-related education than were unemployed workers. Table 4.5 shows a slightly different pattern for the receipt of employer support, however: participants in work-related education who were full-time employees were the most likely to receive support for participating in work-related education, followed by part-time employees and then the unemployed.

The size of one's employer also makes a difference in participation in employer-supported work-related education, with the chances of such participation increasing with employer size (as did participation rates in work-related education in general). For example, just over half (54 percent) of participants with small employers (less than 25 employees) had employer support, compared with 89 percent of participants whose employers had at least 500 employees.

The findings for participants in different occupation groups are less clear. There were no detectable differences in the extent to which participants in the trades and sales/service/support occupations received employer support, nor between those in the professions and the trades. However, participants in the professions were more likely than those in sales/service/support occupations to receive employer support for their work-related education. Those in professional occupations were also the most likely to participate in work-related education.

These findings suggest a double disadvantage for the unemployed and for those working for small employers; both groups are relatively unlikely to participate in work-related education or to receive employer support when they do participate. Adults in professional occupations seem to be doubly advantaged. They are the most likely occupation group to participate in work-related education, and one of the most likely to have employer support when they do participate. Although the AELL–NHES:2001 data cannot directly address this issue, one interpretation of these findings is that the availability of employer support (or lack of this support) contributes to the relatively high and low rates of participation for these particular groups. Further, because the patterns of receipt of employer-sponsored education often follow those for employer support,[51] the critical factor may be the extent to which employers provide education to certain workers rather than others. This interpretation supports Dickerson and Wilson's (2004) contention that employer offerings are the more critical determinant of worker participation in most cases.

[51] Participants who are employed full time are most likely to receive employer-sponsored instruction, followed by part-time employees and then the unemployed. The receipt of employer-sponsored instruction among participants increases with employer size and with educational attainment (up to the bachelor's degree level). However, the likelihood of receiving employer-sponsored training does not vary by occupation group.

Chapter 5: The Role of Employment-Related Inducements to Participation

Previous chapters showed that employment-related inducements to participation—seeking an occupational credential, earning CEUs, or meeting an employer requirement for participation—are relatively common among labor force members who participate in work-related education: about two-thirds of these participants (68 percent) have at least one of these inducements. In other words, more labor force members participate in activities that have an inducement to participation than in activities that do not have one (33 vs. 22 percent; data not in tables). The AELL–NHES:2001 also shows that in 2000–01, 31 percent of labor force members were employed in an occupation that had continuing education requirements (regardless of whether they sought to earn CEUs in the past year; data not in tables).[52]

This chapter takes a closer look at these inducements to participation. The chapter first reviews the research on inducements to participation. Following the pattern of previous chapters, the chapter then examines the prevalence of the three employment-related inducements among participants (1) who are in different work-related learning activities, (2) who have different instructional providers, and (3) who study different topics. The chapter then looks at which labor force members are more likely to be in occupations that have continuing education requirements and which adults are more likely to have employment-related inducements to participation. The chapter concludes with an analysis of how the likelihood of having employment-related inducements is related to the likelihood of participating—that is, are the labor force members who are more likely to have inducements to participation also the adults who are more likely to participate in work-related education?

Background on Inducements to Participation

The underlying motivation for adults' participation in learning has been the topic of much research (see summary in Silva, Cahalan, and Lacireno-Paquet 1998). Economic theorists, for example, have focused on the increased earnings that result from learning as a "return to

[52] Continuing education requirements may extend beyond a 1-year time period. For example, the requirement may stipulate the completion of three CEUs over a 5-year period. Therefore, not everyone who has a continuing education requirement may have had to meet that requirement during the NHES 12-month survey period; likewise, some adults who earned CEUs may not have had to do so during that period. Nonetheless, the percentage of participants who earned CEUs is assumed here to be a reasonably good approximation of the extent to which adults had a CEU requirement to fulfill *over the survey year*.

investment" (OECD 1998). However, as many theories of participation note, incentives to participate include both the individual's own *internal* judgments of the value of the activity and *external* pressures that may override or otherwise influence personal judgments. These external pressures have many labels, including "learning press" (Darkenwald and Merriam 1982) and "subjective norms" (Ajzen and Fishbein 1980). No matter the terminology, the point is that individuals' learning behavior is subject to external pressures; if one wants to know why certain individuals "choose" to participate in learning (or how to encourage participation), these pressures are important considerations.

Within economics, human capital theory provides a useful framework for understanding these external pressures. This theory notes that individuals are often not the only ones who benefit from their learning activities (Becker 1962, 1975). For work-related education, the key external groups with incentives to encourage individuals' participation are employers (who want to maximize competitiveness and productivity at the lowest cost) and government regulatory and professional organizations (who want to maintain standards for safe and effective practice). In situations where costs or other factors may lead individuals to underinvest in training, these external players may encourage participation by imposing requirements for participation in certain activities or over certain time periods (Bishop 1997). These requirements may take many forms, including an employer requirement for participation, initial or continuing education requirements for professional practice, or occupational credentialing requirements.

Given the importance of employment-related requirements as potential incentives for participation in learning, there are relatively little data available on these requirements. While a wealth of information is available on worker training from economists and labor market analysts (see review in Bishop 1997), these analysts have tended to focus on employer-sponsored instruction and on investments in and returns to worker training—regardless of whether the training was voluntary or required. For example, although the U.S. Bureau of Labor Statistics (BLS) 1995 Survey of Employer-Provided Training included a question asking employees if their training was mandatory, published BLS reports on this survey do not include this information.

Typically, the incentives examined in the training literature are those provided by the government to encourage employers to offer training. Pindus and Isbell (1996), for example, summarize findings on state-sponsored incentive programs for employers (e.g., tax credits, grants). These authors and others have also examined the incentives (and disincentives) to employers included in federal job-training legislation, tax policies, and fair labor standards (Pindus and Isbell 1996; Bishop 1997). Incentives for individuals have received less attention. The NHES adult education surveys, targeted on individuals rather than employers, provide a unique opportunity to examine such incentives.

The NHES Tradition

From the inception of the NHES Adult Education Surveys in 1991, a key topic of interest was why adults do *not* participate in learning, with a particular focus on the barriers to participation that adults may face. To address the issue of barriers, the 1991 and 1995 surveys included a series of questions that asked respondents who did not participate in learning in the previous year (but who reported interest in doing so) why they had not participated. A re-interview study of the 1995 survey suggested, however, that the questions about barriers to participation may have had relatively low reliability (Brick, Wernimont, and Montes 1996). The items also were of limited utility, as most "interested nonparticipants" said that lack of either time or money prevented their participation. Because these are the reasons adults give for not doing many things, there was some concern that the data might reflect excuses for nonparticipation more than barriers to participation. After an extensive study of alternatives to these questions (Silva, Cahalan, and Lacireno-Paquet 1998; Silva and Lacireno-Paquet 2000), the questions concerning barriers were dropped from future NHES surveys. Instead, the 2001 survey focused on factors that encourage participation, such as employer support, continuing education, and the other goals and incentives listed in table 2.4 in chapter 2.[53] That is, the focus shifted from understanding why adults do not participate to understanding why they do.

To *fully* understand why adults participate in work-related (or any other) learning, one must understand the different, and often competing, priorities and incentives that adults face in their lives (see, e.g., theories summarized in Silva, Cahalan, and Lacireno-Paquet 1998). This is a more complicated task than can be accomplished with the AELL–NHES:2001 data, as the range of goals and priorities that affect adults' decisionmaking is not easy to capture in a telephone survey. Even an analysis of just the external incentives to participation is difficult to examine in this format. For example, as discussed in chapter 4, although one can determine from the AELL–NHES:2001 who has received employer support for their participation, one cannot determine who had that support available to them but did not take advantage of it. Similarly, one can determine how many participants had a requirement to participate, but not how many nonparticipants had a requirement that they ignored. However, employment-related requirements, unlike some other incentives, promise not just rewards for compliance (e.g., improved job performance, increased earnings) but also the possibility of penalties for noncompliance (e.g., loss of professional standing, loss of job). Thus, it seems safe to assume that while adults may often remain indifferent to employer support for work-related education, they rarely are indifferent to requirements to participate, particularly when these requirements are related to their occupational credentials or to their employers' desires. These requirements are thus strong inducements to

[53] Since 1999, the NHES adult education surveys also have asked individuals about their use of two tax credits designed to encourage adults' participation in learning—the Lifetime Learning tax credit and the HOPE Scholarship tax credit.

participation and are particularly likely to influence who participates in work-related learning activities and the types of activities in which adults participate.

Employment-Related Inducements to Participation

This chapter examines in detail the extent to which participation in work-related education by adults in the labor force is associated with the three employment-related inducements included in the AELL–NHES:2001—seeking (to obtain or renew) an occupational credential, earning CEUs, and meeting an employer requirement for participation. One underlying goal of this chapter is to show the influence that these inducements have on patterns of participation in work-related education. Technically, an analysis of survey data cannot prove that these inducements lead to particular patterns of participation because the data are correlational—that is, they can only show that inducements are *related to* participation, not that they cause participation. For example, it may seem relatively safe to assume that the occupational, professional, and employer requirements considered here as inducements to participation do affect participation rates (i.e., the causal relationship is logically valid). However, a relatively high rate of skill change could cause some occupations and some employers to impose education requirements, and could at the same time cause workers to seek education to enhance their skills, independently of imposed participation requirements. To the extent this is true, the relationship between employment-related requirements and participation is not causal. The reader should thus view the results presented below with caution.

A second caveat is necessary. The AELL–NHES:2001 survey asked only participants (rather than all adults) whether they had each employment-related inducement to participation. To the extent that respondents had an inducement but declined to participate anyway, the data on employment-related inducements underestimate the extent to which respondents had these inducements. For continuing education requirements, this problem can be addressed by using the separate AELL–NHES:2001 question that asks respondents if they are in an occupation that has continuing education requirements. For the other employment-related inducements, the reader should bear in mind that noncompliance with occupational, professional, or employer requirements may result in underestimates of the prevalence of these inducements.

Inducements Among Different Types of Activities

As discussed in chapter 2, the prevalence of employment-related inducements ranged from a low of 8 percent for participants in basic education classes to a high of 100 percent for those in apprenticeship programs (all of whom were defined for this analysis as seeking an occupational credential) (table 5.1). Between these extremes, a minority of participants in postsecondary

programs (29 percent) had any of these inducements to participation, while a majority of participants in credential training programs (78 percent), training courses (74 percent), and postsecondary courses (65 percent) had any of these inducements.

Table 5.1. Percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by type of learning activity: 2000–01

Type of learning activity	Any inducement	Seek occupational credential	Earn continuing education units	Employer requirement
Total, all activities	68.0	37.2	28.5	46.7
Basic education class	7.7	0.0 [1]	0.0 [1]	7.7
Apprenticeship program	100.0 [2]	100.0 [2]	0.0 [1]	0.0 [1]
Postsecondary program	29.2	25.3	0.0 [1]	10.3
Credential training program	78.2	67.0	0.0 [1]	29.5
Postsecondary course	65.1	34.5	45.5	30.0
Training course	73.7	37.2	29.3	53.2

[1] Responses logically imputed to be "no" in every case; see appendix B for details on imputations.

[2] Responses logically imputed to be "yes" in every case; see appendix B for details on imputations.

NOTE: Detail may exceed totals because respondents can participate in multiple activities and can have more than one inducement for a given activity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Comparisons With Participants Overall

Another way to examine the prevalence of employment-related inducements is to compare the percentage of participants in each type of activity that have any employment-related inducement to the percentage of participants in general that have any of these inducements. This analysis shows that those in basic education classes and in postsecondary programs were less likely than participants in general to have any of the three employment-related inducements (table 5.1). Participants in apprenticeships and in training courses were more likely than participants in general to have these inducements. Finally, no differences were detected in the rates at which postsecondary course participants and credential training program participants had these inducements compared with participants in general.

Comparisons by Type of Inducement

Chapter 2 also showed that participants in training activities (courses and credential programs) were more likely than those in corresponding postsecondary activities (courses and

programs) to have an employment-related inducement to participation. This section compares these four activities in terms of their likelihood of involving each of the employment-related inducements. The data for this section are summarized in table 5.1.

Seeking an Occupational Credential

Seeking an occupational credential was a more common inducement among labor force members taking credential training programs than among those participating in the other three activities. Relatively few labor force members were enrolled in credential training programs (about 1 percent), but of those who were, two-thirds were seeking an occupational credential. Only one-fourth of those enrolled in postsecondary programs were seeking an occupational credential, as were about one-third of both postsecondary and training coursetakers.

Earning CEUs

Only coursetakers were asked about earning CEUs in the AELL–NHES:2001. As noted in chapter 3, participants in postsecondary courses were more likely than those in training courses to report that they were earning CEUs (46 vs. 29 percent). However, about four times as many labor force members took training courses as took postsecondary courses so, overall, more CEU-earners were in training courses than in postsecondary courses (81 vs. 30 percent, respectively).

Employer Requirement

Overall, labor force members in training courses were more likely than those in the other three activities to have an employer requirement for participation. For example, 53 percent of training coursetakers had this inducement, compared with 30 percent of postsecondary coursetakers. Postsecondary coursetakers were also more likely than postsecondary program participants to have an employer requirement for participation (30 vs. 10 percent).

Employment-Related Inducements by Instructional Provider

This section examines the prevalence of employment-related inducements among labor force members participating in activities with different instructional providers. For this analysis, participants with each instructional provider are compared with participants in general in terms of the likelihood that they have each inducement and employment-related inducements overall (table 5.2).

Table 5.2. Percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by instructional provider: 2000–01

Instructional provider	Any inducement	Seek occupational credential	Earn continuing education units	Employer requirement
Total, all activities	68.0	37.2	28.5	46.7
Business and industry	72.6	30.3	22.9	55.2
Postsecondary institution	45.1	28.5	19.8	18.0
Professional organization	68.4	41.4	39.4	28.4
Government agency	81.1	51.1	28.9	58.9
Other	26.4	13.2	11.4	17.1

NOTE: Detail may exceed totals because respondents can participate in multiple activities and can have more than one inducement for a given activity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Those with postsecondary instructional providers were less likely than participants in general to be seeking an occupational credential, earning CEUs, or meeting an employer requirement for participation; as a result, participants with postsecondary providers were less likely than participants in general to have any employment-related inducement to participation. Participants with business or industry as an instructional provider were also less likely than participants in general to be seeking an occupational credential or earning CEUs, but were more likely than participants in general to have an employer requirement for participation. Because of the latter difference, participants with business and industry providers were more likely than participants in general to have any employment-related inducement to participation. Participants with government agencies as instructional providers were also more likely than participants in general to have any employment-related inducement to participation, in this case due to higher-than-average rates of seeking an occupational credential and employer requirements for participation. Finally (ignoring the eclectic "other" provider), participants who had professional organizations as providers had an above-average rate of earning CEUs, and a below-average rate of employer participation requirements, resulting in an average rate of employment-related inducements overall.

This pattern of inducements fits well with human capital theory, which proposes that the groups with the most to gain from a more well-educated workforce should be the most likely to support workforce education (Becker 1975). Thus, the more generic and transferable skills typically acquired through postsecondary education would tend to be more internally motivated than externally induced because this learning tends to benefit individuals more than employers. Similarly, employers should be more likely to provide incentives for training they provide (and thus is presumably tailored to their needs), and professional organizations and employers should be

more likely to provide incentives (CEUs or employer requirements) for the training provided by professional organizations, which presumably benefits the profession at large, as well as employers who need legally qualified staff.

Employment-Related Inducements by Topic of Instruction

This section looks at the prevalence of employment-related inducements among labor force members studying different topics. Again, participants studying specific topic areas are compared with participants in general in terms of their likelihood of having these inducements.

Table 5.3 shows that participants studying the two topics of business and computer science were less likely than participants in general to have any employment-related inducements to participation, while participants studying the two topics of health and vocational trades were more likely to have these inducements.[54] The remainder of this section focuses in more detail on the three most common instructional topics (business, health, and computer science).[55] Table 5.3 provides detailed statistics on all topic areas, however.

Table 5.3. Percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by topic of instruction: 2000–01

Topic of instruction	Any inducement	Seek occupational credential	Earn continuing education units	Employer requirement
Total, all activities	68.0	37.2	28.5	46.7
Business	64.8	22.5	25.1	44.0
Computer science	48.1	13.2	18.4	32.8
Education	68.2	37.4	34.9	43.3
Health	84.5	58.8	37.3	56.2
Sciences	69.5	36.5	21.0	46.7
Social sciences and services	57.8	42.1	39.2	23.1
Vocational trades	75.4	54.5	16.9	39.0
Other	48.2	26.8	15.9	32.1

NOTE: Detail may exceed totals because respondents can participate in multiple activities and can have more than one inducement for a given activity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

[54] The estimate for "social sciences and services" had a relatively large standard error, which is why the apparently large difference between participants studying this topic and participants in general was not statistically significant.

[55] See chapter 2 for findings on participation rates by topic of instruction.

Although business was the most common topic studied by participants in work-related education, these participants were, as noted above, less likely than participants in general to have an employment-related inducement to participation, largely because relatively few of those studying business were seeking an occupational credential or CEUs (table 5.3). Those studying computer science, the third most common topic, were even more striking in this regard: these participants were less likely than participants in general to have each of the three specific inducements. While 37 percent of all participants were seeking an occupational credential, only 13 percent of participants studying computer science were doing so; for earning CEUs, the percentages were 29 and 18, respectively, and for meeting employer requirements, the percentages were 47 and 33, respectively.

Health, the second most commonly studied topic, presents the opposite situation. Participants studying health topics were more likely than participants in general to be seeking an occupational credential (59 vs. 37 percent), earning CEUs (37 vs. 29 percent), or meeting an employer requirement for participation (56 vs. 47 percent).

As discussed in chapter 2, the predominance of these three instructional topics reflects a combination of factors, including the employment-related inducements examined here, other inducements (e.g., links between education and pay), the prevalence of jobs in the labor market, and skill demands within occupations. For health topics, a relatively high rate of employment-related inducements appears to contribute to the relatively high rate at which this topic is studied. These inducements seem less likely to be a factor in business and computer science, where the number of jobs in the labor market and changing skill demands likely contribute to the prevalence of these topics, even though those studying these topics are relatively unlikely to have employment-related inducements for participation.

Labor Force Members With Inducements to Participation

This section of the report switches focus to examine the prevalence and distribution of employment-related inducements among labor force members (rather than participants), and the relationship between the prevalence of these inducements and participation rates. The section examines first the extent to which labor force members are in occupations that have continuing education requirements, and second the prevalence of employment-related inducements among different groups of labor force members. The same four background variables examined in chapter 4—level of educational attainment, labor force status, occupation, and employer size—are examined here.

Occupations With Continuing Education Requirements

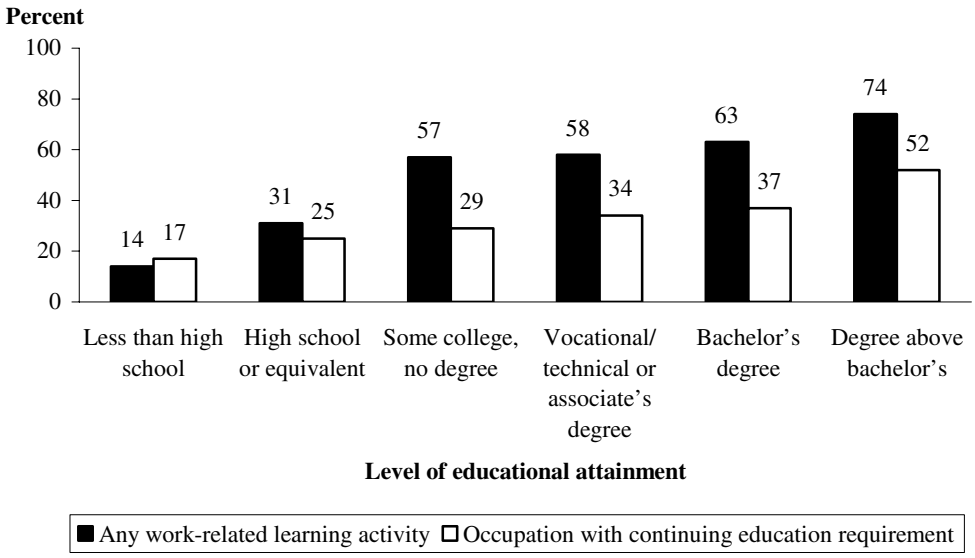
Individuals who have continuing education requirements often have the flexibility to meet these requirements at different points in time, so the percentage of respondents who participated in an activity to earn CEUs during the past 12 months likely underestimates the extent to which respondents had these requirements as part of their job in 2000–01. Another measure available in the AELL–NHES:2001, whether the respondent was in an occupation with continuing education requirements, provides a more accurate picture of the extent to which this requirement for participation exists within the labor force. Thus, this section of the report examines how many and which adults are in occupations that have continuing education requirements, and how this occupational characteristic is related to patterns of participation.

In 2000–01, 31 percent of labor force members were in occupations that had continuing education requirements (not in tables). Not all of these individuals participated in work-related education in the past year, however, because continuing education requirements do not necessarily require *annual* learning. But a majority did participate, and their participation rate was higher than that of labor force members who do not have continuing education requirements: 64 percent of adults in occupations with continuing education requirements participated in work-related education, compared with 40 percent of adults in occupations that did not have these requirements (not in tables). Switching focus to participants, a higher percentage of work-related participants than labor force members in general were in occupations with continuing education requirements (42 vs. 31 percent, not in tables). In other words, about 4 out of 10 work-related participants were in occupations that have continuing education requirements.

Which adults are in occupations with continuing education requirements follows a familiar pattern. Labor force members with higher levels of educational attainment were more likely than those with lower levels of attainment to be in occupations with continuing education requirements, as were those with larger versus smaller employers and those in professional versus other occupations (figures 5.1–5.4). These findings largely mirror the patterns of participation in work-related education seen in chapter 2. No differences were found, however, in the rates at which full-time, part-time, and unemployed workers had continuing education requirements.[56] Taken together, these findings suggest that the distribution of continuing education requirements among

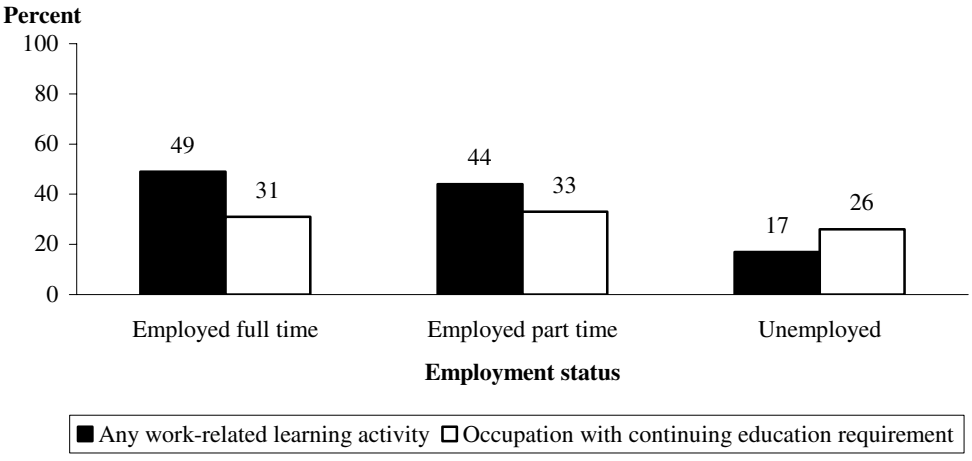
[56] Chapter 2 showed that full-time and part-time workers were more likely than unemployed workers to participate in work-related education. Large standard errors for the unemployed may account for the lack of a significant difference in the likelihood of having a continuing education requirement.

Figure 5.1. Percentage of labor force members ages 25–64 who participated in a work-related education activity and percentage who were in an occupation that had continuing education requirements, by level of educational attainment: 2000–01



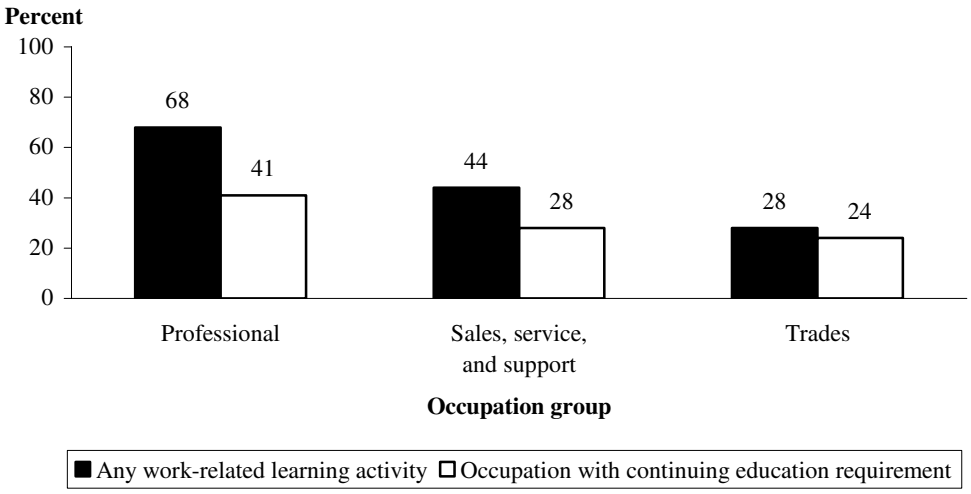
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Figure 5.2. Percentage of labor force members ages 25–64 who participated in a work-related education activity and percentage who were in an occupation that had continuing education requirements, by employment status: 2000–01



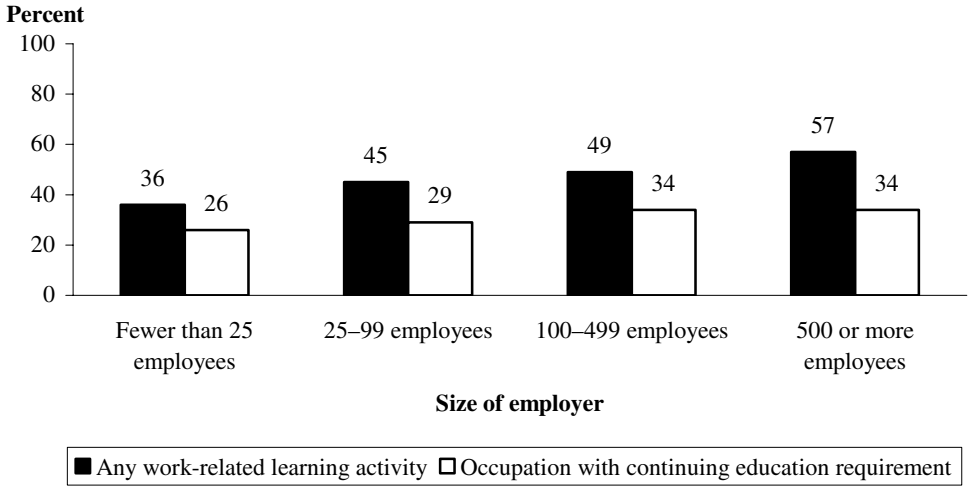
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Figure 5.3. Percentage of labor force members ages 25–64 who participated in a work-related education activity and percentage who were in an occupation that had continuing education requirements, by occupation group: 2000–01



SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Figure 5.4. Percentage of labor force members ages 25–64 who participated in a work-related education activity and percentage who were in an occupation that had continuing education requirements, by size of employer: 2000–01



SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

workers may partly account for differences in participation rates by level of educational attainment, occupation, and employer size.

Figures 5.1–5.4 also suggest that labor force members who have not completed high school may participate at a particularly low rate given their level of continuing education requirements; the same appears to be true for two other groups that tend to have relatively high percentages of adults with low levels of educational attainment—the unemployed and those in the trades (which in this analysis includes unskilled labor).[57] There are a number of possible explanations for this finding. First, these adults may be less likely than other labor force members to have other external requirements or inducements for participation.[58] For example, because of the higher unemployment rate among those with low levels of educational attainment, these labor force members may be less likely to have employer requirements for participation. Second, labor force members with low levels of education may have fewer economic and social resources to support their participation in work-related education. Third, these adults may be relatively uncomfortable in formal learning situations, and thus relatively unlikely to seek to participate in such activities.

In summary, a substantial minority of all labor force members—about one-third—are in occupations that have continuing education requirements, and these adults (as one might expect) participate in work-related education at a higher rate than those in occupations that do not have these requirements. Because the labor force members who are more likely to participate in work-related education—those with higher (vs. lower) levels of educational attainment, larger (vs. smaller) employers, higher status (vs. lower status) jobs, and adults who are employed (vs. unemployed)—are often also more likely to be in occupations with continuing education requirements, this occupational characteristic is a potential factor in determining participation patterns by education and employment background.

Employment-Related Inducements

If one assumes that all adults who had an employment-related inducement during 2000–01 participated in learning in response to that inducement, then the percentage *of labor force members* in activities with these inducements indicates the extent to which these inducements existed

[57] These conclusions are based on comparisons of the percentage of labor force members in each education or employment category participating in work-related education with the percentage who are in occupations with continuing education requirements. For most categories, the percentage of work-related participants is higher than the percentage in occupations with continuing education requirements. The exceptions are those with less than a high school education, the unemployed, and those in the trades, for whom no differences were detected in these percentages.

[58] If one assumes that participants who have occupational credentialing requirements and participants with employer requirements represent virtually everyone who had these requirements, then the data discussed below provide support for this hypothesis.

in the labor force during that period. From this perspective, table 5.4 shows that one-third of those in the labor force had at least one of these inducements in 2000–01, with 22 percent having an employer requirement, 19 percent an occupational credentialing requirement, and 14 percent a continuing education requirement. These data imply that the participation rate among labor force members who did *not* have an employment-related inducement was 21 percent (not in tables), and that—as seen in chapter 2—about two-thirds (68 percent) of the 47 percent of labor force members who did participate may have done so at least in part because of these requirements.

Table 5.4. Percentage of labor force members ages 25–64 who participated in a work-related education activity that had an employment-related inducement, by type of inducement: 2000–01

Employment-related inducement	Percent of labor force members
Any employment-related inducement	33.2
Seeking occupational credential	18.7
Earning continuing education units	13.5
Employer requirement for participation	22.1

NOTE: Detail may exceed totals because respondents can participate in multiple activities and can have more than one inducement for a given activity.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

The remainder of this section examines the logical question that arises from the potential influence of employment-related inducements on participation: to what extent do these inducements determine existing patterns of participation in work-related education among adults in the labor force? For example, do labor force members with higher levels of educational attainment participate at higher rates than those with lower levels of attainment because the former are more likely to have employment-related inducements to participation?[59]

If employment-related inducements do determine these participation patterns, two sets of findings should exist. First, if these inducements contribute to the observed patterns of

[59] Ideally, one would estimate the effect of inducements on participation through a regression equation that added measures of inducements to the standard demographic and labor force variables to predict participation in work-related learning. Unfortunately, the AELL–NHES:2001 does not support such an analysis. Assuming that nonparticipants probably did not have employment-related inducements to participation, and that data on noncompliance would be unreliable if nonparticipants did have such inducements, the NHES survey designers only asked respondents if they had these inducements if they were participants in learning. Thus, there is no variability in inducements among nonparticipants. This limitation does not hold for whether respondents had continuing education requirements (asked of both participants and nonparticipants), which is why this variable is examined separately in this chapter. Regression analysis was not used to examine this variable, however, because it seemed inappropriate to predict the effect of only one of many possible inducements on participation.

participation, they should show the same patterns themselves. That is, the proportions of labor force members who have these inducements should follow the patterns seen for participation in work-related education (e.g., labor force members with higher levels of educational attainment should be more likely to have these inducements than those with lower levels of attainment). So the logical first step is to see whether the labor force groups that are most likely to participate in work-related education are also the groups that are most likely to have employment-related inducements to participation. If this first analysis supports employment-related inducements as a potential explanation for the observed patterns of participation, the second step is to determine whether these same patterns exist when inducements are absent. If the patterns of participation result mainly from the effects of inducements, then participation rates in activities that do not have these inducements should *not* show the expected patterns. These findings can be examined in the AELL–NHES:2001 by examining (1) participation rates in activities that have employment-related inducements (indicating the proportion of labor force members who have these inducements) and (2) participation rates in activities that do not have these inducements.

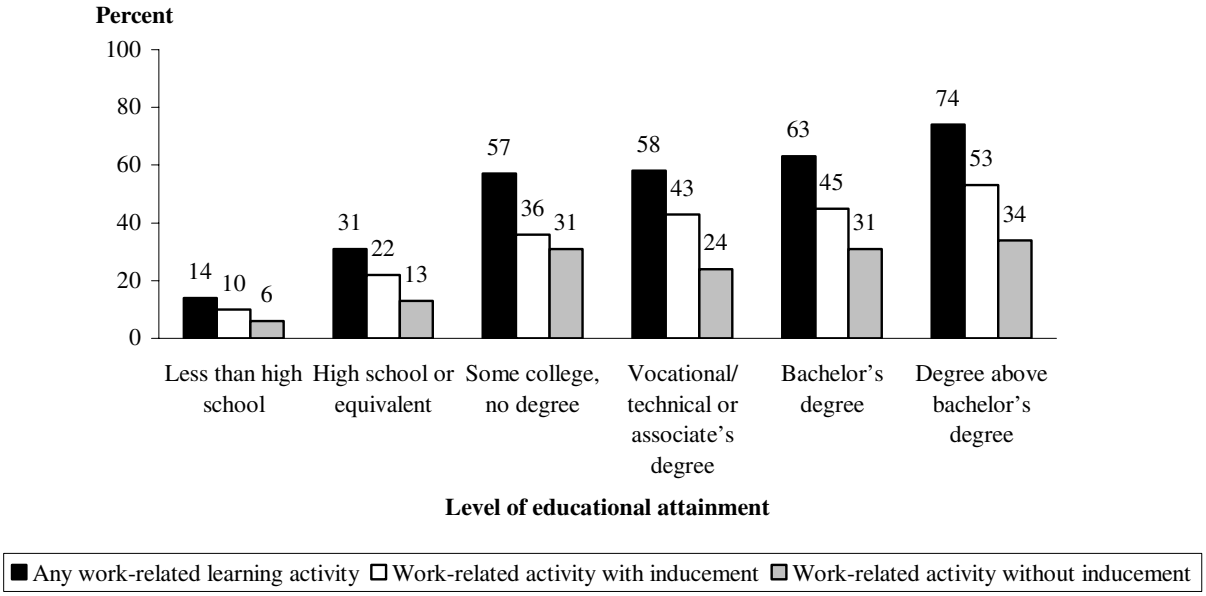
As before, these analyses examine patterns of participation by level of educational attainment, employment status, occupation, and employer size; the findings are plotted in figures 5.5–5.8. These figures tell many stories. First, it was noted above that more labor force members participate in activities that have an inducement to participation than in activities that do not have one. These figures show that this pattern is generally true regardless of level of educational attainment, employment status, employer size, and occupation group.[60]

More importantly, the familiar patterns of participation in work-related education are also evident among labor force members with inducements (i.e., those participating in activities with inducements): those with higher levels of educational attainment, a stronger connection to the labor market, higher status occupations, and larger employers were more likely to have employment-related inducements than their peers with less education, a weaker connection to the labor market, lower status occupations, and smaller employers. These findings suggest that employment-related inducements to participation *can* potentially play a role in creating these same patterns of participation in work-related education.[61] That is, the labor force groups that have higher participation rates may have these rates *at least in part* because of their relatively high rates of occupational credentialing, continuing education, or employer requirements for learning.

[60] There were a few groups for whom no differences were detected in the rates at which they participated in activities with and without employment-related inducements. These groups were those with less than a high school education, those with some college education, the unemployed, and those working for employers with 25–99 employees.

[61] As previously discussed, this conclusion is based on the assumption that all adults who had these inducements participated in work-related learning in response, so that the rates of having inducements among participants accurately reflects the rates of having these inducements among all labor force members.

Figure 5.5. Percentage of labor force members ages 25–64 who participated in work-related education activities overall, activities with employment-related inducements, and activities without employment-related inducements, by adult's level of educational attainment: 2000–01



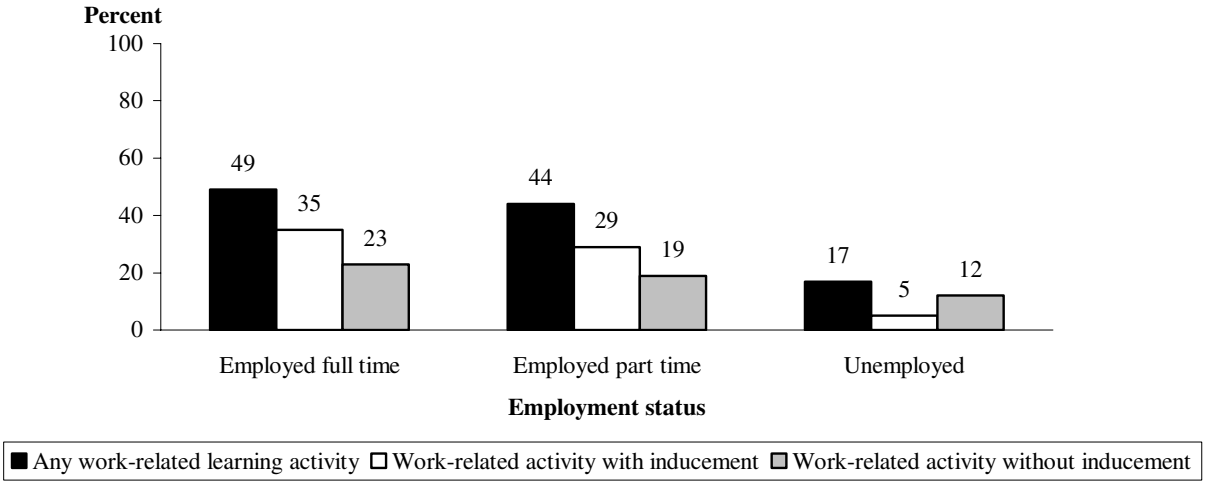
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

The "at least in part" in the previous sentence appears warranted by the third set of findings in these figures: participation rates in activities that do not have employment-related inducements also often follow the familiar patterns by level of educational attainment, employment status, employer size, and occupation group.[62] So, for example, labor force members with higher levels of educational attainment were more likely than those with lower levels of attainment to participate in activities that do not have employment-related inducements. These findings suggest that these inducements to participation do not *fully* determine patterns of participation in work-related education.

In sum, it appears that employment-related inducements such as continuing education requirements, occupational credentialing requirements, and employer requirements for participation may account for some of the observed differences in labor force participation in work-related education by level of educational attainment, employment status, occupation group, and employer size, because the same labor force groups who are relatively likely to participate in

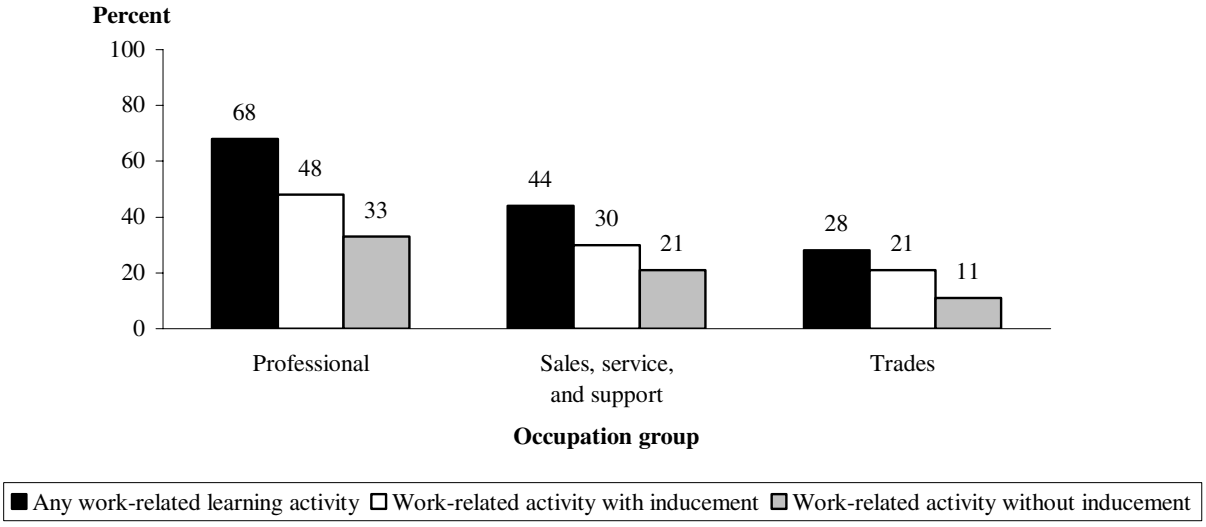
[62] For employment status, the only difference detected was between those employed full time and the unemployed.

Figure 5.6. Percentage of labor force members ages 25–64 who participated in work-related education activities overall, activities with employment-related inducements, and activities without employment-related inducements, by adult's employment status: 2000–01



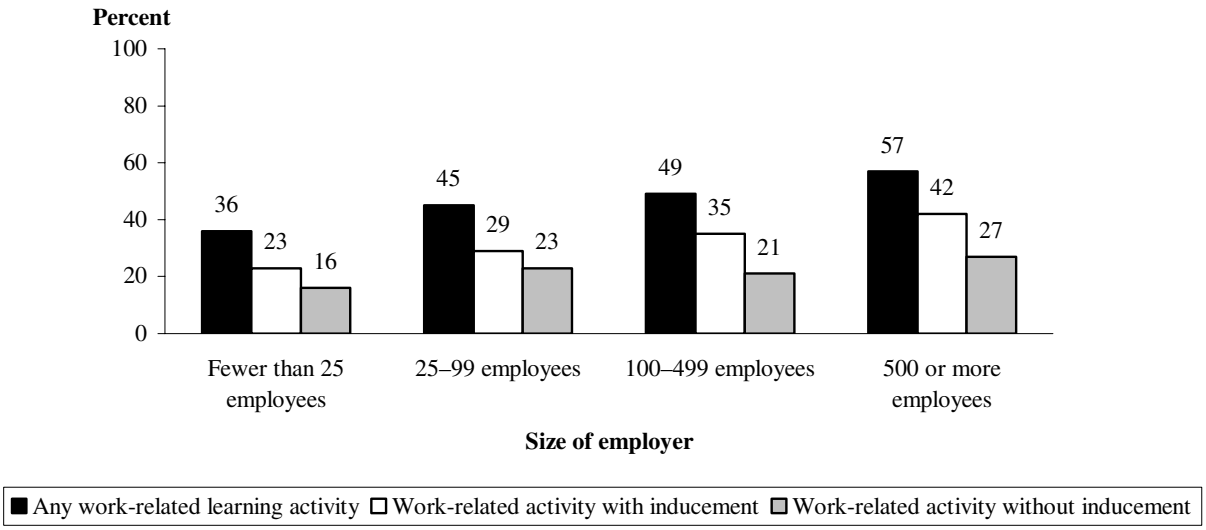
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Figure 5.7. Percentage of labor force members ages 25–64 who participated in work-related education activities overall, activities with employment-related inducements, and activities without employment-related inducements, by adult's occupation group: 2000–01



SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Figure 5.8. Percentage of labor force members ages 25–64 who participated in work-related education activities overall, activities with employment-related inducements, and activities without employment-related inducements, by size of adult's employer: 2000–01



SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

work-related education are also relatively likely to have these inducements. However, the existence of similar participation patterns in activities that do not have inducements suggests that other factors also contribute to the observed patterns—factors that may have more to do with internal motivations or other external motivations that could not be examined in the AELL–NHES:2001.

Chapter 6: Summary

This chapter summarizes the main findings from chapters 2–5, using the original list of analysis questions delineated in chapter 1. The findings follow chapter topics, starting with overall labor force participation in work-related education and then covering the role of postsecondary education in work-related education, employer support for work-related education, and finally, the role of employment-related inducements.

Labor Force Participation in Work-Related Education

Work-related education is an important component of lifelong learning because of its link to economic outcomes for individuals, employers, and society. This report examines participation in work-related education among the group of adults for which such education is of greatest practical and policy concern: labor force participants (including civilian employed and unemployed workers) who are ages 25–64 (i.e., those in the prime working years).

How Prevalent Is Participation in Work-Related Education Among Adults in the Labor Force?

Participation in work-related education is fairly common among adults in the labor force. In 2000–01, 47 percent of these adults participated in some form of work-related education over a 12-month period. This participation rate includes all basic education and other instructional courses that respondents said they had taken for work-related reasons, as well as all apprenticeship, credential training programs, and postsecondary education programs in which they had participated.

In What Types of Activities Do Labor Force Members Participate and From Which Instructional Providers?

Across six major types of work-related learning activities, the most common activity in which labor force members participated was training (nonpostsecondary) courses, with almost 80 percent of these learners taking at least one training course. Fewer work-related learners took postsecondary courses and postsecondary programs (33 percent in either activity), and fewer still (no more than 3 percent) participated in basic education classes, apprenticeship programs, or

credential training programs. The latter programs are small in part because they are targeted to specific groups of adults (those with low levels of educational attainment, those in specific occupational areas) rather than designed to serve adults across a wide range of skill levels and occupational areas. This restriction to targeted populations may also help explain why postsecondary activities are less common than training courses, because participation in postsecondary education is restricted to those with at least a high school education and may not be appropriate for all occupational areas. Training courses, in comparison, tend to be less restrictive in their coverage; they can also be more focused in content than postsecondary courses, making them more attractive as a training tool for employers (who are more likely to require these courses than postsecondary courses).

Business and industry was the most common provider of instruction for labor force members participating in work-related activities, serving almost half (46 percent) of these participants. Postsecondary institutions were also relatively common providers, serving 30 percent of participants. Fewer participants were engaged in activities for which the instructional provider was a professional organization, government agency, or school or school district. The predominance of business and industry as an instructional provider is likely due in part to the role of employers as providers of work-related education. Almost half of all participants (46 percent) were engaged in a learning activity for which their employer was the instructional provider, and 61 percent were engaged in activities for which their employer sponsored the instruction. (See chapter 1 for the definition of "employer-sponsored instruction" used in this report.)

What Are Participants' Reasons for Engaging in These Activities?

Skill enhancement was a common goal among labor force members who were work-related learners. About 80 percent listed the maintenance of existing skills as an instructional goal, and 85 percent listed the acquisition of new skills. (Obviously, many learners have both goals.) About two-thirds of participants also were motivated by what this report calls *employment-related inducements* (seeking an occupational credential, earning CEUs, or meeting an employer requirement for participation). The relatively high level of participation in activities that had an employment-related inducement suggests that these inducements may play a significant role in encouraging participation overall and in determining patterns of participation. Chapter 5 of the report, summarized below in the section on "The Role of Employment-Related Inducements to Participation," addressed this issue.

Reasons for participating often varied by activity. Labor force members who participated in basic skills classes were particularly likely to be seeking to change jobs or get a raise or promotion; at the same time, they were relatively unlikely to have an employment-related inducement

for participation. Participants in postsecondary courses and training courses had similar motivations for participation, although those in postsecondary courses were more likely to be earning CEUs, while those in training courses were more likely to have an employer requirement for participation.

What Are the Main Topics of Instruction Labor Force Members Pursue?

Business was the topic area most often studied by participants in work-related education, followed by health, then computer science; the social sciences/services and education were the least commonly pursued topics, with science and vocational trades falling between. The predominance of business, health, and computer science likely reflects both the prevalence of jobs in these areas within the labor market (particularly for business) and the fast-paced growth of knowledge and technology in these areas (particularly in health and computer science). For those studying health, the demand for skills seems to have been translated into a relatively high level of occupationally related requirements for learning—labor force members studying health topics were more likely than the typical work-related learner to have each of the three employment-related inducements to participation.

Which Labor Force Members Participate in Work-Related Education?

The findings from this study on which labor force members are more likely to participate in work-related education are generally consistent with those from previous research. Among labor force members in 2000–01, participation rates were higher for females than for males, for those ages 25–54 than for those ages 55–64, and for Whites and "other" racial/ethnic groups than for Blacks and Hispanics. Participation rates increased with level of educational attainment, occupational status, and the size of one's employer. Participation rates also were higher among adults who were employed than among the unemployed, and for those in occupations with continuing education requirements than for those in occupations without them.

The Role of Postsecondary Education in Work-Related Education

The AELL–NHES:2001 offers the opportunity to examine the role of postsecondary education within the larger work-related education enterprise. This report shows that postsecondary education plays a substantial role in this enterprise, at least among those in the labor force. As mentioned above, postsecondary institutions were the instructional providers for 30 percent of participants in work-related education, second only to business and industry as a provider source. In addition, one-third of work-related adult education participants were involved in some type of postsecondary activity (a program or course).

To What Extent Do Postsecondary Institutions Provide Various Types of Work-Related Education for Labor Force Members?

Postsecondary institutions provided instruction for a range of work-related education activities. In addition to providing the instruction for all postsecondary programs that labor force members pursue, postsecondary institutions also provided the instruction for most participants in postsecondary courses, and for 17 percent of participants in basic education classes (ESL and adult basic education). Postsecondary institutions also served about 13 percent of apprenticeship participants, based on the incidence of college-credit coursetaking among this group of participants.

Four-year postsecondary institutions were the instructional providers for most participants in work-related postsecondary activities. Overall, 57 percent of participants in these activities had 4-year institutions as their providers, 32 percent had community college (public 2-year institution) providers, and 6 percent had other less-than-4-year institution providers. This distribution reflects the distribution of all students among these institutions, suggesting that none of these institution types serves adults in the labor force to a greater extent than they serve adults in general. It should be noted, however, that this finding could change if the definition of work-related education were changed (particularly if it did not include all postsecondary degree-seeking).

What Types of Postsecondary Education (e.g., Degree Programs, For-Credit Courses) Do Labor Force Members Use for Work-Related Education?

Participants in postsecondary learning activities pursued a broad range of activities, with no one type of postsecondary activity predominating. Both postsecondary programs and postsecondary courses were commonly pursued: about half of postsecondary participants took postsecondary programs, and almost 60 percent took postsecondary courses (some obviously took both). Associate's, bachelor's and master's degree programs were the most common postsecondary programs pursued, with each enrolling one-fifth or more of postsecondary program participants. Among postsecondary course participants, both for-credit and noncredit coursetaking was common (at least 40 percent took each type), although noncredit coursetaking was more common than for-credit coursetaking.

Which Instructional Topics Are Most Likely to Be Pursued Through Postsecondary Education?

The topics that are most commonly studied by labor force members overall—business, health, and computer science—are the same topics most commonly studied by postsecondary participants. However, business and health are more likely to be studied outside of postsecondary

education than within it. Vocational trades were also more likely to be studied outside postsecondary education than within it, while education and social sciences/services were more likely to be studied within postsecondary education.

To What Extent Does Labor Force Members' Postsecondary Education Involve Employer Support, Employer Requirements, or Other Inducements for Participation?

Generally, labor force members in postsecondary education were less likely than other participants (except those in basic skills classes) to receive employer support for their participation, or to have any of the three employment-related inducements for participation. One notable exception was that participants in postsecondary courses sought to earn CEUs at a higher rate than did participants in training courses.

Nonetheless, postsecondary activities—especially postsecondary courses—often involved employer support and employment-related inducements. For example, 81 percent of participants in postsecondary courses reported they had received some form of employer support, as did 46 percent of postsecondary program participants. Similarly, 65 percent of postsecondary course participants had at least one employment-related inducement, as did 29 percent of postsecondary program participants. Looking at specific employment-related inducements shows similar patterns, although postsecondary program and postsecondary course participants differed in which inducement they were most likely to have. Among postsecondary program participants, the most frequent of the three employment-related inducements was seeking an occupational credential (25 percent); among postsecondary course participants, it was earning CEUs (46 percent).

Employer Support for Work-Related Education

The AELL–NHES:2001 provides a unique opportunity to examine employers' role not only in employer-provided training but also in work-related education in general. This advantage, however, is counterbalanced by a disadvantage: the AELL–NHES:2001 cannot reveal to what extent employees in general had employer support available to them, only to what extent employer support was provided to those who participated in work-related education. Therefore, for example, while the survey does show that employer support is widely received by participants, this does not necessarily mean that it is widely available among working adults in general. In addition, as a survey of adults, the AELL–NHES:2001 cannot clearly identify what the literature typically calls "employer-provided training" (i.e., training for one's employees that is organized and paid for by the employer). However, this concept can be approximated with the NHES data, and that approximate measure is referred to here as *employer-sponsored training*.

What Proportion of Work-Related Education Is Employer-Sponsored or Receives Other Employer Support?

Most labor force members who participated in work-related education received employer support for their learning. Overall, 80 percent of these participants were in activities that had some form of employer support. Among participants who were employed when they were learning (concurrently employed participants), 88 percent were in an employer-supported activity. Much of the support that employers provide seems to be due to the provision of employer-sponsored training: about 60 percent of participants reported that they were in employer-sponsored training (67 percent of concurrently employed participants); only one-third of participants were in activities that were not employer sponsored but did receive some other form of employer support.

What Types of Support Do Employers Provide for Work-Related Education?

About three-quarters of participants reported that their employers provided *direct* financial support (pay for tuition, fees, books, or materials), and a similar percentage reported that their employers provided *indirect* financial support (paid time off, workplace space for learning, or provision of instruction). Again, much of this breadth in support appears to be due to the provision of employer-sponsored training, for which employers typically provide both direct and indirect financial support.

Which Labor Force Members and Which Activities Are Most Likely to Receive Employer Support?

Not surprisingly, employers almost always provide support for work-related learning activities that meet some kind of occupational requirement. Among concurrently employed adults who participated in work-related education that had an employment-related inducement, 93 percent received employer support. Employers were particularly likely to provide support for learning activities that they required: 97 percent of concurrently employed participants in employer-required work-related education received employer support. By definition, all apprenticeship participants received employer support. Other than those participants, those most likely to receive employer support included participants in credential training programs, postsecondary courses, and training courses: about 70 to 90 percent of concurrently employed participants in each of these activities received employer support. Employer support was less frequent among those in postsecondary programs and was least frequent among those in basic education classes. Employer support was also more common among concurrently employed participants whose

provider was business and industry or government (vs. those with other providers), and among those studying business (vs. concurrently employed participants in general).

This report also examined the receipt of employer support among participants by level of educational attainment, employment status, employer size, and occupation. For most of these groups, those who were more likely to participate in work-related education also were more likely to receive employer support when they did participate. For example, labor force members with higher levels of educational attainment were more likely to participate in work-related education than those with lower levels of attainment, and the participants with higher levels of educational attainment were also more likely to receive employer support.

How Involved Are Employers in Motivating Participation in Work-Related Education?

How often employers encourage their employees to participate in work-related education in general cannot be determined from the AELL–NHES:2001 data. However, these data do show that labor force members' participation often is accompanied by employer requirements or other encouragement for their participation. Almost 70 percent of participants (and three-quarters of concurrently employed participants) reported that their employer required, suggested, or encouraged their participation in work-related education.

The Role of Employment-Related Inducements to Participation

Participation in work-related education can be internally motivated (motivation that comes from the learner) or externally motivated (motivation that comes from sources outside the learner). As mentioned above, this report examines three types of external motivation that are collectively referred to as *employment-related inducements to participation*—seeking an occupational credential (seeking to get or keep a state, industry, or company certificate or license), earning CEUs, and an employer requirement for participation. As is true for employer support, the AELL–NHES:2001 does not reveal how extensive these inducements were among all labor force members, only among those who participated in work-related education. However, to the extent that all adults who had one of these inducements chose to participate in learning in response to the inducement, these data do reflect the prevalence of these inducements among the labor force in general.

How Extensive Are Employment-Related Inducements Among Labor Force Members Who Participate in Work-Related Education? Which Inducements Are Most Common?

As mentioned above, about two-thirds of work-related education participants had an employment-related inducement to participation, with an employer requirement being the most common: almost half (47 percent) of participants were in an activity that had an employer requirement, compared with 37 percent in an activity taken for an occupational credential and 29 percent in an activity taken to earn CEUs.

In addition, 31 percent of labor force members were in an occupation that had a continuing education requirement. Labor force members in these occupations were more likely than those in occupations without these requirements to participate in work-related education; as a result, 42 percent of work-related education participants were in an occupation that had a continuing education requirement.

Which Activities and Which Labor Force Members Are Most Likely to Have These Inducements?

Participants in apprenticeship programs were the most likely to have any of the three employment-related inducements because they were all defined for this analysis as seeking an occupational credential (i.e., journeyman status). Participants in basic education classes rarely had these inducements, with only 8 percent reporting an employment-related inducement. Between these extremes, training activities were more likely than comparable postsecondary activities to involve employment-related inducements. About three-quarters of participants in credential training programs had an employment-related inducement, compared with 29 percent of postsecondary program participants. Similarly, about three-quarters of training course participants had an employment-related inducement, compared with 65 percent of postsecondary course participants.

In general, the labor force members who have these employment-related inducements tend to be those who are most likely to participate in work-related education—those with more rather than less education, a stronger rather than weaker connection to the labor force, with larger rather than smaller employers, with higher rather than lower status occupations.

What Is the Relationship Between Participation Levels and Employment-Related Inducements?

This question cannot be directly addressed with the AELL–NHES:2001 data. However, one would expect that employment-related inducements should influence participation rates, and the evidence supports this expectation. The effect of continuing education requirements is suggested

by the finding that labor force members in occupations that have these requirements are more likely to participate in work-related education than are those in occupations without these requirements. The findings discussed above also suggest that employment-related inducements help explain which labor force members participate in work-related education, as the labor force members who are more likely to have employment-related inducements to learning are also those who are more likely to participate in work-related education. However, since activities without inducements also show the same participation patterns, employment-related inducements do not appear to fully account for the observed patterns in participation. Future studies that ask both participants and nonparticipants about the various inducements they (do or do not) have for work-related education could help determine the extent to which such inducements account for participation levels and patterns.

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Appendix A: Standard Error Tables

Table A-2.1. Standard errors for the percentage of labor force members ages 25–64 who participated in each type of work-related learning activity, and percentage of participants in each type of work-related learning activity: 2000–01

Type of learning activity	Percent of labor force members	Percent of participants
Total, all activities	0.72	0.00
Postsecondary activities	0.45	0.87
Other (non-postsecondary) activities	0.42	0.83
Basic education class	0.16	0.34
Apprenticeship program	0.19	0.39
Postsecondary program	0.29	0.64
Credential training program	0.10	0.21
Postsecondary course	0.42	0.83
Training course	0.64	0.80

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-2.2. Standard errors for the percentage of work-related education participants ages 25–64 served by each type of instructional provider, by type of learning activity: 2000–01

	Type of instructional provider						
Type of activity	Business and industry	Post-secondary institution	Profes-sional or-ganization	Govern-ment agency	Other school or school district	Other provider	Provider is also employer
Total, all activities	1.10	0.87	0.82	0.72	0.62	0.77	1.01
Basic education class	4.24	4.70	1.89	1.34	7.83	2.76	4.29
Postsecondary program	†	0.00	†	†	†	†	†
Credential training program	6.52	†	5.84	4.35	6.89	3.19	†
Postsecondary course	1.15	1.50	0.89	1.12	0.52	†	2.16
Training course	1.26	†	1.02	0.84	0.65	0.92	1.16

† Not applicable.

NOTE: By definition, all postsecondary programs have postsecondary institutions as their instructional providers.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-2.3. Standard errors for the percentage of concurrently employed work-related education participants ages 25–64 who received any employer support, by type of learning activity: 2000–01

Type of learning activity	Any employer support
Total, all activities	0.76
Basic education class	6.09
Apprenticeship program	0.00 [1]
Postsecondary program	2.73
Credential training program	6.98
Postsecondary course	1.82
Training course	0.55

[1] For this report, all apprenticeship program participants were defined as receiving employer support.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-2.4. Standard errors for the percentage of work-related education participants ages 25–64 with each goal or inducement for participation, by type of learning activity: 2000–01

					Employment-related inducement			
Type of learning activity	To get a new job with a different employer	To help get a raise or promotion	To maintain or improve existing skills	To learn new skills or methods	Any employment-related inducement	To seek an occupational credential	Continuing education units (CEUs)	Employer required participation
Total, all activities	†	†	0.75	0.86	0.97	1.04	0.98	0.84
Basic education class	6.37	7.98	† [1]	0.00 [2]	3.73	† [1]	† [1]	3.73
Apprenticeship program	†	†	† [1]	0.00 [2]	0.00 [2]	0.00 [2]	† [1]	† [1]
Postsecondary program	†	†	† [1]	0.00 [2]	2.08	2.00	† [1]	1.49
Credential training program	†	†	† [1]	0.00 [2]	5.57	6.39	† [1]	6.55
Postsecondary course	1.54	2.40	1.09	2.55	2.55	2.40	2.25	2.04
Training course	0.63	0.87	0.54	0.84	0.98	1.28	1.19	0.89

† Not applicable.

[1] Responses imputed to be "no" in every case; see appendix B for details on imputations.

[2] Responses imputed to be "yes" in every case; see appendix B for details on imputations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-2.5. Standard errors for the percentage of work-related education participants ages 25–64 who studied each topic of instruction, by type of learning activity: 2000–01

Type of learning activity	Business	Computer science	Education	Health	Science	Social sciences and services	Vocational trades	Other topic areas
Apprenticeship program	4.05	†	1.17	0.89	2.01	0.46	5.07	1.34
Postsecondary program	2.18	1.61	1.35	1.63	1.48	1.27	1.35	1.54
Credential training program	5.89	6.84	0.38	4.59	4.69	0.76	5.91	5.02
Postsecondary course	2.10	2.03	1.13	1.80	1.41	0.93	1.29	1.42
Training course	1.29	0.91	0.53	1.12	0.62	0.63	0.83	0.73

† Not applicable.

NOTE: Basic education classes are excluded from this table because their instructional topics are all "other" by definition.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-2.6. Standard errors for the percentage of labor force members ages 25–64 who participated in work-related education, by sociodemographic and educational characteristics: 2000–01

Characteristic	Percent participating
Total, all labor force members	0.72
Sex	
Male	0.97
Female	0.99
Race/ethnicity	
White, non-Hispanic	0.77
Black, non-Hispanic	2.20
Other, non-Hispanic	3.68
Hispanic	2.17
Age	
25–34	1.51
35–44	1.24
45–54	1.49
55–64	1.85
Level of educational attainment	
Less than high school	1.85
High school or equivalent	1.24
Some college, no degree	1.64
Vocational/technical diploma or associate's degree	2.34
Bachelor's degree	1.40
Degree above bachelor's	1.67

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-2.7. Standard errors for the percentage of labor force members ages 25–64 who participated in work-related education, by labor force characteristics: 2000–01

Characteristic	Percent participating
Total, all labor force members	0.72
Employment status	
Employed full time	0.74
Employed part time	2.90
Unemployed	2.84
Occupation	
Professional	1.22
Sales, service, and support	1.18
Trades	1.20
Size of employer	
Fewer than 25 employees	1.38
25–99 employees	2.42
100–499 employees	2.00
500 or more employees	1.09
Whether have continuing education requirement	
Yes	1.35
No	0.83

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-F2.1. Standard errors for the percentage of work-related education participants ages 25–64 with each type of instructional provider, and percentage for whom provider is also the employer: 2000–01

Instructional provider	Percent
Business and industry	1.10
Postsecondary institution	0.87
Professional organization	0.82
Government agency	0.72
Other school or school district	0.62
Other provider	0.77
Provider is also employer	1.01

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-F2.2. Standard errors for the percentage of work-related education participants ages 25–64 who studied each topic of instruction: 2000–01

Topic of instruction	Percent
Business	1.16
Health	0.90
Computer science	0.87
Vocational trades	0.76
Science	0.59
Education	0.47
Social sciences and services	0.58
Other topic areas	0.74

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.1. Standard errors for the percentage of work-related education participants ages 25–64 who participated in each type of postsecondary activity, for all participants, postsecondary program participants, and postsecondary course participants: 2000–01

Type of postsecondary activity	All participants	Postsecondary program participants	Postsecondary course participants
Total, any postsecondary activity	0.87	†	†
Postsecondary program	0.64	0.00	†
Vocational/technical diploma program	0.26	1.53	†
Associate's degree program	0.40	2.18	†
Bachelor's degree program	0.40	2.42	†
Master's degree program	0.33	1.85	†
Ph.D. or professional degree program	0.19	1.20	†
Postbachelor's, postmaster's, or postdoctoral certificate	0.22	1.30	†
Other degree program	0.19	1.17	†
Postsecondary course	0.83	†	0.00
For-credit course	0.49	†	2.11
Noncredit course	0.63	†	1.97

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.2. Standard errors for the percentage of work-related education participants ages 25–64 with each type of instructional provider, by type of postsecondary activity: 2000–01

	Postsecondary institution					
Type of postsecondary activity	Total, all post-secondary institutions	4-year post-secondary institution	Community college (2-year public institution)	Other less-than-4-year institution	Business or industry	Other provider
Total, any postsecondary activity	0.87	1.76	2.00	0.92	0.66	0.93
Postsecondary program	0.00	2.23	2.15	1.19	†	†
Postsecondary course	1.50	2.18	2.82	1.38	1.15	1.61

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.3. Standard errors for the percentage of work-related education participants ages 25–64 who studied each topic of instruction, by type of learning activity: 2000–01

Type of learning activity	Business	Computer science	Education	Health	Science	Social sciences and services	Voca-tional trades	Other topic areas
Nonpostsecondary activity	1.25	0.89	0.50	1.07	0.60	0.60	0.88	0.79
Postsecondary activity (total)	1.62	1.51	0.84	1.33	1.03	0.89	0.98	1.06
Postsecondary program	2.18	1.61	1.35	1.63	1.48	1.27	1.33	1.54
Postsecondary course	2.10	2.03	1.13	1.80	1.41	0.93	1.29	1.42

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.4. Standard errors for the percentage of work-related education course participants ages 25–64 who studied specific topics of instruction in business and in health, by type of course: 2000–01

	Business topics				Health topics				
Type of course	Total, all business	Business manage-ment	Business support	Other business	Total, all health	Health sciences	Allied health	Personal health	Other health
Postsecondary course	2.10	1.60	1.77	0.93	1.80	0.61	1.06	1.78	0.41
Training course	1.29	0.98	0.87	0.67	1.12	0.52	0.68	0.95	0.29

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.5. Standard errors for the percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by type of postsecondary activity: 2000–01

Type of postsecondary activity	Total, any employment-related inducement	Seek occupational credential	Earn continuing education units	Employer required participation
Postsecondary program	2.08	2.00	†[1]	1.49
Postsecondary course (total)	2.55	2.40	2.25	2.04
For-credit course	3.16	3.43	2.97	3.40
Noncredit course	3.00	2.91	2.70	2.62

[1] Responses logically imputed to be "no" in every case; see appendix B for details on imputations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.6. Standard errors for the percentage of work-related education participants ages 25–64 in postsecondary programs who were seeking an occupational credential, by type of postsecondary program: 2000–01

Type of postsecondary program	Percent seeking occupational credential
Total, all postsecondary programs	2.00
Vocational/technical diploma or associate's degree program	3.73
Bachelor's degree program	2.90
Master's, Ph.D., or professional degree program	3.93
Other degree, diploma, or certificate program	4.65

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.7. Standard errors for the percentage of work-related education participants ages 25–64 who had a postsecondary institution as their provider, by type of learning activity: 2000–01

Type of learning activity	Percent with postsecondary provider
Total, all activities	0.86
Basic education class	4.70
Apprenticeship program	3.56
Postsecondary program	0.00 [1]
Credential training program	† [2]
Course (any type)	0.84
Postsecondary course	1.50
Training course	† [2]

† Not applicable.

[1] By definition, all postsecondary programs had postsecondary providers.

[2] By definition, all credential training programs and training courses did not have postsecondary providers.

NOTE: Apprenticeship participants who reported that their apprenticeship involved courses taken for college credit were counted as having a postsecondary provider.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.8. Standard errors for the percentage of work-related education participants ages 25–64 who studied each topic of instruction, by instructional provider: 2000–01

Instructional provider	Business	Computer science	Education	Health	Science	Social sciences and services	Vocational trades	Other topic areas
Postsecondary provider	1.68	1.59	0.92	1.42	1.06	0.95	0.96	1.12
Other provider	1.30	0.86	0.48	1.00	0.57	0.56	0.79	0.75

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.9. Standard errors for the percentage of work-related education participants ages 25–64 who had each type of employment-related inducement to participation, by instructional provider: 2000–01

Instructional provider	Total, any employment-related inducement	Seek occupational credential	Earn continuing education units	Employer required participation
Postsecondary provider	1.93	1.66	1.29	1.56
Other provider	1.00	1.32	1.15	1.02

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-3.10. Standard errors for the percentage of work-related education participants ages 25–64 in 4-year institutions and in community colleges (public 2-year institutions) who participated in each type of activity, studied each topic, and had each employment-related inducement to participation: 2000–01

Instructional characteristic	4-year institution	Community college
Type of learning activity		
Basic education class	0.13	1.06
Postsecondary program	1.96	3.12
Postsecondary course	2.03	2.97
Topic of instruction		
Business	2.03	2.67
Computer science	1.62	2.46
Education	1.47	0.80
Health	1.91	2.13
Science	1.44	1.50
Social sciences and services	1.37	0.82
Vocational trades	0.72	2.16
Other topic areas	1.41	2.22
Employment-related inducement		
Seek occupational credential	2.16	3.03
Earn continuing education units	1.67	2.57
Employer requirement	1.68	2.70

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-4.1. Standard errors for the percentage of all work-related education participants ages 25–64 and of concurrently employed participants who received each type of employer involvement or support: 2000–01

Type of employer involvement or support	Percent of all participants	Percent of concurrently employed participants
Any employer involvement or support	0.66	0.57
Employer involvement:		
Employer required, suggested, or encouraged participation	0.82	0.84
Employer support:		
Employer provided any support	0.77	0.76
Employer provided direct financial support	0.90	0.87
Paid tuition and fees	0.95	0.97
Paid for books and materials	0.88	0.89
Employer provided indirect financial support	0.75	0.77
Paid work hours	1.02	1.05
Provided workplace space	0.94	1.05
Provided instruction	1.01	1.01

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-4.2. Standard errors for the percentage of all work-related education participants ages 25–64 and of concurrently employed participants who received employer-sponsored instruction or other forms of employer support: 2000–01

Type of employer instruction or support	Percent of all participants	Percent of concurrently employed participants
Employer sponsored instruction	0.94	1.01
Employer did not sponsor instruction, but:		
Provided direct financial support	0.93	1.02
Paid tuition and fees	0.94	1.04
Paid for books and materials	0.91	1.00
Provided indirect financial support	0.84	0.94
Paid work hours	0.78	0.85
Provided workplace space	0.79	0.87
Provided instruction	0.60	0.66
Provided direct or indirect support	1.02	1.13

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-4.3. Standard errors for the percentage of concurrently employed work-related education participants ages 25–64 who had each type of employer support, by whether participant had each employment-related inducement to participation: 2000–01

	Sought occupational credential		Earned continuing education units		Employer required participation	
Type of employer support	Yes	No	Yes	No	Yes	No
Employer sponsored instruction	1.87	1.23	2.10	1.10	1.33	1.32
Employer did not sponsor instruction but provided direct or indirect support	1.82	1.37	2.33	1.18	1.39	1.40
Employer sponsored or provided other support	1.10	0.89	1.15	0.96	0.46	1.02

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-4.4. Standard errors for the percentage of concurrently employed work-related education participants ages 25–64 who received each type of employer support, by characteristic of activity: 2000–01

Characteristic of activity	Any employer support	Employer sponsored	Not employer sponsored, other support
Total , concurrently employed participants	0.76	1.01	1.14
Type of learning activity			
Basic education class	6.09	4.05	6.09
Apprenticeship program	0.00 [1]	0.00 [1]	† [2]
Postsecondary program	2.73	† [2]	2.73
Credential training program	6.98	8.84	7.00
Postsecondary course	1.82	† [2]	1.82
Training course	0.55	1.00	1.18
Provider of instruction			
Business and industry	0.59	1.26	1.30
Postsecondary institution	2.08	† [2]	2.08
Professional organization	1.50	2.10	2.17
Government agency	0.92	2.15	2.37
Other provider	2.40	2.14	1.21
Topic of instruction			
Business	0.77	0.95	1.36
Computer science	1.58	2.54	2.72
Education	1.88	2.55	3.22
Health	1.36	2.27	2.10
Science	2.07	2.85	3.26
Social sciences/services	5.41	4.51	4.80
Vocational trades	1.83	2.64	2.78
Other topic areas	2.52	2.31	2.22

† Not applicable.

[1] Responses logically imputed to be "yes" in every case; see appendix B for details on imputations.

[2] Responses logically imputed to be "no" in every case; see appendix B for details on imputations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the Household Education Surveys Program (AELL–NHES:2001).

Table A-4.5. Standard errors for the percentage of work-related education participants ages 25–64 who received each type of employer support, by participants' educational and labor force characteristics: 2000–01

Characteristic	Any employer support	Employer sponsored	Not employer sponsored, other support
Total, all participants	0.77	0.94	1.02
Level of education attainment			
Less than high school	7.01	6.55	5.51
High school or equivalent	1.76	2.27	2.10
Some college, no degree	1.96	2.26	2.41
Vocational/technical diploma or associate's degree	1.87	2.90	2.90
Bachelor's degree	1.34	1.72	1.66
Degree above bachelor's	1.94	1.87	2.50
Employment status			
Employed full time	0.78	0.90	1.09
Employed part time	3.44	4.05	2.74
Unemployed	1.96	1.96	†
Size of employer			
Fewer than 25 employees	2.19	2.47	1.85
25–99 employees	2.86	3.75	3.63
100–499 employees	2.05	2.80	2.88
500 or more employees	0.86	1.44	1.36
Occupation			
Professional	1.00	1.39	1.44
Sales, service, and support	1.61	1.78	1.75
Trades	2.10	2.80	2.81

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the Household Education Surveys Program (AELL–NHES:2001).

Table A-5.1. Standard errors for the percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by type of learning activity: 2000–01

Type of learning activity	Any inducement	Seek occupational credential	Earn continuing education units	Employer requirement
Total, all activities	0.97	1.04	0.98	0.84
Basic education class	3.73	† [1]	† [1]	3.73
Apprenticeship program	0.00 [2]	0.00 [2]	† [1]	†
Postsecondary program	2.08	2.00	† [1]	1.49
Credential training program	5.57	6.39	† [1]	6.55
Postsecondary course	2.55	2.40	2.25	2.04
Training course	0.98	1.28	1.19	0.89

[1] Responses logically imputed to be "no" in every case; see appendix B for details on imputations.

[2] Responses logically imputed to be "yes" in every case; see appendix B for details on imputations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-5.2. Standard errors for the percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by instructional provider: 2000–01

Instructional provider	Any inducement	Seek occupational credential	Earn continuing education units	Employer requirement
Total, all activities	0.97	1.04	0.98	0.84
Business and industry	1.30	1.52	1.47	1.41
Postsecondary institution	1.95	1.70	1.29	1.56
Professional organization	2.29	2.26	2.25	1.98
Government agency	1.80	2.79	2.64	2.15
Other	2.06	1.42	1.28	1.84

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-5.3. Standard errors for the percentage of work-related education participants ages 25–64 who had each employment-related inducement to participation, by topic of instruction: 2000–01

Topic of instruction	Any inducement	Seek occupational credential	Earn continuing education units	Employer requirement
Total, all activities	0.97	1.04	0.98	0.84
Business	1.32	1.34	1.42	1.31
Computer science	2.60	2.12	2.13	2.20
Education	3.39	3.47	2.99	2.80
Health	1.63	2.00	2.00	1.70
Sciences	3.01	2.72	2.49	2.83
Social sciences and services	4.36	4.96	3.78	5.32
Vocational trades	2.87	3.24	2.11	3.10
Other	2.70	2.32	1.59	2.29

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-5.4. Standard errors for the percentage of labor force members ages 25–64 who participated in a work-related education activity that had an employment-related inducement, by type of inducement: 2000–01

Employment-related inducement	Percent of labor force members
Any inducement	0.62
Seeking occupational credential	0.55
Earning continuing education units	0.48
Employer requirement for participation	0.52

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table A-F5.1. Standard errors for the percentage of labor force members ages 25–64 who participated in a work-related education activity and who were in an occupation that had continuing education requirements, by various characteristics of adults: 2000–01

Characteristic	Percent who participated in work-related learning activity	Percent in an occupation with continuing education requirements
Total, all labor force members	0.72	0.74
Education attainment		
Less than high school	1.85	2.04
High school or equivalent	1.24	1.34
Some college, no degree	1.64	1.71
Vocational/technical diploma or associate's degree	2.34	2.13
Bachelor's degree	1.40	1.59
Degree above bachelor's	1.67	2.04
Labor force status		
Employed full time	0.74	0.79
Employed part time	2.90	2.26
Unemployed	2.84	3.79
Size of employer (employed adults only)		
Fewer than 25 employees	1.38	1.18
25–99 employees	2.42	1.91
100–499 employees	2.00	2.10
500 or more employees	1.09	1.09
Occupation (employed adults only)		
Professional	1.22	1.18
Sales, service, and support	1.18	1.25
Trades	1.20	1.37

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001)

Table A-F5.2. Standard errors for the percentage of labor force members ages 25–64 who participated in work-related education activities overall, activities with employment-related inducements, and activities without employment-related inducements, by various characteristics of adults: 2000–01

Characteristic	Work-related learning activity		
	Total, all activities	With employment-related inducement	Without employment-related inducement
Total, all labor force members	0.72	0.62	0.59
Education attainment			
Less than high school	1.85	1.48	1.24
High school or equivalent	1.24	1.07	0.76
Some college, no degree	1.64	1.91	1.77
Vocational/technical diploma or associate's degree	2.34	2.40	1.98
Bachelor's degree	1.40	1.44	1.38
Degree above bachelor's	1.67	2.27	1.72
Labor force status			
Employed full time	0.74	0.66	0.63
Employed part time	2.90	2.22	1.87
Unemployed	2.84	1.38	2.58
Size of employer (employed adults only)			
Fewer than 25 employees	1.38	1.24	0.97
25–99 employees	2.42	1.92	2.24
100–499 employees	2.00	1.67	1.59
500 or more employees	1.09	1.03	1.01
Occupation (employed adults only)			
Professional	1.22	1.16	1.10
Sales, service, and support	1.18	1.07	1.05
Trades	1.20	1.15	0.86

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

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Appendix B: Technical Notes and Methodology

The data in this report come from the Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001). This appendix provides more detail on the technical features of this survey and on the analyses conducted for this report. Included here is information on survey response rates, data reliability, weighting procedures, variables created for the analyses (i.e., derived variables), and statistical testing procedures.

The 2001 National Household Education Surveys Program

The 2001 National Household Education Surveys Program (NHES:2001) is a set of telephone surveys that were conducted by the U.S. Department of Education's National Center for Education Statistics (NCES) in 2001; the AELL–NHES:2001 is one survey in this set. Data collection for the AELL–NHES:2001 took place from January 4 through April 14, 2001. The sample, which is nationally representative of all civilian, noninstitutionalized persons in the 50 states and the District of Columbia, was selected using random digit dialing (RDD) methods. The data were collected using computer-assisted telephone interview (CATI) technology. This section provides a brief description of the study methodology; for a more complete discussion, see the *National Household Education Surveys of 2001: Data File User's Manual, Volumes I and IV* (U.S. Department of Education 2003b, 2003c).

In the AELL–NHES:2001, a set of household screening items was administered to an adult member of the household. Household members were enumerated, the adult education participation status of each adult (age 16 or older, not in high school) was collected, and the sample of adults was selected according to the sample design. The key determinants of the sample size were the requirements to detect change from previous estimates of participation in adult education activities overall and participation by educational activity (using data from the 1995 and 1999 NHES Adult Education Surveys [AE–NHES:1995 and 1999]). Estimation of participation by race/ethnicity and by educational attainment (i.e., less than high school completion or high school completion and higher) was also considered in the design of the sampling approach; further details appear in U.S. Department of Education (2003b). The sample included both participants and nonparticipants in educational activities.

In the AELL–NHES:2001 interview, information was collected from 10,873 adults about their demographic characteristics, participation in educational activities in the previous 12 months, and labor force participation. The only person who could respond to this interview was the sampled adult him/herself. Multiple attempts were made to complete interviews with persons not available at the time of selection, and interviews were conducted in both English and Spanish. This report is based on a subset of the total interview sample, consisting of 6,777 adults ages 25–64 who were in the labor market (employed or looking for work) in the 12 months preceding the survey. The number of work-related education participants in the analysis sample was 3,776. These numbers correspond to an estimated 123,430,818 adults ages 25–64 in the labor market (62 percent of the weighted AELL–NHES:2001 survey sample) and an estimated 58,420,067 work-related education participants (47 percent of the weighted analysis sample).

Comparison of the AELL–NHES:2001 With Previous NHES Adult Education Surveys

To understand how this report builds on past reports that use the NHES to examine adult education, one first needs some background on the NHES Adult Education Surveys conducted in 1991, 1995, 1999, and 2001 (AE–NHES:1991, 1995, and 1999 and AELL–NHES:2001).[1] All the NHES Adult Education Surveys ask adults about their participation in various types of adult education activities during the 12 months preceding the survey. The surveys define adult education to include both voluntary and required formal learning activities (activities for which there is an instructor). The 2001 survey includes an additional section about participation in informal adult learning activities (not included in previous survey years); this section was not used in this report and thus is not discussed further.

The 1995 and 1999 surveys asked about participation in six types of formal learning activities, in the following order:[2] English as a second language (ESL); adult basic education classes, including General Educational Development (GED) preparation classes and other adult high school completion programs; credential programs; apprenticeship programs; job- or career-related courses; and other (personal development) courses. In both years, respondents who participated in any education activity were asked to provide one main reason for their participation in each activity. These reasons were coded during the interview into six or seven categories that varied slightly by survey section. For each activity, however, two of the coded reasons can be characterized as work-related: (1) to improve, advance, or keep up-to-date on a current job; and (2) to train for a new job or career. All other reasons (e.g., to improve basic reading, writing, or

[1] A copy of the questionnaires used in each of these surveys is available on the NCES website at http://nces.ed.gov/nhes/questionnaires.asp.

[2] The 1991 survey asked about (in order): full-time postsecondary education; adult basic skills programs; English as a second language (ESL) programs; part-time postsecondary education; and other courses or formal instruction.

mathematics skills; for a personal, family, or social reason) can be characterized as nonwork-related.

The AELL–NHES:2001 largely follows the structure of the 1995 and 1999 surveys, with two important exceptions. After collecting information on ESL and adult basic education classes, the 2001 instrument asks respondents to list all college credential programs and, in a separate section, all postsecondary vocational programs; these latter two sections combined correspond to the "credential" section from past NHES surveys. The survey then asks about apprenticeship programs, followed by a section on all formal courses taken in the past year (combining the "job/career courses" and "other courses" sections from previous surveys). These formal courses are rostered and then divided (by the respondent) into those taken mainly for work-related reasons, those taken mainly for personal interest, and those taken for both reasons equally. A subsequent survey section then focuses on the courses taken mainly for work-related reasons (including courses taken for work and personal reasons equally), followed by a section on the courses taken mainly for personal reasons. This new format eliminates a problem with the earlier surveys, in which the survey section and respondents' reported reasons for taking courses did not always match, making it difficult to determine which courses should be counted as work related.

The AELL–NHES:2001 has a number of other advantages over its predecessors. These advantages include the following new questions in the work-related courses section that ask

- whether courses were taken for college credit or for continuing education units (CEUs), permitting a better analysis of the role of postsecondary education and continuing education requirements in work-related education;
- whether the employer encouraged or suggested that the respondent take the course;
- whether the course was taken for a state, industry, or company certificate or license; and
- the size of the respondent's employer (a known correlate of the likelihood of receiving employer-provided training).

The survey also includes a better series of questions that can be used to define "employer-sponsored" courses and more clearly restricts the postsecondary education section of the survey to programs that lead to a college credential. (Past surveys had included other vocational training programs in this section.) Finally, previous surveys asked respondents who had a postsecondary institution as a provider to report the type of institution that provided the instruction. The 2001 survey instead collects the name and location of the institution; coders then add the institution's IPEDS[3] code to the data file, so that IPEDS data can be used to determine institution type. While

[3] IPEDS is the acronym for the NCES Integrated Postsecondary Education Data System. This system collects administrative records information from all postsecondary institutions in the country.

analytically more cumbersome, this process provides more valid information on institution type than did self-reported data.

Course Rostering

To minimize interview time and respondent burden, the AELL–NHES:2001 survey asked detailed questions about a sample of learning activities—up to three college programs, two vocational programs, four work-related courses, and two personal development courses (courses taken mainly for personal reasons)—rather than all activities in which adults participated. This restricted set of questions covers 100 percent of reported college credential programs, 100 percent of vocational credential programs, and approximately 92 percent of all work-related courses respondents reported having taken.[4] Because not all learning activities were accounted for in the detailed questioning, it is possible that some respondents who failed to report an event (such as the receipt of employer support) may have in fact experienced the event for an activity that was not asked about in detail. However, given the relatively high level of coverage, this underestimation bias is assumed to be trivial.

Response Rates

In the AELL–NHES:2001, screeners were completed with 48,385 households, with a screener response rate of 69.2 percent. Of the 13,858 adults sampled for the survey, 77.2 percent or 10,873 adults completed the interview. Thus, the overall response rate for the AELL–NHES:2001 interview is 53.4 percent (the product of the screener response rate and the survey response rate).

Item nonresponse (i.e., the failure to complete some items in an otherwise completed interview) was very low for most items in the AELL–NHES:2001. The item response rates for most variables in this report are 98 percent or higher. As in many surveys, item response rates are lower for questions concerning salary or household income. In addition, items concerning the third college degree program (e.g., CRCERT3, CRPROV3, CRPTFT3, CRCRSNU3, etc.) are relatively low. These items pertained to few respondents (eight cases), so that a single nonresponse under these circumstances had a large effect on the item response rates. Items with missing data were imputed using a hot-deck procedure in which cells were formed that contain cases with similar characteristics, and a donor value was used to impute the missing value.[5] The estimates included in this report are based on the imputed data.

[4] Personal development courses are not examined in this report, so the sampling of these courses is not relevant for this study.

[5] Additional information about hot-deck imputation can be found in Rao and Shao (1992).

A nonresponse bias analysis was not done for AELL–NHES:2001 because such an analysis had been done for AE–NHES:1999, where no nonresponse bias had been found. The nonresponse bias analysis for the 1999 survey was deemed sufficient for the 2001 survey because the differences in unit nonresponse rates by interviewee characteristics were similar and because the 1999 and 2001 survey administrations were very similar in terms of their target populations, contact procedures, and salience. The 1999 nonresponse bias analysis involved an examination of unit response rates as a whole and for various subgroups, an analysis to determine characteristics that are associated with screener nonresponse, an examination of the potential usefulness of household-level data from an external source in reducing nonresponse bias, and a comparison of estimates based on adjusted and unadjusted weights. For further information on this bias analysis, the reader is referred to chapter 5 of the 1999 NHES methodology report (Nolin et al. 2000).

Data Reliability

Estimates produced using data from the AELL–NHES:2001 are subject to two types of errors: nonsampling errors and sampling errors. Nonsampling errors are errors made in the collection and processing of data. Sampling errors occur because the data are collected from a sample rather than the whole population.

Nonsampling Errors

Nonsampling error is the term used to describe variations in the estimates that may be caused by population coverage limitations and data collection, processing, and reporting procedures. The sources of nonsampling errors are typically problems like unit and item nonresponse, respondents' differing interpretations of the meaning of the questions, response differences related to the particular time the survey was conducted, and mistakes in data preparation.

In general, it is difficult to identify and estimate either the amount of nonsampling error or the bias caused by this error. This is particularly problematic in telephone surveys because so little is known about the sampled telephone numbers with which contact has not been made. Another important source of nonsampling error for a telephone survey is the failure to include in the sample persons who do not live in households with telephones. In the United States, 95 percent of all adults ages 16 and older live in households with telephones (U.S. Department of Commerce 1999). Estimation procedures were used to help reduce the bias in the estimates associated with excluding the 5 percent of adults who do not live in households with telephones. Another source of noncoverage error for the AELL–NHES:2001 is related to estimates of ESL participation. The AELL–NHES:2001 interviews were conducted in English and Spanish, and persons

who did not speak either of these languages were not interviewed. As a result, the survey data likely underrepresent participation in ESL programs.

Another potential source of nonsampling error is response bias. Response bias occurs when respondents systematically misreport information in a study (intentionally or unintentionally). There are many different forms of response bias. One of the best known is social desirability bias, which occurs when respondents give what they believe is the response they "should" give. For example, surveys that ask about whether respondents voted in the most recent election typically obtain a higher estimate of the number of people who voted than do voting records (Presser, Traugott, and Traugott 1990). Although response bias may affect the accuracy of overall estimates, it does not necessarily invalidate other results from a survey. If there are no systematic differences among specific groups under study in their tendency to give socially desirable responses, then comparisons of the different groups will accurately reflect differences among the groups.

Sampling Errors

The sample of telephone households selected for the AELL–NHES:2001 is just one of the many possible samples that could have been selected. Therefore, estimates produced from the AELL–NHES:2001 sample may differ from estimates that would have been produced from other potential samples. This type of variability is called sampling error because it arises from using a sample of households with telephones, rather than all households with telephones.

The standard error is a measure of the variability due to sampling when estimating a statistic. Standard errors can be used as a measure of the precision expected from a particular sample. The probability that a sample estimate would differ from the population parameter obtained from a complete census count by less than 1 standard error is about 68 percent. The chance that the difference would be less than 1.65 standard errors is about 90 percent, and that the difference would be less than 1.96 standard errors, about 95 percent. These standard errors and precision estimates can be used to produce confidence intervals. For example, an estimated 47.3 percent of labor force members ages 25–64 participated in work-related education in the 12 months before the administration of the survey, and this figure has an estimated standard error of 0.45. Therefore, the estimated 95 percent confidence interval for this statistic is 46.4 to 48.2 percent ($47.3 \pm 1.96 \times 0.45$). That is, in 95 out of 100 samples from the survey population, the estimated participation rate should fall between 46.4 and 48.2 percent. Standard errors for all the estimates in the tables and figures of this report are presented in appendix A.

To minimize both sampling and nonsampling errors, the estimates in this report are based on observations that were weighted using the probabilities of selection of the respondents and other weighting adjustments to account for nonresponse and coverage bias. Person (FAWT) and replicate weights (FAWT1–FAWT80) were used for all analyses. These weights were developed to produce unbiased and consistent estimates of U.S. Census Bureau national totals. In addition, special procedures for estimating the standard errors of the estimates were used to account for the survey's complex sample design. Complex sample designs result in data that violate some of the assumptions that are required to properly estimate standard errors and thus to assess the statistical significance of results. Frequently, the standard errors of the estimates from a complex sample design are larger than would be expected if the sample were a simple random sample, as is assumed for traditional statistical testing. To compute approximately unbiased estimates of the standard errors, a jackknife replication method was used to compute the standard errors for all estimates in this report.

Derived Variables

The majority of the variables used in this report are on the AELL–NHES:2001 public-use and restricted-use data files. Many variables, however, were created specifically for this analysis from the existing variables on the data files. This section describes the construction of these derived variables. The derived variables appear in lower case text and the original data file variables appear in upper case text.

Demographic Characteristics

Educational Attainment (edlevel)

Respondents' level of educational attainment was obtained by combining information on the highest grade attended (IBGRADE) and the receipt of a high school diploma or GED (IBDIPL). The response categories for this derived variable are as follows:

- less than high school;
- high school diploma or equivalent;
- some college, no degree;
- vocational/technical diploma or associate's degree;
- bachelor's degree; and
- degree above bachelor's.

Employment Status (laborfr)

Respondents' employment status was obtained by combining IBWORK12 (worked at a job in the past 12 months), PAYHRS (usual hours per week worked for pay), AUNEMP (unemployed in the past 12 months and looking for work), and JOBACTY (main activity during time not worked). The response categories for this variable are as follows:

- employed full time (if worked at a job in the past 12 months and usually worked 30 or more hours per week);
- employed part time (if worked at a job in the past 12 months and usually worked less than 30 hours per week); and
- unemployed, looking for work (if did not work at a job in the past 12 months and was at some point unemployed and looking for work).

In addition, self-employed workers were defined as follows: If the respondents said that they were self-employed at any time in the past 12 months (on IBSELFEM) and they had no other employer during those 12 months (on IBOTHEMP), they were counted as self-employed. Thus, those who were both self-employed and had an external employer were not counted as self-employed in this analysis.

Finally, concurrently employed workers were defined as respondents who were working at the time of their instruction, based on BSWORK, CRWORK1–CRWORK3, VOWORK1, VOWORK2, and WRWORK1–WRWORK4.

Aggregated Occupation (occ3cat)

The AELL–NHES:2001 collects information on the occupation the respondent held for the longest time during the 12 months prior to the survey administration. Occupations are classified into 22 categories based on the U.S. Bureau of Labor Statistics' Standard Occupational Classification (FSOC). These categories were aggregated into the following three broad occupational groupings: If FSOC was between 1 and 11 (inclusive), the occupation was coded as "professional." If FSOC was 12, 13, 14, or 22, the occupation was coded as "sales, service, or support." If FSOC was between 15 and 21 (inclusive), the occupation was coded as "trades." Unemployed adults (based on laborfr) were not assigned occupation codes (i.e., they were coded as "not applicable").

Types of Learning Activities

In the AELL–NHES:2001, respondents were asked about their participation in the following eight educational activities: English as a second language; basic skills or GED preparation

classes; college or university degree programs; vocational or technical diploma programs; apprenticeship programs; work-related courses (courses taken mainly for work-related reasons, or for work and personal reasons equally); personal interest courses (courses taken mainly for personal interest); and work-related informal learning activities. All personal interest courses and work-related informal learning activities were excluded from the current analysis. Also, programs in the college/university and vocational/technical credential sections were separated into postsecondary programs and credential training programs, based on their instructional provider. The following dichotomous variables representing different activity types were created using a combination of the derived variables crvctyp1–6, crsprov1–3, vosprov1–2 (explained later in this appendix), and the original variables APPRENTI, ESLANG, ESREAS, BSIMPROV, BSGED, BSHSEQUV, IBDIPLYR, IBHSREQ, BSREAS, WRACTY, WRPRTYP1–4, WRCEU1–4, and WRCRED1–4:

- Basic education class (eslbaswk): Any ESL, basic skills, or GED preparation classes taken for work-related reasons.
- Apprenticeship program (APPRENTI): All participation in apprenticeship programs was considered work related.
- Postsecondary program (postprog): Any college/university degree program or vocational/technical diploma program taken from a postsecondary institution (see discussion below on instructional providers).
- Credential training program (profprog): Any degree or diploma program taken from an organization other than a postsecondary institution (see discussion below on instructional providers).
- Postsecondary course (collcor): Any work-related course for which the instructional provider was a postsecondary institution or for which college credit was received.
    - For-credit postsecondary course (colcred): Any postsecondary course for which college credit was received.
    - Noncredit postsecondary course (noncred): Any postsecondary course for which no college credit was received.
- Training course (nonpost): Any work-related course for which the instructional provider was not a postsecondary institution and for which no college credit was received.
- Postsecondary activity (postact): Participation in any postsecondary credential program or postsecondary course.
- Nonpostsecondary activity (npostact): Participation in basic education classes, apprenticeship programs, professional training programs, or training courses.

Participation in Work-Related Education

Participation in Work-Related Education (wradult)

This report defines work-related education as including (1) all classes reported in the ESL and basic education sections of the survey for which the main reason for participation was work related (including work-related and personal reasons equally); (2) all postsecondary (college and vocational) programs; (3) all credential training programs; (4) all apprenticeship programs; and (5) all courses from the work-related course section of the survey. Adults were assigned a value of 1 if they participated in one or more work-related activities; they were assigned a value of 0 if they participated in no work-related activity. The following variables were used to derive this measure: ESREAS, BSREAS, crvctyp1, crsprov1–3, CRREAS1–3, vosprov1–2, VOREAS1–2, WRACTY, and APPRENTI.

Instructional Providers

Instructional Provider for Programs (crsprov1–3, vosprov1–2)

To determine the instructional provider for postsecondary programs and credential training programs, information from the following variables was used: enrollment in a program to earn a college or university degree and/or enrollment in a program to earn a vocational or technical diploma after high school (CRDEGREE, CRPOSTDG, CRVOCDIP); enrollment in a postsecondary degree program (CRTYASC, CRTYBCH, CRTYDOC, CRTYPRF, CRTYOTH, CRPOSBAC, CRPOSMAS, CRPOSDOC, VOVOC, VOTECH, VOASSOC, VOOTHDIP); and the write-in name of the institution that provided the instruction (CRSNAM1/R–CRSNAM3/R, VOSCNAM1/R–VOSCNAM2/R). The following response categories for these derived provider variables are identical to the provider categories for other adult education activities: postsecondary institution; other school or school district, business or industry, government agency, professional association, library, and other. If adults in the college or vocational program sections reported that their provider was a postsecondary institution, they were regarded as enrolled in a postsecondary program and as having a postsecondary provider. If adults in the college or vocational program sections reported that the provider for the program was anyone other than a postsecondary institution, they were regarded as enrolled in a credential training program and as having a nonpostsecondary provider. The issue of determining enrollment in postsecondary vs. credential training programs and identifying the providers of these programs is discussed in greater detail in the later section on "recoding of postsecondary data."

Provider Types Across All Work-Related Education Activities

Seven types of instructional providers are covered in the ESL, basic education, and course sections of the survey: postsecondary institutions; other schools or school districts (including elementary and secondary schools and adult learning centers); business or industry; government agencies; professional associations/organizations; public libraries; and "other" providers (including religious and community organizations and tutors). The following five types of providers are covered in the apprenticeship section of the survey: employer; labor union; local or state government; federal government; and "other" providers. Using a combination of original and derived variables (ESPRTYP, BSPRTYP, crsprov1–3, vosprov1–2, and WRPRTYP1–4, APUNION, APSTAGOV, APFEDGOV, and APOTHER), the following dichotomous variables were created to indicate that the adult had a given instructional provider for any work-related education activity:

- provpost: a postsecondary institution is the provider
- provosch: another school or school district is the provider
- provbus: business or industry is the provider
- provgov: federal, state or local government is the provider (includes federal, state, or local government as providers for apprenticeships)
- provprof: a professional association is the provider (includes unions as providers for apprenticeships)
- provoth: a provider other than the ones listed above is the provider (includes other providers for apprenticeships)

Instructional Provider Is Also Employer (prov_emp)

The survey question that asked respondents if the instructional provider was also their employer was used to separate employers from other instructional providers and to help identify employer-sponsored instruction. This question was not asked of apprenticeship participants, but it was imputed that these participants had their employer as an instructional provider if in the preceding question they reported that their employer was one of their providers. The following variables were used to develop a dichotomous measure of whether participants' providers were also their employers for any of the activities in which they participated: ESPROVEM, BSPROVEM, CRSPROVE1–3, VOPROVE1–2, APEMPLOY, and WRPROVE1–4.

Type of Postsecondary Provider (posttype)

For all cases in which the provider was a postsecondary institution (based on provpost), data on institution type from IPEDS was merged with the AELL–NHES:2001 file in order to categorize postsecondary providers as 4-year institutions, public 2-year institutions (community colleges), and other less-than-4-year institutions. The variables INSTNM, SECTOR, and ICLEVEL from the 2000–01 IPEDS file were used to make this classification.

Postsecondary Provider for Apprenticeships (appsprov)

For apprenticeship programs, postsecondary providers were indirectly identified using the survey questions that asked about "classroom or instruction hours" (APCLSHR) and whether any courses were taken for college credit (APCOLCR). If respondents indicated that they had some "classroom or instruction hours" *and* received college credit, they were assumed to have a post-secondary institution provider and were assigned a value of 1 on this dichotomous variable. This variable was used in tables 2.2 and 3.7 of the report.

Topics of Instruction

The AELL–NHES:2001 includes information on the instructional topics studied in work-related education, which was used to classify work-related education activities into eight topical areas. This classification was developed based on a preliminary analysis that revealed the topics that had the greatest amounts of participation (and that therefore would yield the most reliable estimates). Using APPRENTI, FSOC, CRCIPF1–3, VOCIPF1–2, WRCRS1–4, the following dichotomous variables were created:

- Business (topbus): includes business management, accounting, business support, marketing, and public administration
- Computer science (topcomp)
- Health (tophlth)
- Science (topsci): includes engineering and related technologies, mathematics and science, and agricultural/natural resources
- Social sciences and services (topsoc): includes law/legal studies, religious studies, psychology, and social sciences
- Education (topedu)
- Vocational trades (topvoc)

- Other topic areas (topoth): includes communications, foreign languages, English language/literature, basic education/personal improvement, protective services, visual and performing arts, and all other (unspecified) topics

Table B-1 shows how the activities in the different survey sections were coded into these topic areas.

Reasons or Inducements for Participation

For this report, the following reasons for participation were regarded as employment-related inducements for participation: seeking an occupational credential (listed in the survey as seeking to get or keep a state, industry, or company certificate or license); earning continuing education units; or an employer requirement for participation. Each learning activity was matched with its specific requirement to derive the following summary measures.

Any Activity Taken for a License or Certification (lic_cert)

The following variables were used to derive a dichotomous measure of whether respondents participated in an activity to get or keep a state, industry, or company certification or license: appcert (imputed variable for apprenticeships; see table B-2), CRCERT1–3, VOCERT1–2, WRRSCER1–4.

Any Activity That Was Required by the Employer (anyreq)

The following variables were used to derive a dichotomous measure of whether respondents participated in an activity because it was required by their employer: ESEMPREQ, BSEMPREQ, CREMPRE1–3, VOEMPRE1–2, WREMPRE1–4, and apempreq (imputed variable for apprenticeships; see table B-2).

Employer Involvement and Support

To examine employers' involvement in motivating employees' participation in work-related education, the following variable was created:

Any Activity Suggested or Encouraged by the Employer (anysug)

The following variables were used to derive a dichotomous measure of whether respondents participated in an activity that their employer suggested or encouraged: ESEMPSUG, BSEMPSUG, CREMPSU1–3, VOEMPSU1–2, WREMPSU1–4, and apempsug (imputed variable for apprenticeships; see table B-2).

Table B-1. Classification of AELL–NHES:2001 work-related learning activities into topic areas, by survey section

Topic area	Apprenticeship section	College/university credential section	Vocational/technical credential section	Course section
Business				
Business management, accounting, and business support	1, 13	52	52	44–48
Marketing	12	8	8	41–43
Public administration	†	44	44	36
Computer science	†	11	11	51
Education	5, 6	13	13	60
Health	7, 10	51	34, 51	111–114
Science				
Engineering and related technologies	11	10, 14–15	10, 14–15	70
Mathematics and science	3	26, 27, 40	26, 27, 40	91–93
Agriculture/natural resources	15	1–3	1–3	10
Social sciences and services				
Law/legal studies	†	22	22	33
Religious studies/philosophy	†	38, 39	38, 39	121–123
Psychology	†	42	42	34
Social sciences	4	45	45	31
Vocational trades	14, 16–20	12, 19, 20, 46–49	12, 19, 20, 46–49	81, 82
Other topic areas				
Communications	†	9	9	32
Foreign languages	†	16	16	23
English language/literature	†	23	23	22
Basic education and/or personal improvement	†	32, 36	32, 36	102, 105, 131
Protective services	†[1]	43	43	35
Visual/performing arts	9	50	50	104
All other	-1, 21	4, 5, 24, 25, 30, 31, 91	91	21, 140, 150

† Not applicable.

[1] The eight service occupations among apprenticeships were coded into "personal services"; some of these could be protective service occupations.

NOTE: Numbers listed under survey sections are the AELL–NHES:2001 survey codes used to classify topics within each survey section (from variables CRCIPF1–3, VOCIFP1–2, APTRADE, WRCRS1–4, and FSOC).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

Table B-2. Imputations made to AELL–NHES:2001 survey questions, by survey section

Survey question (and variable name, where relevant):	Survey section(s) ESL	Basic education	Appren-ticeship	Credential programs	Courses
Reason for participating in activity:					
To get a new job with a different employer	†	†	No imputation made	No imputation made	†
To help get a raise or promotion	†	†	No imputation made	No imputation made	†
To get or keep a state, industry, or company certificate or license (appcert)	Impute "no"	Impute "no"	Impute "yes"	†	†
To maintain or improve skills or knowledge one already has	Impute "no"	Impute "no"	Impute "no"	Impute "no"	†
To learn new skills or methods one did not already know	Impute "yes"	Impute "yes"	Impute "yes"	Impute "yes"	†
Because one was required to take it	([1])	([1])	([1])	([1])	†
Activity taken for work-related reasons or work/personal equally	†	†	Impute "yes"	Impute "yes"	†
Instructional provider was also employer	†	†	Impute "yes" if provider was employer	†	†
Types of employer involvement and support:					
Whether employer required participation (apempreq)	†	†	Impute "no"	†	†
Whether employer suggested or encouraged participation (apempsug)	†	†	Impute "no"	†	†
Activity taken at workplace	†	†	Impute "yes"	†	†
Activity taken during work hours	†	†	Impute "yes"	†	†
Adult paid during participation	†	†	Impute "yes"	†	†
Employer paid for tuition and fees	†	†	Impute "yes"	†	†
Employer paid for books and materials	†	†	No imputation made	†	†
Whether CEUs earned for participation	Impute "no"	Impute "no"	Impute "no"	Impute "no"	†

† Not applicable; cell had complete data.

[1] No imputation made.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

The AELL–NHES:2001 asks about different types of support employers typically provide. The variables anyreq, anysug, ESLWRKHR, BSWRKHR, CRWRKHR1–3, VOWRKHR1–2, APPWRKHR, WRWRKHR1–4, ESEMPAID, BSEMPAID, CREMPAI1–3, VOEMPAI1–2, APPPAID, WREMPAI1–4, ESEMPTUI, BSEMPTUI, CREMPTU1–3, CREMPTU3, VOEMPTU1–2, APPTUI, WREMPTU1–4, ESEMPMAT, BSEMPMAT, CREMPMA1–3, VOEMPMA1–2, APPBOOK, and WREMPMA1–4 were used to derive the following measures of employer support and involvement:

- Employer required or encouraged participation (reqsug).
- Employer paid for employees time during activity (paidtime): the activity was taken during work hours, *and* the employee was paid during time in activity.
- Employer provided direct financial support (direct): employer paid tuition and fees *or* paid for books and materials.
- Employer provided indirect financial support (indirect): the activity was taken during paid work hours *or* taken at the workplace, *or* the employer was the instructor.

Employer-Sponsored Instruction (esi)

Employers often make learning activities available to their employees at the employer's expense; the typical survey of employers asks about this type of learning experience. Employer-sponsored instruction[6] is more difficult to measure from a survey of adults, but the AELL–NHES:2001 survey does include items that allow for a reasonable approximation for employer-sponsored instruction. Hence, *employer-sponsored instruction* was defined as follows:

- All postsecondary activities (postsecondary programs and postsecondary courses) were regarded as *not* being employer-sponsored instruction.[7]
- All apprenticeships were regarded as being employer-sponsored instruction.
- Other nonpostsecondary activities (basic education classes, credential training programs, and training courses) were regarded as being employer-sponsored instruction if any of the following conditions were met: the employer was the instructor, and the adult did not pay tuition/fees; the activity was provided during paid work hours;[8] the employer pays tuition or fees, and the respondent did not pay tuition/fees; or the

[6] This report uses the term *employer-sponsored* instruction rather than the more commonly used *employer-provided* instruction to help clarify the distinction between situations where the employer is the instructional provider and situations where the employer sponsors the learning activity (whether or not the employer provides the instruction). This terminology also acknowledges the fact that in the AELL–NHES:2001 data are not available from employers on what instruction they are providing their employees; the analysis instead approximates this measure based on information from employees.

[7] College programs and courses are sometimes paid for by employers through tuition reimbursements and may be taken during paid work hours. However, these activities do not encompass what is typically meant by employer-provided instruction.

[8] An activity was regarded as provided during "paid work hours" if it was taken during regular work hours *and* if the employee was being paid during the course.

activity was provided during paid work hours, was taken at the workplace, the employer did not pay tuition/fees, and the respondent did not pay tuition/fees.

The following variables were used to derive a measure of employer-sponsored instruction: postprog, collcor, apprenti, ESTUITON, ESPROVEM, ESWRKHR, ESEMPAID, ESEMPTUI, ESWRKPL, BSTUITON, BSPROVEM, BSWRKHR, BSEMPAID, BSEMPTUI, BSWRKPL, crsprov1–3, CRTUITO1–3, CRPROVE1–3, CRWRKHR1–3, CREMPAI1–3, CREMPTU1–3, CRWRKPL1–3, CRPROVE1–3, CRASSIS1–3, vosprov1–2, VOTUITO1–2, VOPROVE1–2, VOWRKHR1–2, VOEMPAI1–2, VOEMPTU1–2, VOWRKPL1–2, VOASSIS1–2, WRPRTYP1–4, nonpost1–4, WRTUITO1–4, WRPROVE1–4, WRWRKHR1–4, WREMPAI1–4, WREMPTU1–4, and WRWRKPL1–4.

Employer Support for Apprenticeship Programs

Only one question about employer support and involvement was asked in the apprenticeship section of the AELL–NHES:2001: whether the employer was the instructional provider. For the other employer involvement and support questions, the data were imputed to reflect the organization of apprenticeship programs in the United States. The imputations made are discussed below and listed in table B-2.

Recoding and Imputation of Data

Recoding of Postsecondary Data

For respondents who indicated that they participated in an activity provided by a postsecondary institution, the IPEDS code for the school is listed on the AELL–NHES:2001 restricted-use data file. As indicated above, these IPEDS codes were linked to the 2000–01 IPEDS data file in order to classify postsecondary schools by type (4-year, public 2-year, and other less-than-4-year). There were 426 cases across all survey sections, however, for which information on the postsecondary institution provided by the respondent could not be linked with the IPEDS data file.

Examination of the write-in school names for these cases revealed the unavailability of an IPEDS match due to two reasons: (1) Respondents wrote in an incomplete or misspelled name of the postsecondary institution to which a valid IPEDS code could not be assigned; or (2) although respondents had listed a postsecondary institution as an instructional provider, the detailed information provided in subsequent survey questions indicated that the provider was not a postsecondary institution and could therefore not be assigned a valid IPEDS code.

Of the 197 cases missing an IPEDS match in the credential program section of the survey, 93 were recoded as one of the following: a 4-year institution, a public 2-year institution, or a less-than-4-year institution. The remaining 104 cases were reclassified as participants in credential training programs, and based on the write-in response, the provider was classified as other school or school district, business and industry, government agency, professional association/organization, or other provider. The degree/diploma program enrolled in was recoded to "other program."

A similar approach was used to classify the 229 cases without an IPEDS match in the work-related courses, ESL, and basic education sections of the survey. Of these cases, a total of 110 cases were recoded as a postsecondary institution; 119 cases were recoded as having a non-postsecondary provider because the write-in response indicated that the provider was not a post-secondary institution. For the work-related courses section, 18 cases were also recoded as not having received college credit for the courses. These cases represented situations in which participants reported a postsecondary provider for their course and reported receiving college credit for the course, but wrote in the name of a nonpostsecondary institution as the provider. Table B-3 presents the details of the recoding across all survey sections.[9]

Imputations

Certain key variables were not available for all respondents in the analysis sample because some questions were either not asked in a given survey section or were asked only of a subset of respondents. This is especially the case for the survey section on apprenticeship programs, which does not include questions about many of the topics of interest in this report, such as employer support and inducements to participation. For missing questions on the apprenticeship section of the survey and for some of the other questions missing on other parts of the survey, values were imputed for the requisite variables. In the case of apprenticeship programs—the section of the survey in which the majority of the imputations were made—imputation decisions were based on a review of apprenticeship programs conducted by the U.S. Department of Labor (Crosby 2002). Table B-2 presents the details of the imputations made across the survey.

In addition to the imputations shown in table B-2, imputations of "no support" on all employer support and involvement questions were made for respondents who were not employed when they participated in an activity. These imputations are not shown in table B-2 because they apply to all sections of the survey and to all questions that ask about different types of employer

[9] The identification numbers for recoded cases are available upon request.

Table B-3. Summary of IPEDS-based recoding of instructional provider data in the AELL–NHES:2001 with unweighted counts of participation episodes (N), by survey section

Characteristics of recoded episodes	ESL section	Basic education section	College credential section	Vocational/ technical credential section	Course section
Total N with postsecondary provider write-in[1]	13	13	705	187	969
N IPEDS links made	8	8	606	89	750
N with no IPEDS link	5	5	99	98	219
N write-ins coded as postsecondary provider (AB9, AC8, AD13, AE11, AH7)	4	2	83	10	104
N write-ins coded as nonpostsecondary provider and/or original provider question recoded as nonpostsecondary provider (AB6, AB9, AC6, AC8, AD13,AE11, AH3, AH7)[2]	1	3	16	88	115
N with postsecondary degree program recoded to "other" degree (nonpostsecondary credential) (AD2,AD4,AE2)[3]	†	†	16	88	†
N with college credit question recoded (AH5)[4]	†	†	†	†	†
Final N postsecondary program participants	†	†	689	99	†
Final N credential training program participants	†	†	16	88	†
Final N postsecondary course participants	12	10	†	†	854

† Not applicable.

[1] These numbers reflect each episode of participation in the following: three college credential programs; two vocational/technical credential programs; and four work-related courses for which the adult reported a postsecondary provider.

[2] These are adults with the following characteristics: reported a postsecondary provider (AH3); no IPEDS match available; gave the name of a nonpostsecondary institution (AH7).

[3] These are adults with the following characteristics: reported enrollment in a program to earn a college or university degree, and/or enrollment in a program to earn a vocational or technical diploma after high school (AD1; AD3; AE1); reported enrollment in a postsecondary degree program (AD2; AD4; AE2); no IPEDS match available; and gave the name of a nonpostsecondary institution (AD13; AE11).

[4] These are adults with the following characteristics: reported a postsecondary provider (AH3); no IPEDS match available; gave the name of a nonpostsecondary institution (AH7); and reported receiving college credit for course (AH5).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL–NHES:2001).

support. All of these imputations are logical in most cases (e.g., a worker could not get paid time off for courses when she was not employed). However, exceptions are likely. For example, the imputations of "no employer support" assume that employers do not pay for workers to take courses when the firm does not employ the workers. There may be rare cases where this assumption is false (e.g., an employer may grant a worker a leave of absence to finish a degree program for which the employer provides tuition support).

Significance Tests for Analyses

Pairwise Comparisons

Comparisons of pairs of estimates were tested using Student's *t* statistic. For this procedure, differences between estimates are tested against the probability of a Type I error,[10] or significance level. The significance levels were determined by calculating the Student's *t* value for the difference between each pair of estimates and comparing the *t* value with published tables of significance levels for two-tailed hypothesis testing.

Student's *t* values are computed to test the difference between estimates with the following formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}} \tag{1}$$

where E_1 and E_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors. This formula is valid only for independent estimates. When estimates are not independent, a covariance term is added to the formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2 - 2(r)se_1\, se_2}} \tag{2}$$

where *r* is the correlation between the two estimates. This formula is used, for example, when comparing two percentages from a distribution that adds to 100. If the comparison is between the mean of a subgroup and the mean of the total group, the following formula is used:

$$t = \frac{E_{sub} - E_{tot}}{\sqrt{se_{sub}^2 + se_{tot}^2 - 2p\ \ se_{sub}^2}} \tag{3}$$

[10] A Type I error occurs when one concludes that a difference observed in a sample reflects a true difference in the population from which the sample was drawn, when no such difference exists.

where p is the proportion of the total group contained in the subgroup.

A few caveats should be kept in mind when reporting these statistical tests. First, comparisons based on large t statistics may appear to merit special attention. This can be misleading since the magnitude of the t statistic is related not only to the observed differences in percentages but also to the number of respondents in the specific categories used for comparison. Hence, a small difference compared across a large number of respondents would produce a large t statistic.

A second issue in reporting statistical tests is the possibility that one can report a "false positive" or Type I error. In the case of a t statistic, this false positive would result when a difference measured with a particular sample showed a statistically significant difference when there is no difference in the underlying population. Statistical tests are designed to control this type of error, denoted by alpha. The alpha level of .05 selected for findings in this report indicates that a difference of a certain magnitude or larger would be produced no more than one time out of 20 when there was no actual difference in the quantities in the underlying population. When hypothesis tests show t values at the .05 level or smaller ($p \leq .05$), this finding is treated as rejecting the null hypothesis that there is no difference between the two quantities. However, there are cases when exercising additional caution is warranted. When a large number of related comparisons (a family of comparisons) is tested, Type I errors cannot be ignored. For example, when making paired comparisons among different occupation groups, the probability of a Type I error for these comparisons taken as a group is larger than the probability for a single comparison.

When this situation was encountered in this report, a Bonferroni correction was made to the test's alpha level. In the Bonferroni correction, comparisons are made with $p \leq .05/k$ for a particular pairwise comparison, where that comparison was one of k tests within a family. This guarantees both that the individual comparison would have $p \leq .05$ and that for k comparisons within a family of possible comparisons, the significance level for all the comparisons will sum to $p \leq .05$.[11]

For example, in a comparison of the percentages of males and females who participate in work-related education, only one comparison is possible (males vs. females). In this family of tests, $k = 1$, and the comparison can be evaluated without adjusting the significance level. When respondents are divided into three occupation groups and all possible comparisons are made, then $k = 3$ and the significance level of each test is adjusted to $p \leq .05/3$, or $p \leq .017$. The formula for calculating family size (k) is as follows:

[11] The standard that $p \leq .05/k$ for each comparison is more stringent than the criterion that the significance level of the comparisons should sum to $p \leq .05$. For tables showing the t statistic required to ensure that $p \leq .05/k$ for a particular family size and degrees of freedom, see Dunn (1961).

$$k = \frac{j(j-1)}{2} \tag{4}$$

where *j* is the number of categories for the variable being tested. In the example with three occupation groups, k = 3(2)/2 = 3.

Equivalence Tests

The *t* statistic is used to test the null hypothesis of no difference between two values; thus a significant result leads to a rejection of the hypothesis that the two values are not different and acceptance of the alternative hypothesis that the two values are different. However, a failure to reject the null hypothesis does not mean that one can accept the null hypothesis of no difference; absent any further statistical evidence, a failure to reject the null hypothesis simply means that the data in question yielded inconclusive results. (These findings are typically described in this report by stating that no difference was detected between two estimates.)

To test for no difference between estimates, the null hypothesis must be that there is a difference at least as large as some appropriately defined nonzero value. The selected nonzero value is called the delta value and is the value at which differences between estimates are considered to become substantively meaningful or important. The alternative hypothesis is then defined as the complement of the null hypothesis (i.e., no difference). A statistical test that rejects this null hypothesis means that the alternative hypothesis of no difference can be accepted. This type of test is called an equivalence test.

Equivalence tests were used in this report, based on a delta value of 3 percentage points. That is, in cases for which differences were 3 percentage points or less, an equivalence test was done to determine whether the observed difference indicated no difference within the population. To perform the equivalence test, a confidence interval was constructed about the observed difference; a confidence interval within the bounds [-3,3] led to a rejection of the null hypothesis of a difference of more than 3 percentage points, and thus acceptance of the hypothesis that the estimates are not different. (These findings are typically described in this report by stating that estimates are similar.)

Linear Trend Tests

While most comparisons in this report were tested using Student's *t* statistic, some comparisons among categories of an ordered variable with three or more levels (e.g., level of educational attainment, employer size) involved a test for a linear trend across all categories, rather than a series of tests between pairs of categories. In this report, when differences among

percentages were examined for a variable with ordered categories, analysis of variance (ANOVA) was used to test for a linear relationship between the two variables (e.g., to determine whether participation rates increase as adults' level of educational attainment increases). To do this, ANOVA models included orthogonal linear contrasts corresponding to successive levels of the independent variable. The squares of the Taylorized standard errors (i.e., standard errors that were calculated by the Taylor series method), the variance between the percentages, and the unweighted sample sizes were used to partition the total sum of squares into within-group and between-group variance components and their corresponding *F* statistics, which were then compared with published values of *F* for a significance level of .05. A significant value of the overall *F* is required as evidence of a linear relationship.