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Executive Summary

Adults participate in various types of educational activities in order to acquire the knowledge and skills necessary to succeed in the workforce, to earn a college or advanced degree, to learn basic skills or English language skills, or to enrich their lives. Taken as a whole, these activities constitute adult education. Traditionally, full-time enrollment in postsecondary degree or diploma programs is not considered to be adult education participation.¹ This report holds to that convention. A recent study indicates that participation in adult education has grown steadily over the past three decades (Kim and Creighton 2000; Creighton and Hudson 2002). Many societal factors influence participation in adult education activities. Changing demographics, including the aging of the population, reentry of women into the workplace, and an influx of immigrants, alter the base of potential participants. The effect of the global economy and technological advances on the nature of adult education has been significant.

This is the first full report using data from the Adult Education and Lifelong Learning Survey of the 2001 National Household Education Survey Programs (AELL-NHES:2001) on the educational activities of adults in the United States. The NHES:2001 was a random digit dial (RDD) telephone survey of the civilian, noninstitutionalized population of the 50 states and the District of Columbia conducted from January 2 through April 14 of 2001. For the Adult Education and Lifelong Learning Survey, the population of interest included civilian, noninstitutionalized persons ages 16 and older who were not enrolled in elementary or secondary school at the time of the interview.

Adult education is a diverse arena defined in a variety of ways (Cross 1984; Elias and Merriam 1984; Knowles 1980; Merriam and Caffarella 1999; Peters, Jarvis, and Associates 1991). Some regard adult education as noncompulsory or voluntary learning activities constituting a continuous learning process throughout the life (Belanger and Tuijnman 1997). Others include required activities in their definitions because a fairly large proportion of adults are required to participate in work-related adult education for continuing professional development purposes (Cervero 1989). Yet another way of defining adult education includes not only formal course work or training, but also informal educational activities (that is, those that do not involve an instructor). The AELL-NHES:2001 incorporates a broad approach to the range of activities that may be considered adult education. This approach distinguishes

¹ Part-time participation in postsecondary programs is considered to be adult education in this analysis, and those who were enrolled in postsecondary programs on a part-time basis in the previous 12 months are included as participants. Those who were full-time postsecondary students may have also participated on a part-time basis at some point in the previous 12 months and, if so, are included as participants due to their part-time participation. Thus, reports of participation in postsecondary programs include those who participated on a part-time basis and those who participated on both part-time and full-time bases in the previous 12 months. Full-time postsecondary students may have also participated in adult education activities such as English as a Second language, work-related courses, or personal interest courses in addition to their full-time college or vocational programs and, if so, are included as participants.

voluntary and required educational activities that are formal, as defined by the presence of an instructor, from activities that are informal.

In the AELL-NHES:2001, respondents were asked about both formal and informal learning activities in which they may have participated during the 12-month period prior to the interview. The seven types of formal learning activities included English as a Second Language (ESL), basic skills education, college or university degree programs, vocational or technical diploma programs, apprenticeship programs, work-related courses, and personal interest courses. Work-related informal learning activities included supervised training or mentoring, self-paced study using books or video tapes, self-paced study using computers, attending “brown-bag” or informal presentations, attending conferences or conventions, and reading professional journals or magazines.

This report provides a broad overview of the extent to which adults participate in educational activities and their educational experiences in such activities. Major topics include participation rates overall and in various types of formal educational activities; characteristics of participating adults; educational experiences in college or university degree programs on a part-time basis, work-related courses, and personal interest courses; reasons for participation in work-related courses; characteristics of participants who received employer support; and characteristics of participants in work-related informal learning activities. Because there is variation in the nature and purpose of various adult education activities, this analysis examines individual types of activities in addition to adult education overall.

The research questions addressed in this report are listed below along with a brief summary of the findings from the AELL-NHES:2001.

Participation in Adult Education

To what extent do adults participate in educational activities and how is participation in educational activities related to characteristics of adults?

The two previous NHES adult education surveys conducted during the 1990s (i.e., AE-NHES:1995 and AE-NHES:1999), which excluded informal work-related training, found increasing rates of participation in formal adult education, from 40 percent in 1995 to 45 percent in 1999 (Kim et al. 1995; Kim and Creighton 2000; Creighton and Hudson 2002) (figure 1). In 2001, the overall participation rate in formal adult education during the 12-month period prior to the interview was 46 percent (table 1). About 92 million adults participated in one or more types of formal educational activities during this period.

Adult education participation rates were higher among the population ages 50 and younger. The rates of participation for the three younger age groups (ages 16–30, 31–40, and 41–50) were 53 to 55 percent, compared to 41 and 22 percent for the two older age groups (ages 51–65 and 66 and older) (table 1).

Merriam and Caffarella (1999) noted that women have had a higher rate of participation than men since 1978. The AELL findings are consistent with this observation; females were more likely than males to participate in an educational activity (49 percent versus 43 percent) (table 1).

The prior educational attainment of adults was positively associated with participation in educational activities. Among those who had not completed high school, 22 percent participated in educational activities during the 12-month period prior to the interview, whereas 34 percent of those with a high school diploma or equivalent, 58 percent of those with some college education, and 66 percent of those with a bachelor's degree or more education did so (table 1).

The overall participation rate among adults who were never married (52 percent) was higher than the rate among adults who were married (47 percent), unmarried and living with a partner (43 percent), and separated, divorced, or widowed (38 percent) (table 1).

Participation rates in adult education also varied by the employment status and occupation of adults. Those adults who had worked for pay or income during the 12 months prior to the survey were more likely to participate in educational activities (54 percent) than those who had not worked (25 percent). Adults in professional or managerial occupations had a higher rate of participation in adult education activities (71 percent) than those in other occupations (i.e., service, sales, or support occupations and those employed in the trades) (55 percent and 34 percent, respectively), and adults in service and sales occupations had a higher participation rate than those in the trades (table 1).

Adults who had an occupational or legal requirement to take continuing education were more likely to participate in educational activities than those who did not have such a requirement (64 percent versus 40 percent) (table 1).

Household income was positively related to the participation of adults in educational activities. Adults in households with incomes over \$50,000 were more likely to participate in educational activities (56 to 59 percent) than those in households with incomes of \$50,000 or less (28 to 48 percent). Participation rates in adult education activities also increased at every household income level up to \$50,000 (table 1).

Adults who had children under the age of 10 in their households were more likely to participate in adult education activities than their counterparts. In 2001, 52 percent of adults with children under 10 in their households participated compared with 44 percent of adults without children under age 10.

A logistic regression analysis was conducted to examine whether the relationships between individual personal characteristics and participation observed in the bivariate analyses remain when these characteristics are examined simultaneously. The regression analysis yielded findings generally consistent with the bivariate analyses for age, sex, race/ethnicity, employment/occupation, income, and prior educational attainment. Bivariate findings by the presence of children under age 10 in the household were not observed when the other characteristics of adults were taken into account. Somewhat different findings were observed by marital status, specifically, never-married adults were not more likely to participate than married adults or those who were separated, divorced, or widowed.

In what specific types of educational activities do adults participate and what characteristics of adults are associated with participation in specific types of educational activities?

Approximately 4 percent of adults were enrolled part-time in college or university degree or certificate programs in the previous 12 months. Several characteristics were found to be related to participation in college degree or certificate programs. Participants tended to be less than 30 years of age, had never married, had worked in the past 12 months, had continuing education requirements for their occupations, had at least a high school education, or worked at professional or managerial occupations or service, sales, or support occupations (table 1).²

Thirty percent of adults participated in work-related courses during the 12 months prior to the interview. Several characteristics examined in this study were found to be associated with participation in work-related courses. Participants tended to be of White, non-Hispanic race/ethnicity;³ have some education after high school; work in a professional or managerial occupation; have continuing education requirements for their occupations; to be age 31 to 50; or have children under 10 years old in the households (table 1).

About one in five adults (21 percent) participated in personal interest courses. Participants tended to be female, had completed some college or more education, worked in professional or managerial

² Readers should note that each of the characteristics noted is individually associated with participation; the intent is not to suggest that the combination of these individual characteristics constitute typical characteristics of participants.

³ For the remainder of this report, the descriptor “White” is used for ease of presentation.

occupations, had continuing education requirements for their occupations, and had never been married (table 1).

Compared to the other adult education activities, a smaller percentage of adults participated in English as a Second Language, basic skills education, vocational or technical diploma or degree programs, and apprenticeship programs (4 to 30 percent compared to 1 percent) (table 1).

Characteristics of Participation in Adult Education

The diversity of adult education is reflected not only in the various types of educational activities in which adults participate, but also in important features of their participation. Characteristics of participation in educational activities collected in the AELL-NHES:2001 included credit and instructional hours, instructional providers, personal expenses for participation, the use of automated technology as an instructional tool, and keeping or obtaining a certificate or license.

How much time do adults spend in educational activities?

Participation in college or university degree programs varied considerably in terms of the number of credit hours taken. Forty-five percent of adults who participated in college or university degree programs on a part-time basis took 11 credit hours or less in the previous 12 months, 26 percent took 12 to 18 credit hours, and 7 percent took 31 credit hours or more during the year (table 3).⁴

There was wide variability in the amount of time that adults spent in work-related courses. Twenty-eight percent of adults spent 10 hours or less in such courses, 25 percent spent 11 to 25 hours, 23 percent spent 26 to 50 hours, and 24 percent spent 51 hours or more. The amount of time that adults spent in personal interest courses also varied considerably. Twenty-five percent of participating adults spent 10 hours or less and 33 percent spent 51 hours or more in such courses during the year (table 3).

To what extent do adults participate in educational activities provided by various institutions or organizations?

More adults took work-related courses provided by business and industry (49 percent) than any other provider type. Twenty percent of adults took work-related courses from postsecondary institutions

⁴ Participants include those who participated in college programs on a part-time basis (an estimated 886,384 adults) as well as those who participated on both part-time and full-time bases in the previous 12 months (an estimated 1,981,794 adults). An additional estimated 6,798,999 adults participated in college programs on a full-time basis only and are not included as adult education participants in college programs here. It is not possible to differentiate credit hours taken on a part-time basis or a full-time basis for those who participated in both statuses in the previous 12 months.

(2-year and 4-year colleges, and postsecondary vocational/technical schools), 20 percent from professional organizations, and 15 percent from government agencies (local, state, or federal) (table 3).

Participants in personal interest courses also received instruction from a wide variety of providers. Fifty percent of participants took personal interest courses from “other” types of providers, examples of which include community centers, public libraries, private organizations, and religious organizations. Twenty percent of adults took personal interest courses from postsecondary institutions and 17 percent from business or industry (table 3).

To what extent do adults use their own resources to pay for participation in educational activities?

Information about personal expenses for participation in educational activities, such as tuition and fees and costs for books or other materials, was collected in the AELL-NHES:2001. Twenty-five percent of the participants in college or university degree programs reported no personal expenses for their programs, 34 percent spent \$1 to \$1,000, 23 percent spent \$1,001 to \$3,000, and 18 percent spent more than \$3,000 (table 3).

A large majority of participants in work-related courses (73 percent) reported that they had not spent any of their own or their families’ money to pay for the courses. Twenty percent reported that they spent \$1 to \$500 for all of their work-related courses and 6 percent reported spending more than \$500. Forty percent of participants in personal interest courses reported paying none of their own money to take courses, 48 percent spent \$1 to \$500, and 12 percent spent more than \$500 over the previous 12 months (table 3).

To what extent do adults participate in educational activities where technologies are used as an instructional method?

The AELL-NHES:2001 data indicate that adult education providers are turning to emerging technologies to increase the flexibility and accessibility of their programs. For college or university instruction, the use of computers was reported by more participants (57 percent) than any other automated technology, followed by the use of the Internet or World Wide Web (32 percent) and television, video, or radio (26 percent) (table 3).

The use of automated technology for instruction in work-related courses was also reported by many participants. The types of technology most often reported were television, video, or radio, reported by 54 percent of participating adults, and computer instruction, reported by 53 percent (table 3).

About one third (32 percent) of participants in personal interest courses reported the use of television, video, or radio as an instructional mode and 19 percent reported the use of computers for instruction (table 3).

To what extent do adults participate in educational activities in order to obtain or to maintain a certificate or license?

About half of the adults participating in college or university degree programs on a part-time basis or both part-time and full-time bases reported that they did so to obtain or to maintain a state, industry, or company certificate or license (48 percent). Among those adults who took work-related courses, 38 percent reported taking courses to obtain or to maintain a state, industry, or company certificate or license (table 3).

Receipt of Employer Support for Participation

In the AELL-NHES:2001, information was collected on employer support for participation, including provision of instruction, offering courses or classes at the workplace, providing courses or classes during paid work hours, and paying for or reimbursing educational expenses. A question about employer requirements for taking courses or classes also was included.

To what extent do adults report employer support and incentives for participation in educational activities?

Sixty-eight percent of employed adults who participated in educational activities received some type of employer support (table 4). Several characteristics examined in this study were found to be associated with receipt of employer support: being White adults; having higher prior educational attainment; being of a marital status other than never married;⁵ working in a professional or managerial occupation; working for a large employer (i.e., 500 or more employees); having a higher household income;⁶ or being required to participate in continuing professional education (table 5).

A logistic regression analysis was conducted to examine whether the relationships observed in the bivariate analysis are also observed when they are examined simultaneously. The results of the regression analysis were consistent with the bivariate analyses for marital status, prior educational attainment, occupation, employer size, continuing education requirement, race/ethnicity, and household income.

⁵ Adults in the marital statuses of (1) currently married, (2) separated, divorced, or widowed, and (3) living with a partner were more likely to report receipt of employer support for adult education participation than those who had never been married.

⁶ Those with household incomes of \$50,000 or more were more likely to participate than those with household incomes under \$35,000.

Reasons for Participation

For what reasons do adults participate in work-related courses?

The most frequently reported reasons for participation in work-related courses were maintaining or improving skills or knowledge (95 percent) and learning new skills or methods (84 percent).⁷ Sixty-two percent of participants reported being required to take courses by an employer or due to professional certification requirements, legal requirements, and so on.

Work-Related Informal Learning

Informal learning is regarded as a major source of the acquisition of new knowledge and skills in the workplace (Bruce, Aring, and Brand 1998). In the AELL-NHES:2001 survey, respondents were asked about their participation in a variety of work-related informal learning, including supervised training or mentoring, self-paced study using manuals, videos, or a computer; attending informal presentations; attending conferences; or reading professional journals or magazines. With the exception of supervised training or mentoring, respondents were asked about each type of informal learning regardless of whether they were working in the 12 months prior to interview.

To what extent do adults participate in work-related informal learning activities?

Nearly two-thirds of adults (about 125 million) reported participating in work-related informal learning activities in the 12 months prior to the interview. Those adults with some college or more education, those in professional or managerial occupations, and those with higher household incomes were generally more likely to participate in work-related informal learning activities (table 8).

Summary

Education, employment and occupation, and household income were consistently associated with participation in adult education. Prior educational attainment is positively associated with overall participation and with participation in the two most common forms of formal learning—work-related courses and personal interest courses—and with participation in work-related informal learning activities. In addition, having worked in the previous 12 months and having a professional or managerial occupation

⁷ Some participants gave more than one reason, so percents sum to more than 100.

are characteristics associated with participation overall, in work-related courses, in personal interest courses, and in work-related informal learning. Also, higher levels of household income are associated with overall adult education participation, and participation in work-related courses, personal interest courses, and work-related informal learning.

The characteristics of educational activities in which adults participate are associated with the type of adult education activity in which they engage. The participation of adults in educational activities encompasses a variety of providers, with business and industry being a leading provider of instruction for work-related courses. Intensity of participation (e.g., number of courses and hours of instruction) varies considerably among all education types. The use of automated technology in instruction is quite common in college or university degree programs, work-related courses, and, to a lesser extent, personal interest courses.

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Introduction

Adults participate in various types of educational activities in order to acquire the knowledge and skills necessary to succeed in the workforce, to earn a college or advanced degree, to learn basic skills or English language skills, or to enrich their lives. Taken as a group, these activities constitute adult education (Merriam and Caffarella 1999). Traditionally, full-time enrollment in postsecondary degree or diploma programs is not considered to be adult education participation.¹ This report holds to that convention. Many societal factors influence participation in adult education activities. Changing demographics, including the aging of the population, reentry of women into the workplace, and an influx of immigrants, alter the base of potential participants. The effect of the global economy and technological advances on the nature of adult education has been significant. The shift of the economic structure of the United States to a service and information society has changed the configuration of the labor force and influences what kinds of learning take place, what is offered, and who participates (Merriam and Caffarella 1999).

Tracking the participation of adults in educational activities and the nature of such activities provides important information about the extent to which adults in the United States are engaging in educational activities to improve their lives and their occupational skills, the types of activities in which they are engaged, and which adults are participants in such activities. Research has shown that participation in educational activities among adults has increased over the past decade (Korb, Chandler, and West 1991; Kim et al. 1995, Kim and Creighton 2000; Creighton and Hudson 2002). In 1991, 32 percent of adults participated in adult education during the previous 12 months (Korb, Chandler, and West, 1991). By 1995, the participation rate had increased to 40 percent (Kim et al. 1995), and by 1999, the participation rate was 45 percent (Kim and Creighton 2000).

This is the first full report using data from the Adult Education and Lifelong Learning Survey of the 2001 National Household Education Surveys Program (AELL-NHES:2001) on the educational activities of adults in the United States from early January 2000 to mid-April 2001. The purpose of this report is to provide a descriptive overview of the extent to which adults participated in educational activities during a 12-month period prior to the interview, the types of activities in which they participated, and their educational experiences in such activities.

¹ Part-time participation in postsecondary programs is considered to be adult education in this analysis, and those who were enrolled in postsecondary programs on a part-time basis in the previous 12 months are included as participants. Those who were full-time postsecondary students may have also participated on a part-time basis at some point in the previous 12 months and, if so, are included as participants due to their part-time participation. Thus, reports of participation in postsecondary programs include those who participated on a part-time basis and those who participated on both part-time and full-time bases in the previous 12 months. Full-time postsecondary students may have also participated in adult education activities such as English as a Second language, work-related courses, or personal interest courses in addition to their full-time college or vocational programs and, if so, are included as participants.

What is Adult Education?

Adult education encompasses a wide range of educational and learning activities and is defined in a variety of ways in the literature (Cross 1984; Elias and Merriam 1984; Knowles 1980; Merriam and Caffarella 1999; Peters, Jarvis, and Associates 1991). Some analysts regard adult education as noncompulsory or voluntary learning activities constituting a continuous learning process throughout life (Belanger and Tuijnman 1997). Others include required activities in their definition because a fairly large proportion of adults are required to participate in work-related education or training for continuing professional development purposes (Cervero 1989).

Much research on participation in adult education examines formal learning activities—those that involve classroom instruction, have a planned curriculum, and may or may not involve some form of evaluation of the learning that takes place. Examples of formal learning activities are college and university courses or programs, instruction in basic skills or English as a second language, and structured courses or programs associated with work-related learning or personal interest.

Another way of defining adult education includes not only formal courses or programs, but also informal educational activities. Informal educational activities are those that do not involve an instructor or teacher in a traditional sense. According to Bunning (1993), "learning can be defined as changes in behavior resulting from experience" (p. 7). This definition situates learning in a universe much wider than the educational institution or any classroom. Increasingly over the last several decades, scholars and educators have recognized that adult education comprises both formal (institutional) and informal aspects. While formal learning is often institutionally sponsored, classroom-based, and highly structured, Marsick and Watkins (1990) noted that informal learning may occur in institutions, but it is not typically classroom-based or highly structured, and control of learning rests primarily in the hands of the learner.

There have been and will continue to be many approaches to defining adult education. Existing surveys and studies employ different definitions, and they are often not comparable. Some research studies include all knowledge acquisition, whether by formal or informal means. Other studies limit their definitions to formal arrangements. Others focus on specific types of education, for example, work-related training or adult literacy. Other methodological differences, such as proxy reports of participation or limitations on populations (for example, including employed persons only), are also found. One natural consequence of these differences is a wide range of estimates in participation rates (Collins et al. 1997).

The AELL-NHES:2001 incorporates a broad approach to the range of education activities that may be considered adult education, including both formal and informal learning activities. Formal learning addressed in the AELL survey includes English as a Second Language (ESL), basic skills education, part-time postsecondary degree or diploma programs, apprenticeship programs, work-related courses, and personal interest courses. Although informal learning can be related to either work or personal interest, the AELL-NHES:2001 addresses only work-related informal learning, including computer-based tutorials, mentoring at the workplace, attending conferences or “brown-bag” presentations, or reading professional journals or magazines.

In the AELL-NHES:2001, adults were asked about participation in seven types of formal adult education activities during the 12 months prior to the interview. They are listed below in the order in which they appeared in the survey.

- *English as a Second Language (ESL)*²—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.
- *Adult Basic Education (ABE), General Educational Development (GED) preparation classes, and adult high school programs*³—programs or classes to help adults improve basic reading, writing, and math skills or prepare for a high school diploma or its equivalent.
- *College or university degree programs*—formal postsecondary programs leading to a college or university degree, or other education certificate programs, such as post-baccalaureate, post-master’s, or post-doctoral certificate programs.
- *Vocational or technical diploma programs*—formal postsecondary programs leading to a postsecondary vocational or technical degree or diploma in an occupational field.
- *Apprenticeship programs*—formal, on-the-job training, and other related instruction leading to a journeyman status⁴ in a skilled trade or craft.
- *Work-related courses*—those related to a job or career other than postsecondary degree or diploma programs or apprenticeship programs, whether or not respondents had a job when they took the courses. Some examples are courses taken at work, courses taken elsewhere that relate to a job or career, or courses for a license or certification for a job.

² In the NHES:2001 survey administration, interviews were conducted in English and Spanish. As a result, the survey underrepresents participation in ESL among adults who speak a language other than English or Spanish.

³ Persons who received their high school diploma or its equivalent during the 12 months prior to the interview were asked about their participation in ABE/GED activities in the 12 months prior to the interview, as were those without a diploma or equivalent.

⁴ Journeyman status indicates that a person has received sufficient training and achieved a level of skill so as to be recognized by a state or federal registration agency or an industry as being qualified to perform the work of the trade or occupation. Requirements vary by field, but may include apprenticeship, on-the-job training, and a standard examination.

- *Personal interest courses*—various types of educational activities that have an instructor and are not included in the categories described above. These courses are not taken as part of a college or vocational degree or diploma program. Examples include courses related to health, hobbies or sports lessons, foreign languages, dance or music, and Bible study.

Traditionally, full-time enrollment in college or university degree programs or vocational or technical degree or diploma programs has not been considered to be adult education, and this convention was maintained in this report. If adults participated only in postsecondary degree, certificate, or diploma programs as full-time students, they were not counted as adult education participants in the calculation of the participation rates in overall adult education activities, college or university degree programs, or in vocational or technical diploma programs. However, adults who were full-time degree seekers may have participated in adult education activities in addition to their full-time college or vocational education. If so, they were counted as participants in those types of adult education. For example, if an adult was enrolled in a bachelor's degree program on a full-time basis and took part in computer desktop publishing class for work-related reasons, he/she was counted as an adult education participant in overall participation rate and in work-related courses. However, he/she was not counted as a participant in the college or university degree program. On the other hand, if an adult was pursuing a master's degree on a part-time basis for a semester and on a full-time basis for another semester, he/she was included in the calculation of the overall participation rate and participation rate in college or university degree programs, because their part-time participation in a postsecondary program is considered adult education.

In this report, participation status was determined by whether adults participated in one or more of the seven formal types of learning activities during the 12-month period prior to the interview. Thus, adult education participation includes the following: basic skills education, English as a Second Language, part-time college/university or vocational/technical programs, apprenticeships, work-related courses, and personal interest courses. Respondents reported participation based on their understanding of the educational activities involved, and readers should not assume that the respondents' definitions are the same as those of federal, state, or private ABE programs or ESL classes.

In addition to the formal educational activities listed above, adults were also asked about six different types of work-related informal learning activities, including supervised training or mentoring, self-paced study using books or video tapes, self-paced study using a computer, attending "brown-bag" or informal presentations, attending conferences or conventions, and reading professional journals or magazines. Readers should also be aware that, while the survey collected information on selected work-related informal learning activities, and these are presented later in this report (table 8), informal learning activities were not included in the calculation of overall adult education participation rates that are shown in table 1.

Research Questions

In presenting a broad overview of the adults' participation in educational activities, this report examines a number of research questions. These research questions are enumerated below, grouped according to the topics addressed in the report. The first set of questions concerns participation in formal educational activities overall and in specific types of adult education. The second set of research questions focuses on the features of adults' participation, including time, cost, instructional providers, and the use of automated technology in instruction. Other research questions addressed in this report concern employer support for participation, reasons for participation, and work-related informal learning.

Participation in Formal Adult Education

1. To what extent do adults participate in formal educational activities and how is participation in educational activities related to characteristics of adults?
2. In what specific types of formal educational activities do adults participate?
3. What characteristics of adults are associated with participation in specific types of formal educational activities?

Characteristics of Participation in Formal Adult Education

4. What are the characteristics of participation in formal educational activities?
 - a) How much time do adults spend in educational activities?
 - b) To what extent do adults participate in educational activities provided by various institutions or organizations?
 - c) To what extent do adults use their own resources to pay for participation in educational activities?
 - d) To what extent do adults participate in educational activities where technologies are used as an instructional method?
 - e) To what extent do adults participate in educational activities in order to obtain or to maintain a certificate or license?

Receipt of Employer Support for Participation

5. To what extent do adults report employer support and incentives for participation in formal educational activities?

Reasons for Participation

6. Why do adults participate in work-related courses?

Participation in Work-Related Informal Learning

7. To what extent do adults participate in work-related informal learning activities?

Data Source: The National Household Education Surveys Program

The NHES:2001 was a random digit dial (RDD) telephone survey of the civilian, noninstitutionalized population of the 50 states and the District of Columbia conducted from January 2 through April 14 of 2001. For the Adult Education and Lifelong Learning Survey, the population of interest included civilian, noninstitutionalized adults ages 16 and older who were not enrolled in elementary or secondary school at the time of the interview.⁵ The appendix, Survey Methodology and Data Reliability, provides information on the survey and methodology, response rates, and data reliability. Additional information on these and other related topics can be found in the *National Household Education Survey of 2001, Data File User's Manual, Volume IV, Adult Education and Lifelong Learning* (Hagedorn et al. 2002) and at the NHES World Wide Web home page, <http://nces.ed.gov/nhes>.

Organization of the Report

This report presents a descriptive overview of participation in adult education. The first section of the findings addresses the first set of research questions presented above. The analysis examines the rates of participation in adult education overall and in seven specific types of educational activities. The variation in participation rates across characteristics of adults is examined. Both bivariate and multivariate analyses are employed to examine characteristics associated with the participation of adults in adult education activities. The bivariate analyses include two-way crosstabulations of variables of interest. The multivariate analyses use logistic regression to learn whether the relations between adult characteristics and educational participation observed in bivariate analysis are still observed when these characteristics are examined simultaneously.

The second section of the findings describes several features of adults' participation in educational activities. Included in this analysis are the amount of time spent in activities, personal expenses for participation, instructional providers, the use of automated technology in instruction, and the extent to which adults participate in educational activities to obtain or to maintain certification or licensure. These characteristics of participation were selected to give an overall picture of adult's educational experiences.

⁵ Full-time students in postsecondary programs are included in the population of interest, but their full-time participation in postsecondary programs is not considered to be adult education participation. Some full-time postsecondary students, however, are participants in adult education activities, for example, in work-related training, personal interest courses, or English as a Second Language classes.

The third section of the findings examines the extent to which adults receive support from their employers and the types of support they receive. The fourth section of the findings examines reasons for participation in work-related adult education. The fifth and final section of the findings describes adults' participation in work-related informal learning activities. The analysis addresses participation overall and in six specific types of informal learning. Following the presentation and summary of the findings, the appendix, Survey Methodology and Data Reliability, provides information about the sample, methodology, and response rates, and discusses the reliability of the survey estimates.

Findings

The report relies on a series of bivariate analyses followed by multivariate analyses to provide a large amount of information about adult participation educational activities. The bivariate analyses are designed to provide characteristics of adults who participate and do not participate in educational activities. Bivariate statistics show relationships between two variables without consideration of confounding factors. For example, bivariate analyses can show how household income is related to participation and how prior educational attainment is related to participation. However, household income and prior educational attainment are often related to each other so it is important to see how prior educational attainment relates to participation while simultaneously taking into account household income (and vice versa).

Participation in Adult Education

Table 1 presents the overall participation rate, rates of participation in seven types of formal educational activities, and bivariate statistics showing participation rates by characteristics of adults. (A later section addresses participation in work-related informal learning activities.) The 12-month overall participation rate for all adults in formal adult education activities was 46 percent in 2001; a total of 92 million adults participated. This overall participation rate includes adults who have taken one or more types of the seven formal adult education activities described in the previous section, but does not include those whose only participation was full-time enrollment in college or university degree programs or vocational or technical diploma or degree programs.

Participation in adult education activities has shown steady increases over the past few decades (Kim and Creighton 2000; Creighton and Hudson 2002). The first national survey of adult education, conducted by Johnstone and Rivera in 1965, found that 22 percent of American adults participated in either formal or informal learning activities in the course of one year, and that the majority of these activities were practical and skill-oriented rather than academic. Since 1969, the National Center for Education Statistics (NCES) has collected data about the participation of adults in formal learning through the Current Population Survey (CPS) from 1969 to 1984 and through the National Household Education Surveys Program (NHES) from 1991 to 2001. In 1969, data from the first CPS adult education supplement revealed a 10 percent overall participation rate of adults in formal education courses; by 1984, the rate had risen to 14 percent (Hill 1987). As shown in figure 1, the two previous NHES adult education surveys (i.e., AE-NHES:1995 and AE-NHES:1999) also found increasing rates of participation, from 40 percent in 1995 to 45 percent in 1999 (Kim et al. 1995; Kim and Creighton 2000).⁶

⁶ The CPS and NHES analyses did not include informal learning activities. However, informal activities were included in the Johnstone and Rivera (1965) study.

Table 1. Number of adults and rates of participation in selected adult education activities, by selected demographic, educational, and occupational characteristics: 2000–01

Characteristic	Total adults (in thousands)		Overall participation ¹		College or university degree programs ²		Work-related courses		Personal interest courses		English as a Second Language ³		Basic skills education ⁴		Vocational or technical diploma programs ⁵		Apprenticeship programs	
	Number	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	
Total	198,803	46	0.5	4	0.2	30	0.5	21	0.5	1	1.1	1	0.1	1	0.1	1	0.1	
Age																		
16 to 30 years old	46,905	53	1.5	10	0.8	28	1.1	24	1.2	3	0.7	3	0.5	2	0.4	3	0.5	
31 to 40 years old	41,778	53	1.4	4	0.4	39	1.3	20	1.0	1	0.3	1	0.2	1	0.2	2	0.3	
41 to 50 years old	41,255	55	1.5	4	0.4	42	1.3	21	1.2	#	#	1	0.3	1	0.3	1	0.2	
51 to 65 years old	39,523	41	1.2	1	0.2	28	1.1	21	1.0	#	#	#	#	1	0.2	#	#	
66 years and older.....	29,342	22	1.1	#	#	4	0.4	19	1.1	#	#	#	#	#	#	#	#	
Sex																		
Male.....	94,955	43	0.8	4	0.3	29	0.7	16	0.7	1	0.3	1	0.2	2	0.2	2	0.2	
Female.....	103,848	49	0.8	5	0.3	30	0.7	26	0.7	1	0.1	1	0.1	1	0.1	1	0.2	
Race/ethnicity																		
White, non-Hispanic.....	144,147	47	0.6	4	0.3	32	0.5	22	0.6	#	#	1	0.1	1	0.1	1	0.2	
Black, non-Hispanic.....	22,186	43	1.5	5	0.7	23	1.5	26	1.5	#	#	3	0.5	1	0.3	1	0.3	
Hispanic.....	21,537	42	2.3	4	0.5	22	1.2	16	1.6	8	0.4	3	0.7	2	0.5	2	0.5	
Other.....	10,932	49	2.5	6	1.3	32	2.8	18	1.8	3	0.8	1	0.2	2	0.6	2	0.6	
Educational attainment																		
Less than high school.....	31,343	22	1.5	#	#	6	0.7	11	1.3	4	0.9	7	0.8	1	0.2	1	0.2	
High school diploma or its equivalent....	64,606	34	0.9	2	0.3	20	0.8	15	0.8	1	0.2	#	#	1	0.2	1	0.2	
Some college.....	52,559	58	1.1	8	0.6	36	1.0	26	1.0	1	0.2	#	#	2	0.3	2	0.4	
Bachelor's degree or higher.....	50,295	66	1.1	6	0.5	51	1.1	30	1.0	1	0.2	†	†	1	0.2	1	0.2	
Marital status⁶																		
Married.....	121,455	47	0.7	3	0.2	33	0.6	21	0.7	1	0.2	#	#	1	0.1	1	0.1	
Living with a partner, unmarried.....	14,009	43	2.5	5	0.9	27	2.2	15	1.6	2	1.2	2	0.5	3	0.7	3	0.9	
Separated/divorced/widowed.....	30,503	38	1.3	2	0.3	23	1.1	20	1.0	1	0.1	1	0.2	1	0.2	1	0.2	
Never married.....	32,836	52	1.5	10	0.9	26	1.2	26	1.3	3	0.5	4	0.7	1	0.3	2	0.5	
Employment/Occupation⁷																		
Employed in the past 12 months.....	145,249	54	0.7	6	0.3	39	0.6	22	0.6	1	0.2	1	0.2	1	0.2	2	0.2	
Professional or managerial.....	42,230	71	1.1	8	0.6	59	1.2	29	1.0	#	#	#	#	1	0.2	1	0.1	
Service, sales, or support.....	65,298	55	1.0	6	0.5	36	0.8	23	0.9	1	0.4	2	0.3	2	0.3	1	0.2	
Trades.....	37,722	34	1.3	2	0.5	21	1.0	12	1.0	2	0.5	2	0.5	1	0.2	3	0.5	
Not Employed in the past 12 months.....	53,553	25	0.9	1	0.2	5	0.5	19	0.9	1	0.2	1	0.2	#	#	1	0.3	

Table 1 Number of adults and rates of participation in selected adult education activities, by selected demographic, educational, and occupational characteristics: 2000–01—Continued

Characteristic	Total adults (in thousands)	Overall participation ¹			College or university degree programs ²		Work-related courses		Personal interest courses		English as a Second Language ³		Basic skills education ⁴		Vocational or technical diploma programs ⁵		Apprenticeship programs	
	Number	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	
Continuing education requirements																		
Yes	50,549	64	1.1	6	0.4	49	1.2	25	1.0	1	0.2	1	0.3	2	0.3	2	0.3	
No	148,253	40	0.6	4	0.3	23	0.5	20	0.6	1	0.2	1	0.2	1	0.1	1	0.2	
Household income																		
\$20,000 or less	40,246	28	1.3	3	0.4	12	0.9	15	1.1	2	0.5	2	0.3	1	0.2	1	0.4	
\$20,001–\$35,000	38,876	39	1.2	4	0.4	20	0.9	18	1.0	2	0.5	2	0.5	1	0.3	1	0.3	
\$35,001–\$50,000	33,035	48	1.5	4	0.6	31	1.3	22	1.4	1	0.2	1	0.4	1	0.3	2	0.4	
\$50,001–\$75,000	40,725	56	1.5	6	0.6	39	1.3	24	1.3	#	#	#	#	1	0.2	1	0.3	
\$75,001 or more	45,922	59	1.3	5	0.5	45	1.2	26	0.9	#	#	#	#	1	0.1	1	0.2	
Children under 10 years old in household																		
Yes	55,333	52	1.3	5	0.5	35	1.1	21	1.1	2	0.5	1	0.2	2	0.3	2	0.3	
No	143,469	44	0.6	4	0.2	28	0.5	21	0.6	1	0.1	1	0.2	1	0.1	1	0.1	

† Not applicable.

Rounds to zero or zero cases in sample.

¹ Adults who participated in college or university degree or certificate programs or vocational or technical diploma programs on a full-time basis only, for part or all of the year, and did not participate in any other type of formal educational activities are not counted as participants in adult education. Adults who participated in college or university degree programs or vocational or technical diploma programs on a full-time basis only and also participated in another type of formal educational activity are included in the overall participation rate and rate for the type of non-degree/diploma programs in which they participated, but not in the college or university degree programs or vocational or technical diploma programs.

² Adults who participated in college or university degree or certificate programs on a part-time basis or on both part-time and full-time bases are included in the participation rate.

³ Adults whose first language was any language other than English were asked about participation in English as a Second Language and are included in the participation rate.

⁴ Adults, who did not have a high school diploma or its equivalent or who received a high school diploma in the past 12 months are included in the participation rate.

⁵ Adults who participated in vocational or technical diploma or degree programs on a part-time basis or on both part-time and full-time bases are included in the participation rate.

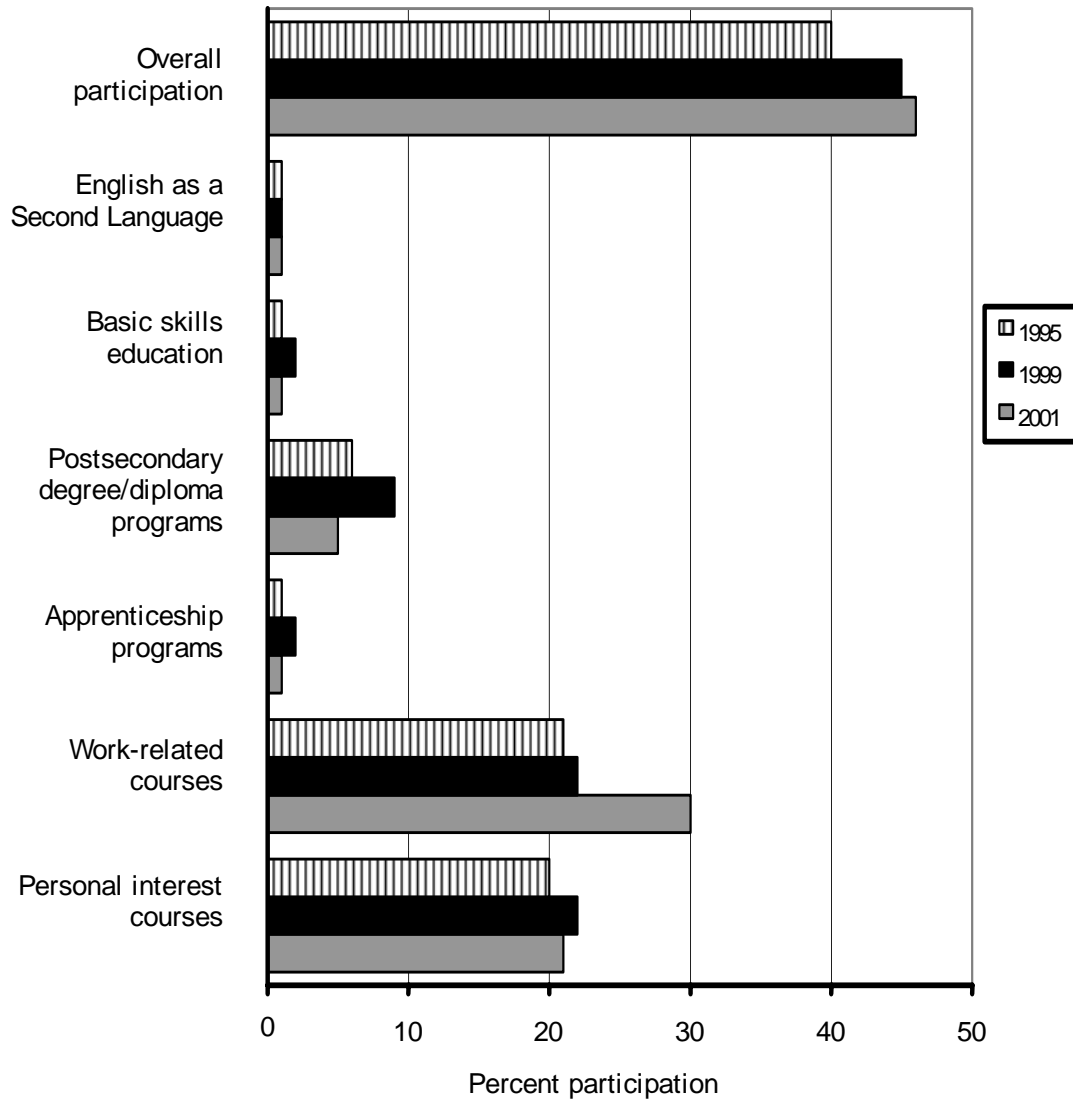
⁶ For the purpose of this report, marital status was coded as follows. Respondents who reported being married are coded as “Married.” Respondents living in households with another adult member (over age 16) and who were separated, divorced, widowed, or never married were asked if they were currently living with a partner. If the respondents reported that they were living with a partner, they are coded as “Living with a partner, not married” regardless of their current marital status (i.e., separated, divorced, widowed, and never married). Respondents not living with a partner or living in households with no other adults who reported being separated, divorced, or widowed are coded as “Separated/divorced/widowed.” Respondents not living with a partner or living in households with no other adults who reported never having been married are coded as “Never married.”

⁷ **Professional or managerial occupations** include executive and managerial occupations, engineers, natural scientists, social scientists, teachers, health diagnosing, registered nurses, writers, health technologies; **service, sales, or support occupations** include technologists, marketing and sales occupations, administrative support, service occupations, miscellaneous occupations; **trades occupations** include agricultural occupation, mechanics, construction occupations, precision production occupation, production working occupations, transportation and laborer occupations.

NOTE: s.e. is standard error. Because of rounding, details may not add to totals.

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

Figure 1. Participation rates in adult education activities: 1995, 1999, and 2001



¹ Includes those who participated in a college or university degree or certificate program or in a vocational/technical diploma or degree program on a part-time basis during the previous 12 months.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning Survey of the National Household Education Surveys Program (NHES), 2001; Adult Education Survey of the NHES, 1999; and Adult Education Survey of the NHES, 1995.

Who Participates in Adult Education?⁷

While participation rates have increased over the years, the demographic characteristics of adult education participants are consistent with those found earlier. More than three decades ago, Johnstone and Rivera (1965) described the adult learner as follows: “The adult education participant is just as often a woman as a man, is typically under forty, has completed high school or more, enjoys an above-average income, works full-time and most often in a white-collar occupation, is married and has children...” (p. 8). The characteristics of participants in 2001 are largely consistent with this observation, although some differences were observed as discussed below.

Age. The overall participation rate in formal educational activities was higher among adults ages 50 and younger than among adults ages 51 or older. Specifically, adults in the three youngest age groups examined (ages 16–30, ages 31–40, and ages 41–50) were more likely to participate in educational activities than adults in the two older age groups (ages 51–65 and ages 66 and older). The rates of participation for the three younger age groups were 53 to 55 percent, compared to 22 and 41 percent for the two older age groups. Older adults, those 66 and older, were less likely than any other age group to participate in educational activities (22 percent compared to 41 to 55 percent) (table 1).

Sex. While Johnstone and Rivera (1965) did not find a sex difference in participation in the 1960s, Merriam and Caffarella (1999) noted that women have had a higher rate of participation than men since 1978. Creighton and Hudson (2002) reported that the participation rate among females was higher than among males in 1999. The AELL findings are consistent with these more recent observations; females were more likely than males to participate in an educational activity (49 percent versus 43 percent) (table 1).

Race/Ethnicity. No differences were detected in participation rates in educational activities by race/ethnicity. In 2001, 47 percent of White adults, 43 percent of Black adults, and 42 percent of Hispanic adults participated in adult education activities (table 1).⁸

Prior Educational Attainment. The prior educational attainment of adults was positively associated with participation in educational activities; the overall participation rate increased with each level of education. Specifically, among those who had not completed high school, 22 percent participated in educational activities during the 12-month period prior to the interview, whereas 58 percent of those

⁷ This section presents the analysis of two-way tabulations examining the relationships between several characteristics and participation in adult education. In a following section, a logistic regression model examines several characteristics simultaneously. The reader will see that some apparent two-way relationships that appear in the tables are not observed when other characteristics are taken into account.

⁸ For ease of presentation, White indicates that the adult is of White, non-Hispanic origin and Black indicates that the adult is of Black, non-Hispanic origin.

with some college education and 66 percent of those with a bachelor's degree or more education did so. The AELL findings regarding the relationship between prior educational attainment and participation in adult education activities are consistent with those of numerous previous research studies (Bureau of Labor Statistics 1993; Creighton and Hudson 2002; Frazis et al. 1998; Hight 1998; Lee, Clery, and Carroll 1999; Lynch and Black 1998; Kim et al. 1995; Kim and Creighton 2000; Veum 1993).

Marital Status. The overall participation rate among adults who were never married (52 percent) was higher than the rate among adults who were married (47 percent), unmarried and living with a partner (43 percent), and separated, divorced, or widowed (38 percent). In addition, the overall participation rate was higher among married adults than it was for separated, divorced, or widowed adults. The higher rates of participation among those who have never been married are at odds with the profile suggested by Johnstone and Rivera more than 30 years ago. To some extent, this finding may be associated with the relationship between age and participation. Young adults (those ages 30 and younger) were more likely to have never been married⁹ and while at the same time their participation rate is higher than adults ages 51 or older (table 1). This is addressed further in a later section of this report.

Employment/Occupation. Employment status and occupational types were also found to be associated with participation. Those adults who had worked for pay or income during the past 12 months were more likely to participate in educational activities (54 percent) than those who had not worked during that period (25 percent). Among those who had worked in the previous 12 months, adults in professional or managerial occupations had a higher rate of participation in adult education activities (71 percent) than those in service, sales, or support occupations (55 percent) and those employed in the trades (34 percent), and those in service, sales, or support occupations had a higher participation rate than adults in trade occupations (table 1). Similar findings were also reported by Creighton and Hudson (2002).

Continuing Education Requirements. Professional or occupational requirements for continuing education or professional development may provide a stimulus for participating in educational activities. As shown in table 1, about one quarter of adults reported that they are required to participate in continuing education or continuing professional development. Adults who had an occupational or legal requirement to take continuing education were more likely to participate in educational activities than those who did not have such a requirement (64 percent and 40 percent, respectively).

Household Income. Household income was positively related to the participation of adults in educational activities. Adults in households with incomes of \$50,001 or more were more likely to participate in adult education activities (56 to 59 percent) than those in households with incomes of

⁹ Among adults under 30 years of age, 47 percent had never been married (s.e. 1.31). Among adults age 30 or older, only 7 percent had never been married (s.e. 0.29) Special tabulations, not shown in tables.

\$50,000 or less (28 to 48 percent). Among households with incomes below \$50,000, the participation rate increased with each household income category shown, from 28 percent among those in households with incomes of less than \$20,000 to 48 percent among those from households with incomes of \$35,001 to \$50,000 (table 1). In addition to the ability to pay for adult education activities associated with higher incomes, the higher rates of participation may reflect the correlation between household income and other factors associated with participation, such as prior educational attainment, or professional or managerial occupations. This is examined in the regression analysis in a later section of this report.

Children Under 10 Years Old in Household. Those adults with children under age 10 living in the household were more likely to participate in educational activities than those without young children (52 percent versus 44 percent) (table 1). While this result appears surprising, it may be associated with the relationship between age and adult education participation. For instance, adults ages 50 or younger would be more likely than those over age 50 to have children under the age of 10; they were more likely to participate in adult education than adults ages 51 or older. This possibility is also examined later in this report.

Summary. As noted at the beginning of this section, the characteristics of participants in formal adult education activities share much in common with the profile stated by Johnstone and Rivera (1965) more than three decades ago, although some differences are observed. In general, the results from these analyses indicate that those who were more likely to participate in adult education activities were young to middle aged; relatively well-educated; employed in the past 12 months; working in professional, service, sales, or support occupations; from households with relatively higher incomes; or subject to continuing education requirements. Contrary to Johnstone and Rivera's profile, but consistent with the more recent observations of Merriam and Caffarella (1999), women were more likely than men to participate in adult education activities. In addition, never-married adults and those who live in households with children under the age of 10 were also more likely to participate in adult education. While all of these adult and household characteristics were associated with participation, they may not all be associated with participation when considered simultaneously. In a later section of this report, a multivariate analysis of overall participation is presented, allowing consideration of how these adult and household characteristics are collectively associated with overall participation in adult education activities.

Participation in Specific Types of Educational Activities

This section focuses on participation rates in three of the seven types of formal educational activities: college or university degree programs, work-related courses, and personal interest courses.

Participation rates in the other four types of educational activities (i.e., ESL, basic skills education, vocational or technical diploma programs, and apprenticeship programs) were very low, 1 percent for each, and no detailed discussion of these estimates is presented in this report. However, participation rates in these four educational activities by characteristics of adults are included in table 1.

Thirty percent of adults participated in work-related courses and 21 percent participated in personal interest courses (table 1). The rate of participation in work-related courses in the AELL-NHES:2001 was higher than the work-related participation rates of 22 percent in the AE-NHES:1999 and 21 percent in the AE-NHES:1995 (figure 1); however, this may be due in part to a difference in the way that courses were identified as work-related in the 2001 survey compared to the two previous surveys.¹⁰ In 1995 and 1999, 20 and 22 percent participation rates, respectively, were observed for personal interest courses as were 6 to 9 percent rates for college/university or vocational/technical degree or diploma programs). For basic skills education, ESL, and apprenticeship programs, however, no differences were detected across the three surveys; estimates are 1 to 2 percent for each year.

Participation in College or University Degree Programs

Four percent of adults participated in college or university degree programs on a part-time basis in the previous 12 months. Participating adults who were enrolled in college or university degree programs on a part-time basis or on both full-time and part-time bases during the 12 months prior to the interview are included in the analysis. Since participation in college or university degree programs on a full-time basis only is not considered to be an adult education activity, those adults (5 percent) are excluded from the participation rate.¹¹

Age. Younger adults (i.e., ages 16–30) were more likely than older adults to participate in part-time college or university degree programs (10 percent for ages 16–30 versus 4 percent or less for all other age groups) (table 1). While many older adults return to college, the traditional path of attending college immediately or shortly after high school graduation persists for many young adults; the higher rate of part-time college participation among younger respondents reflects this. The Integrated Postsecondary Education Data System (IPEDS) reported that, in the fall of 1997, the median age of all full-time and part-time undergraduate students was 21.8 and the median age of all graduate students was

¹⁰ In the AE-NHES:1999 and AE-NHES:1995, 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 the AE-NHES:1999 were in fact work-related courses remembered by the respondent after the work-related section was completed. Therefore, the personal interest section may have acted to some extent as a “residual” section, including activities not recalled earlier in the interview. 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. Those reported as work-related or both were included as work-related courses.

¹¹ Standard error is 0.3%; not shown in tables.

30.6 (National Center for Education Statistics 1999). The NHES:2001 findings, while including only those who were enrolled on a part-time basis, are consistent with the IPEDS findings.

Sex. In 2001, 4 percent of men and 5 percent of women participated in a part-time college or university degree program (table 1). The difference in participation rates found here, 1 percentage point, is very small although statistically significant. Creighton and Hudson (2002) reported that the participation rate in college or university degree or certificate programs did not differ by sex in 1999.

Race/Ethnicity. No differences were detected in part-time college or university program participation by race/ethnicity. Four percent of White, 5 percent of Black, and 4 percent of Hispanics participated in college or university programs in 2001 (table 1).

Prior Educational Attainment. Adults with a high school education or higher were more likely to participate in part-time college or university programs than adults with less than a high school education; postsecondary programs typically require that students have a high school diploma or equivalent prior to enrollment. Adults with some college education or higher were also more likely to participate in college or university programs compared with adults with a high school education (table 1).¹²

Marital Status. Rates of participation in part-time college or university degree or certificate programs were higher among those who had never been married (10 percent) than among those in any other marital status (2 percent to 5 percent). In addition, married adults and unmarried adults who were living with a partner had higher participation rates in part-time college or university degree programs than did adults who were divorced, separated or widowed (table 1).

Employment and Occupation. Consistent with the finding for overall participation, those who worked in the past 12 months had a higher part-time college degree program participation rate (6 percent) than those who had not worked in that time period (1 percent). Among those who were employed, adults who had professional or managerial occupations or service, sales or support occupations (8 percent and 6 percent, respectively) were more likely to participate in college or university degree programs than adults in the trades (2 percent) (table 1).

Continuing Education Requirements. As with the findings for overall participation, adults with continuing education requirements for their occupation or job were more likely to participate in part-

¹² This finding was expected, given that unless a respondent was enrolled in his/her first semester or term in a college or university degree program, he/she will have completed some prior college education.

time college or university programs (6 percent) compared with adults without such requirements (4 percent) (table 1).

Household Income. Participation rates in part-time college or university degree programs ranged from 3 percent to 6 percent according to adult's household incomes. There were very few differences in participation rates in college or university programs according to adult's household income. Only those adults with the lowest household incomes (less than \$20,000) had lower rates of participation compared with adults with household incomes over \$50,001 or more (table 1).

Children Under 10 Years Old in Household. Unlike the findings for the overall adult education participation rate, no difference was detected between the rates of participation for adults living with children under age 10 and adults not living with children under age 10. In 2001, 5 percent and 4 percent of adults living with and without children under age 10, respectively, participated in college or university programs (table 1).

In summary, adults who were more likely to participate in college or university degree or certificate programs on a part-time basis or on both part-time and full-time bases tended to be under age 30; had never been married; had at least completed high school; were employed; were working in professional or managerial occupations or service, sales, or support occupations; and had continuing education requirements.

Participation in Work-Related Courses

Thirty percent of adults participated in one or more work-related courses during the 12 months prior to the interview (table 1). In general, the relationships between adult characteristics and participation in adult education activities overall that were reported earlier are also found for participation in work-related courses, with the exceptions of sex, race/ethnicity, and marital status.

Age. Adults ages 31–40 and those ages 41–50 had higher rates of participation in work-related courses (39 to 42 percent) than did those ages 16–30 and those ages 51–65 (28 percent of each group). This is consistent with the findings of Creighton and Hudson (2002). Among adults ages 66 or older, 4 percent participated in work-related courses, a lower rate than any other age group (table 1). The low rate among older adults reflects the fact that many adults in this age group were not in the labor force.¹³

¹³ Among adults age 66 and older, 57 percent were retired (standard error, 1.3) and 84 percent had not worked in the past 12 months (standard error, 1.1). Not shown in tables.

Sex. Unlike the finding presented above for overall adult education participation, no sex difference was observed in the rate of participation in work-related courses (table 1). This is consistent with the findings of Darkenwald, Kim, and Stowe (1998) and Creighton and Hudson (2002).

Race/Ethnicity. The rate of participation in work-related courses was higher among White adults (32 percent) than among Hispanic and Black adults (22 and 23 percent, respectively) (table 1).

Prior Educational Attainment. When comparing participation rates by prior educational attainment, the pattern that was found for adults taking work-related courses was consistent with that observed for overall adult education participation. Specifically, the rate of participation increased with each level of education, from 6 percent among those who had not completed high school to 51 percent among those with a bachelor's degree or more education (table 1). This finding is consistent with the findings of the 1995 and 1999 NHES adult education surveys (Kim et al. 1995; Darkenwald, Kim, and Stowe 1998; Kim and Creighton 2000; Creighton and Hudson 2002).

Marital Status. A higher participation rate in work-related courses was observed among married adults (33 percent) than among those who were never married (26 percent) or were separated, divorced, or widowed (23 percent) (table 1).

Employment /Occupation. Adults who had worked in the past 12 months were more likely to have participated in work-related courses than those who had not worked, a finding also consistent with previous research (Kim et al. 1995; Darkenwald, Kim, and Stowe 1998; Kim and Creighton 2000; Creighton and Hudson 2002). While 39 percent of those who worked in the previous year participated in such courses, 5 percent of those who had not worked did so. Adults employed in professional or managerial occupations had a higher rate of participation in work-related courses (59 percent) than those in service, sales, or support occupations (36 percent) or those employed in the trades (21 percent). Additionally, adults employed in service, sales, or support occupations had a higher participation rate than adults in the trades (table 1).

Continuing Education Requirements. As with overall participation and part-time college or university programs, adults with continuing education requirements for their work or professions were more likely to participate in work-related courses compared with adults with no such requirements (49 versus 23 percent) (table 1).

Household Income. Household income, a correlate of both prior educational attainment and occupation, was also positively associated with participation in work-related courses. Participation rates

by household income ranged from 12 percent for adults with household incomes of less than \$20,000 to 45 percent for adults with household incomes over \$75,000 (table 1).

Children Under 10 Years Old in Household. Those with children under age 10 in their households were more likely to participate in work-related courses than those without children under age 10 (35 versus 28 percent) (table 1). This is possibly because adults in the age groups most likely to participate in work-related courses are also in the age range where they are likely to have children under age 10. For example, 40 percent of adults ages 50 and younger had children under 10 years old living with them; this was true for 4 percent of adults over age 50.¹⁴ Among adults 51 years old or older, no differences were detected in participation by presence of children under age 10 in the household (20 percent versus 17 percent).¹⁵ Similarly, among adults 50 years old or younger, no differences were detected in participation by presence of children under age 10 in the household (35 percent versus 37 percent).¹⁶

In summary, several adult characteristics were found to be associated with participation in work-related courses. Those who were more likely to participate are adults age 31–50; those who were White; who had higher levels of prior educational attainment; who were employed in the previous 12 months; who worked in a professional or managerial occupation; who had some continuing education requirement; who lived in households with higher incomes; or who were married.

Participation in Personal Interest Courses

About one in five adults (21 percent) participated in one or more personal interest courses in the 12 months prior to the interview (table 1). In general, the patterns of association between adult characteristics and overall participation rates are observed here as well, with the exception of age, race/ethnicity, and presence of children under age 10 in the household.

Age. The variability in participation by age that was observed for overall participation, participation in college or university degree programs, and participation in work-related courses is not detected for personal interest courses. Instead, participation rates across age groups ranged from 19 percent among adults ages 66 and older to 24 percent among adults ages 16–30. Adults ages 16–30 were

¹⁴ Standard errors are, for 40 percent, 0.8; and for 4 percent, 0.5; not shown in tables.

¹⁵ Standard errors are, for 20 percent, 6.1, and for 17 percent, 0.6; not shown in tables.

¹⁶ Standard errors are, for 35 percent, 1.1, and for 27 percent, 0.8; not shown in tables.

more likely to participate in personal interest courses than adults ages 66 and older (table 1); this was the only age difference detected.

Sex. Consistent with the findings concerning overall participation, females were more likely than males to participate in personal interest courses (26 percent versus 16 percent) (table 1). This is consistent with the pattern observed for overall adult education participation, and with Merriam and Caffarella's (1999) report of higher participation among females.

Race/Ethnicity. White adults and Black adults reported participating in personal interest courses at higher rates than Hispanics (table 1).

Prior Educational Attainment. As observed for participation overall and in work-related courses, prior educational attainment was associated with participation in personal interest courses. Adults who attended some college or earned a college degree had higher rates of participation (26 percent and 30 percent) than those who did not complete high school or had only a high school diploma (11 percent and 15 percent). Additionally, adults with a bachelor's degree or more education had a higher participation rate than adults with some college education (table 1).

Marital Status. Adults who had never been married were more likely to participate in personal interest courses (26 percent) than were married adults (21 percent), those who were living with a partner (15 percent), and those who were separated, divorced, or widowed (20 percent). Adults who were unmarried and living with a partner were less likely than those in any other marital status to take personal interest courses (table 1).

Employment/Occupation. Consistent with the findings for adult education participation overall and in work-related courses, employment and occupational status were associated with participation in personal interest courses. Adults who had been employed during the prior 12 months were more likely than those who had not to participate in personal interest courses (22 versus 19 percent). Rates of participation were highest for those in professional or managerial occupations (29 percent). Those in service, sales, or support occupations were more likely to participate in personal interest courses (23 percent) than those employed in the trades and those who had not worked in the past 12 months (12 percent and 19 percent, respectively). Finally, those who had not worked in the prior 12 months had a higher rate of participation in personal interest courses than those in the trades (19 percent versus 12 percent) (table 1).

Continuing Education Requirements. Adults who had professional or legal requirements to participate in continuing education were more likely to participate in personal interest courses (25 percent) than adults without such requirements (20 percent) (table 1).

Household Income. The findings concerning the association of household income with participation in personal interest courses are also consistent with the findings for overall participation. Adults from households with incomes of less than \$20,000 or \$20,001 to \$35,000 (15 percent and 18 percent, respectively) were less likely to participate in personal interest courses than those whose household incomes were \$50,001 to \$75,000 or \$75,000 or more (24 percent and 26 percent, respectively) (table 1).

Children Under 10 Years Old in Household. No differences were detected in participation in personal interest courses by the presence of children under age 10 in the household. Twenty-one percent of both adults living with and without children under age 10 took personal interest courses (table 1).

In summary, adults who were more likely to participate in personal interest courses were females, non-Hispanics, those with at least some college education, those who had never been married, those who were employed during the past 12 months, those working in professional or managerial occupations, those with continuing education requirements, or those living in households with higher incomes.

Summary

When considering the findings across the different types of adult education, an interesting pattern emerges. Measures of socio-economic status (household income, employment/occupation, and prior educational attainment) fit the general pattern in the literature and had consistent patterns of association across all types of adult education. On the other hand, the association of some demographic variables with participation in adult education (e.g., sex, race/ethnicity, marital status, and presence of children in the household) varied by type of adult education activity.

The characteristics of adult education participants depend on which type of adult education is being examined. For adult education overall and for the three specific types discussed in this report, participation rates were higher among adults with higher household income; employed adults; those in professional or managerial occupations or service, sales or support occupations; adults with continuing education requirements; and adults with higher levels of education.

Participation rates by demographic characteristics such as age, race/ethnicity, sex, marital status, and presence of children in the household differed by the type of adult education. Overall participation

rates were higher among adults under age 50; for college or university degree programs, participation was higher for those ages 16–30 than for any other age group. For work-related courses, participation rates were lowest among the youngest and oldest adults, and highest among those ages 31–50. However, for participation in personal interest courses, there was little difference in participation rates by age.

Overall participation rates were higher for women than men, but this appears to be a function of the higher participation rate for women in personal interest courses; no differences were detected between the sexes for work-related courses, and the difference for college or university degree programs was one percent. No differences were found by race/ethnicity for overall participation and for college or university programs. However, the participation rate in work-related courses among White adults was higher than among Black or Hispanic adults. Also, White and Black adults had higher participation rates in personal interest courses than did Hispanics.

The relationship of marital status to adult education participation also varied by the types of educational activities. Adults who had never married and were not living with a partner had higher participation rates for adult education overall, college or university degree programs, and personal interest courses. However, for work-related courses, married adults had higher participation rates than did never-married adults, those not living with a partner, or separated, divorced, or widowed adults. Also, while no differences were detected in the participation rates for postsecondary degree or diploma programs or personal interest courses by whether children under 10 years old reside in the household, adults with children living in their households had higher participation rates in overall adult education, which may result from the fact that they are overrepresented among work-related course takers and among age groups with higher participation rates.

A Multivariate Look at Overall Participation

In the preceding section, the bivariate relationships of personal characteristics and adult education participation were presented. Although a complete multivariate analysis of adult participation in educational activities is beyond the scope of this report, a logistic regression analysis is presented here to examine whether the relationships between individual personal characteristics and participation observed in the bivariate analyses remain when these characteristics are analyzed simultaneously.

The regression results given in table 2 show the association of overall participation with several characteristics: age, sex, race/ethnicity, prior educational attainment, household income, presence of

children under 10 years old in the household, employment/occupation status, and continuing education requirements.¹⁷

The bivariate results for age, sex, race/ethnicity, education, household income, employment/occupation status, and continuing education requirements were largely supported by the multivariate results, although each individual comparison not confirmed for each variable. However, there were somewhat different findings for marital status and presence of children under age 10 in the household.

The regression results indicated that adults ages 51–65 and ages 66 and older were less likely to participate in adult education than all other age groups. Differences were not detected between adults ages 16–30 and 31–40 or 41–50; nor were differences detected between those aged 31–40 and 41–50. Females were more likely than were males to participate, and adults with a college degree or more education were more likely to participate in adult education than were adults with a high school diploma or less education. No differences by race/ethnicity were detected. In addition, the results indicated that those adults with household incomes of \$20,000 or less had lower overall participation rates than adults with household incomes of \$35,001 to \$50,000, \$50,001 to \$75,000, or more than \$75,000, and those with household incomes of \$20,001 to \$35,000 were less likely to participate in adult education than those with household incomes of \$50,001 to \$75,000 or more than \$75,000. The regression results also indicated that those who did not work in the previous 12 months were less likely to participate in adult education than those employed in professional or managerial occupations and those employed in service, sales, or support occupations. Those in professional or managerial occupations were more likely to participate in adult education than those in service, sales, or support occupations and those in trades. Likewise, those in service, sales, or support occupations were more likely than those in trades to participate in adult education. Finally, the results indicate that those adults with continuing education requirements were more likely to participate in adult education than were those adults without.

Consistent with the bivariate results, the regression indicated that those adults who had never married were more likely than those who were unmarried and living with a partner to participate in adult education. However, unlike the bivariate results, no differences were detected between never-married adults and those who were married or who were separated, divorced, or widowed.

When the presence of children under age 10 in the household was examined within a multivariate context, the results were also somewhat different from the bivariate results. While the bivariate results

¹⁷ All adults, including those who had not worked in the previous 12 months, were queried about continuing education requirements. This is because adults not currently in the labor force may have professional or occupational credentials or licenses that they maintain for possible use at a later time, for example, teacher certification, a nursing license, or a beautician's license.

indicated that those with children under age 10 in the household were more likely to participate in overall adult education, no difference was detected in the multivariate analysis.

Table 2. Results of logistic regression analysis of adults' characteristics and participation in adult education: 2000–01

Characteristic	Parameter estimate	s.e.	Odds ratio
Age (Reference category: 41 to 50 years old)			
16 to 30 years old.....	0.19	0.10	1.20
31 to 40 years old.....	-0.02	0.09	0.98
51 to 65 years old.....	-0.39	0.09	0.68*
66 years and older.....	-0.70	0.12	0.50*
Sex (Reference category: Female)			
Male.....	-0.35	0.06	0.70*
Race/ethnicity (Reference category: White, non-Hispanic)			
Black, non-Hispanic.....	-0.02	0.09	0.98
Hispanic.....	0.12	0.11	1.13
Other, non-Hispanic.....	-0.07	0.13	0.94
Educational attainment (Reference category: Bachelor's degree or higher)			
Less than high school.....	-1.08	0.14	0.34*
High school diploma or its equivalent.....	-0.90	0.09	0.41*
Some college.....	-0.10	0.08	0.90
Marital status ¹ (Reference category: Never married)			
Married.....	0.00	0.09	1.00
Living with a partner, unmarried.....	-0.27	0.13	0.76*
Separated/divorced/widowed.....	0.08	0.11	1.09
Employment /Occupation ² (Reference category: Professional or managerial)			
Service, sales, or support.....	0.24	0.08	0.79*
Trades.....	-0.76	0.10	0.47*
Not employed in the past 12 months.....	-1.05	0.09	0.35*
Continuing education requirements (Reference category: Yes)			
No.....	-0.64	0.06	0.53*
Household income (Reference category: \$75,001 or more)			
\$20,000 or less.....	-0.58	0.09	0.56*
\$20,001–\$35,000.....	-0.33	0.08	0.72*
\$35,001–\$50,000.....	-0.10	0.09	0.91
\$50,001–\$75,000.....	0.07	0.09	1.07
Children under 10 years old in household (Reference category: Yes)			
No.....	-0.00	0.07	1.00

* $p < .05$.

¹ For the purpose of this report, marital status was coded as follows. Respondents who reported being married are coded as “Married.” Respondents living in households with another adult member (over age 16) and who were separated, divorced, widowed, or never married were asked if they were currently living with a partner. If the respondents reported that they were living with a partner, they are coded as “Living with a partner, not married” regardless of their current marital status (i.e., separated, divorced, widowed, and never married). Respondents not living with a partner or living in households with no other adults who reported being separated, divorced, or widowed are coded as “Separated/divorced/widowed.” Respondents not living with a partner or living in households with no other adults who reported never having been married are coded as “Never married.”

² **Professional or managerial occupations** include executive and managerial occupations, engineers, natural scientists, social scientists, teachers, health diagnosing, registered nurses, writers, health technologies; **service, sales, or support occupations** include technologists, marketing and sales occupations, administrative support, service occupations, miscellaneous occupations; **trades occupations** include agricultural occupation, mechanics, construction occupations, precision production occupation, production working occupations, transportation and laborers occupations.

NOTE: s.e. is standard error.

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

In summary, the regression analysis yielded findings generally consistent with the bivariate analyses for age, sex, race/ethnicity, prior educational attainment, income, and occupational/employment status. Other findings of the bivariate analysis were not confirmed. Specifically, the greater rate participation of never-married adults compared to those who were married or who were separated, divorced, or widowed was not observed in the multivariate analysis. However, never-married adults were more likely to participate than were unmarried adults living with a partner. The greater likelihood of participation in adult education when children under age 10 were present in the household was not observed when the other characteristics of adults were taken into account.

Characteristics of Participation in Educational Activities

The diversity of adult education is reflected not only in the various types of educational activities in which adults participate, but also in important features of their participation. This section provides information about several characteristics of participation in college or university degree or certificate programs, work-related courses, and personal interest courses. The analysis examines the intensity of participation, as measured by credit and instructional hours; personal expenditures for educational activities; providers of instruction; the use of automated technology in instruction; and participation in educational activities with the goal of obtaining or maintaining a state, industry, or company certificate or license. Readers should note that, because of differences in the nature of the various types of educational activities, some information was collected only for pertinent types of activities (e.g., provider for work-related and personal interest courses, credit hours for college and vocational programs).

As noted earlier, the participation rates for overall adult education and college or university degree or certificate programs do not include adults whose only enrollment was in a college or university program on a full-time basis. Those full-time-only degree-seekers are also excluded in the analysis presented here.

Total Credit Hours in College or University Degree Programs. Participants in college or university degree programs varied considerably in the number of credit hours they took in the 12 months prior to the interview. Forty-five percent of adults who participated part-time in college or university degree programs took 11 credit hours or less and 26 percent took 12–18 credit hours during the past 12 months. Seven percent took 31 credit hours or more (table 3).¹⁸ Since some adults were enrolled in

¹⁸ Participants include those who participated in college programs on a part-time basis (an estimated 886,384 adults) as well as those who participated on both part-time and full-time bases in the previous 12 months (an estimated 1,981,794 adults). An additional estimated 6,798,999 adults participated in college programs on a full-time basis only and are not included as adult education participants in college programs here. It is not possible to differentiate credit hours taken on a part-time basis or a full-time basis for those who participated in both statuses in the previous 12 months.

college degree programs on a part-time basis and others on both part-time and full-time bases at some time during the past 12 months, the numbers of credit hours reflects the range of full-time and part-time enrollment status for the latter group. Since the analysis excluded full-time-only degree seekers, table 3 shows relatively lower numbers of credit hours than if all degree-seeking participants were included in the analysis.

Total Instructional Hours in Work-Related Courses and Personal Interest Courses.¹⁹ In college and university programs, courses are typically assigned a number of credit hours. However, while some work-related and personal interest courses may be college courses, many are not, and an alternative measure of intensity is needed. For these two types of courses, participants were asked to report the total instructional hours for their courses in the previous 12 months. Twenty-eight percent of adults spent a total of 10 hours or less in work-related courses, 25 percent spent 11–25 hours, 23 percent spent 26–50 hours, and 24 percent spent 51 hours or more in work-related courses.

A quarter of participating adults (25 percent) spent 10 hours or less in personal interest courses during the 12-month period. One-third of participants in personal interest courses (33 percent) spent 51 hours or more in such courses. In contrast, 24 percent of participants in work-related courses spent 51 hours or more (table 3). Previous NHES data indicate that many work-related courses are brief and intensive (Darkenwald, Kim, and Stowe 1998). An example of such a course would be a one-day management seminar. In contrast, many personal interest activities may continue for an extended period of time (for example, ongoing Bible study or physical fitness classes).

Providers of Instruction for Work-Related Courses and Personal Interest Courses.²⁰ According to Darkenwald and Merriam (1982), the wide variety in the number of organizations that plan and conduct adult education activities has been a source of vitality and effectiveness in the field. Examples of adult education providers include traditional providers (e.g., elementary schools, secondary schools, colleges and universities, and vocational or technical schools) and other organizations such as businesses, community agencies, private organizations, voluntary organizations or groups, religious

¹⁹ Instructional hours are summed across courses and weighted for subsampling of courses taken for work-related reasons or personal interest.

²⁰ The reader will note that the percentages for the various types of instructional providers sum to more than 100 percent. This is because some adults took courses from more than one type of provider.

Table 3. Number and percent of adults reporting selected educational characteristics in college or university degree programs, work-related courses, and personal interest courses: 2000–01

Characteristic	College or university degree programs ¹		Work-related courses		Personal interest courses ²	
	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.
Number of adults (in thousands)	8,781	405	59,084	932	42,346	1,074
Total credit hours³						
11 credit hours or fewer	45%	3.0	†	†	†	†
12–18 hours	26	2.5	†	†	†	†
19–30 hours	18	2.1	†	†	†	†
31 hours or more	7	1.2	†	†	†	†
Credit hours do not apply.....	4	0.9	†	†	†	†
Total instructional hours						
10 hours or less	†	†	28%	1.1	25%	1.2
11–25 hours	†	†	25	1.0	22	1.0
26–50 hours	†	†	23	1.0	20	1.0
51 hours or more	†	†	24	0.9	33	1.2
Instructional providers⁴						
Postsecondary school	†	†	20	0.8	20	0.9
Other school or school district	†	†	7	0.5	6	0.5
Business or industry	†	†	49	1.1	17	1.0
Government agency	†	†	15	0.7	5	0.5
Professional association.....	†	†	20	0.9	8	0.6
Others ⁵	†	†	15	0.8	50	1.1
Personal expenses for participation⁶						
None	25	2.6	73	0.9	40	1.3
\$500 or less	17	1.9	20	0.9	48	1.4
\$501–\$1,000.....	17	1.9	3	0.4	7	0.7
\$1001–\$3,000.....	23	2.4	2	0.3	4	0.5
\$3,001 or more	18	2.2	1	0.2	1	0.2
Use of technology in instruction⁴						
TV, video, or radio.....	26	2.2	54	1.0	32	1.0
Computer.....	57	3.2	53	1.2	19	0.9
Computer conferencing.....	12	1.6	10	0.6	4	0.5
Internet or WWW.....	32	2.5	16	0.8	8	0.6
Participated in programs/courses to obtain or maintain certificate or license						
Yes.....	48	3.9	38	1.1	†	†
No.....	52	3.9	62	1.1	†	†

† Not applicable.

¹ Participants include those who participated in college programs on a part-time basis (an estimated 886,384 adults) as well as those who participated on both part-time and full-time bases in the previous 12 months (an estimated 1,981,794 adults). An additional estimated 6,798,999 adults participated in college programs on a full-time basis only and are not included as adult education participants in college programs here.

² Personal interest courses include educational activities that have an instructor other than English as a Second Language, basic skills courses, college or vocational degree or diploma programs, and work-related courses. Examples include courses related to health, hobbies or sports lessons, foreign languages, dance or music, and Bible study.

³ Total credit hours for the previous 12 months are given. It is not possible to differentiate credit hours taken on a part-time basis or a full-time basis for those who participated in both statuses in the previous 12 months.

⁴ Participants could give more than one response.

⁵ Other providers include religious organizations, community organizations, a tutor or private instructor, or some other organization.

⁶ Participants were asked about personal expenses for tuition, fees, books, and other materials.

NOTE: s.e. is standard error. Because of rounding and/or because some categories are not mutually exclusive, percents may not sum to 100.

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

organizations, and government agencies. Merriam and Brockett (1997) also note that only traditional providers have education as their primary function and nontraditional providers typically offer adult education as a secondary function.

Bassi, Cheney, and Van Buren (1997) collected information about providers of training programs or courses from employers. The study reported that employers are likely to use a wide variety of external training providers, such as community and technical colleges, universities, for-profit learning and development centers, and private industry associations. They also noted that another recent trend is the rise in 4-year universities developing corporate education departments that provide training on a contract basis.

In an analysis of data from the 1995 NHES adult education survey, Darkenwald, Kim, and Stowe (1998) reported that 48 percent of the participants in work-related courses took courses from business or industry, followed by a professional organization (15 percent), 4-year college or university (12 percent), and private vocational, trade, business, or flight school or hospital (10 percent). Twenty-six percent of adults reported taking work-related courses at other institutions, including adult learning centers; federal, state, or local government agencies; public libraries; churches or religious organizations; tutors or private instructors; or some other organizations.

Similar findings were observed in the NHES:2001 (table 3). While adults took work-related courses from a wide variety of instructional providers, more adults took courses provided by business and industry (49 percent) than any other provider type. Twenty percent of adults took work-related courses from postsecondary schools and 20 percent from professional organizations. Fifteen percent of adults took courses from government agencies, and 7 percent from schools or school districts. In addition, 15 percent of adults took work-related courses from other providers, including private organizations, religious organizations, community centers, and public libraries.

Participants in personal interest courses also took classes from a wide variety of providers, but the distribution of providers was quite different from that of participants in work-related courses. The most frequently reported response was “other” types of providers, which includes community centers, public libraries, private organizations, and religious organizations (50 percent). Twenty percent of adults took personal interest courses from postsecondary institutions and 17 percent from business or industry. Small percentages of adults took personal interest courses from schools or school districts, government agencies, or professional associations (5 percent to 8 percent). A smaller percentage of participants in personal interest courses took courses from business and industry (17 percent) than did participants in work-related courses (49 percent).

Personal Expenses for Participation. The AELL-NHES:2001 collected information about personal expenses for participation in educational activities, such as tuition and fees and costs for books or other materials. Twenty-five percent of the participants in college or university degree programs reported no personal expenses for their classes (table 3); that is, neither they nor their families paid any of the expenses. Seventy-five percent of participating adults spent their own or their families' money for college degree programs during the past 12 months: 17 percent of adults spent \$500 or less; another 17 percent spent between \$501 and \$1,000; 23 percent spent between \$1,001 and \$3,000; and 18 percent spent more than \$3,000.

Nearly three quarters of participants in work-related courses (73 percent) reported that they had not spent any of their own or their families' money to pay for the courses. Another 20 percent reported that they spent \$500 or less for all of the work-related courses taken over the previous 12 months. Six percent of participants spent more than \$500 to participate in work-related courses.

Fewer participants in personal interest courses reported that they had not spent any of their own or their families' money to pay for courses (40 percent) compared to the participants in work-related courses (73 percent). Forty-eight percent of participants in personal interest courses spent \$500 or less over the previous 12 months; few adults (12 percent) spent more than \$500.

In summary, participants in college or university degree programs were more likely to spend more than \$500 for educational expenses than participants in work-related courses or personal interest courses. On the other hand, participants in work-related courses were more likely to take courses without any personal expenses than participants in college or university degree programs or personal interest courses.

Use of Automated Technology in Instruction. Adult education providers are turning to emerging technologies to increase the flexibility and accessibility of their programs (Bassi and Van Buren 1998). Some examples of such automated technology are computers, TV, video, and the Internet or World Wide Web.

Bassi, Cheney, and Van Buren (1997) conducted an employer-based study in which human resources directors reported on training activities offered by the employers. The following techniques were most frequently reported to be used for training purposes: computer-based training (55 percent), video-teleconferencing (53 percent), CD-ROM (43 percent), and Internet/World Wide Web (27 percent). In a 1998 report on industry trends, Bassi and Van Buren (1998) predicted the continued growth of the

Internet, as well as advances in intelligent tutoring systems, object-based learning, and voice-recognition technology as having a significant impact on technology-delivered training.

The NHES:2001 data show that the use of automated technology in instruction varied by type of educational activity. The use of technology for college or university instruction was reported by many participating adults.²¹ The use of computers for instruction (57 percent) was most often reported, followed by instruction using the Internet or World Wide Web (32 percent) as well as instruction using television, video, or radio (26 percent). Instruction using computer conferencing was least reported (12 percent) (table 3).

The use of automated technology for instruction in work-related courses was also reported by many participants. The types of technology most often reported were television, video, or radio, reported by 54 percent of participating adults; and computer instruction, reported by 53 percent. Much smaller percentages of adults reported the use of computer conferencing and the Internet or World Wide Web (10 and 16 percent, respectively).

The use of automated technology for instruction in personal interest courses was reported less often than in work-related courses. Almost one-third of adults taking personal interest courses reported the use of television, video, or radio as an instructional mode (32 percent). A smaller percentage of adults reported the use of computers for instruction (19 percent). Eight percent of participating adults reported the use of the Internet or World Wide Web for instruction.

Obtaining or Maintaining a Certificate or License. An area that is not addressed in the research literature is the extent to which adults participate in educational activities for the purposes of obtaining or maintaining a state, industry, or company certificate or license. To fill this gap, the AELL-NHES:2001 asked participants whether they took educational activities for this purpose. About half of the adults participating in college or university degree programs on a part-time basis or both part-time and full-time bases reported that they did so to obtain or to maintain a state, industry, or company certificate or license (48 percent). Among those who took work-related courses, a smaller percentage (38 percent) reported that they did so to obtain or to maintain a state, industry, or company certificate or license.

²¹ Percentages sum to more than 100 because respondents could report the use of more than one type of technology.

Employer Support for Participation

Research on who receives employer-sponsored job training mirrors much of the research on the relationship between adult characteristics and adult education participation. In general, the youngest and oldest workers were less likely to receive employer-sponsored training (Bowers and Swaim 1994; Frazis et al. 1998), and workers with higher education levels were more likely to receive employer-sponsored training (Altonji and Spletzer 1991; Bowers and Swaim 1994; Frazis et al. 1998; Lynch and Black 1998). In general, White workers tended to receive more employer-sponsored education than did Black or Hispanic workers (Bureau of Labor Statistics 1993; Frazis et al. 1998). Also, higher-paid workers were more likely to receive employer-sponsored training than lower-paid workers (Frazis et al. 1998).

Lee, Clery, and Carroll (1999) reported that employer support for degree programs varied by adults' occupations. Employees in technical fields were more likely to receive employer financial aid than adults working in occupations such as sales or marketing. In addition, employees in executive, management, or professional positions were more likely to receive employer financial support than those in administrative support occupations. Engineers, surveyors, or architects who enrolled in degree programs received more financial support from their employers than any other group of employees.

In the AELL-NHES:2001, adults who participated in educational activities in the 12 months prior to the survey and were employed at the time they did so were asked whether they received any support from their employer for their participation. This section examines the characteristics of participating adults who received any type of employer support and the percentage of adults who received particular types of support for participation in college or university degree programs and in work-related courses. Employer support includes provision of instruction, offering courses or classes at the workplace, providing courses or classes during paid work hours, and paying for or reimbursing educational expenses.

Age. As shown in table 4, 68 percent of employed adults who participated in adult education activities in the 12 months prior to the survey received some type of employer support. Consistent with the findings of Bowers and Swaim (1994) and Frazis et al. (1998) regarding employer-sponsored training, the youngest and oldest participating adults were least likely to receive any employer support. Forty percent of participating adults ages 66 and older received such support, as did 60 percent of those ages 16–30. In contrast, receipt of employer support education activities was reported by 73 percent of participating adults ages 31–40, 74 percent of those ages 41–50, and 68 percent of those ages 51–65.

Sex. No sex difference in reports of receiving employer support was detected; 68 percent of males and females who participated in adult education activities reported receiving employer support for participation.

Race/Ethnicity. When looking at employer support by race/ethnicity, White participants were more likely to receive employer support (71 percent) than Black or Hispanic participating adults (63 percent and 53 percent, respectively). These results are consistent with findings cited earlier in this section regarding employer-sponsored training (Bureau of Labor Statistics 1993; Frazis et al. 1998).

Prior Educational Attainment. The receipt of employer support was positively associated with the prior educational attainment of adults. The percentage of participating adults who received employer support increased with each level of education.

Marital Status. Participating adults who had never married reported lower rates of employer support than did those who were either married or separated, divorced or widowed. Fifty-nine percent of participating adults who had never married reported receiving employer support, compared to 68 percent of separated, divorced, or widowed adults and 71 percent of married adults.

Occupation. Participating adults working in professional or managerial occupations were more likely to receive employer support (78 percent) than those in service, sales, or support occupations (63 percent) or those employed in the trades (60 percent).

Employer Size. Employer size was also associated with the receipt of employer support. Participating adults who worked for large employers (i.e., 500 employees or more) were more likely to receive employer support for their participation (78 percent) than were adults who worked for smaller employers (73 percent of participants in organizations with 25–499 employees), who were in turn more likely to report receiving employer support for their participation than were adults from the smallest employers (43 percent of those in organizations with 1–24 employees).

Continuing Education Requirements. Participants with continuing education requirements for their job or profession were more likely to receive employer support for their participation than were adults without such requirements. Seventy-four percent of participating adults with education requirements received support compared with 65 percent of adults without requirements.

Table 4. Number of adult education participants who worked in the previous 12 months and the percent who received any employer support for participating, by selected demographic, educational, and occupational characteristics: 2000–01

Characteristic	Total adults who worked in the previous 12 months (in thousands)	Any employer support ¹ for participation in adult education activities	
	Number	Percent	s.e.
Total	78,883	68	0.9
Age			
16 to 30 years old	22,539	60	2.0
31 to 40 years old	20,323	73	1.7
41 to 50 years old	21,223	74	1.5
51 to 65 years old	13,372	68	1.9
66 years and older.....	1,427	40	5.2
Sex			
Male	37,451	68	1.4
Female.....	41,432	68	1.2
Race/ethnicity			
White, non-Hispanic.....	59,040	71	0.7
Black, non-Hispanic	8,071	63	2.8
Hispanic	7,292	53	3.2
Other	4,481	70	4.0
Educational attainment			
Less than high school	4,835	34	4.4
High school diploma or its equivalent.....	17,849	62	1.8
Some college.....	26,394	70	1.5
Bachelor's degree or higher	29,805	76	1.2
Marital status²			
Married	49,215	71	1.1
Living with a partner, not married	5,583	68	3.7
Separated/divorced/widowed	8,767	68	2.0
Never married	15,319	59	2.3
Occupational group³			
Professional or managerial	30,087	78	1.2
Service, sales, or support.....	35,883	63	1.4
Trades	12,914	60	2.4
Employer size			
1–24 employees	18,642	43	1.9
25–499 employees.....	21,793	73	1.6
500 employees or more	38,448	78	1.1
Continuing education requirements			
Yes	28,789	74	1.4
No	50,094	65	1.1
Household income			
\$20,000 or less.....	7,956	48	3.1
\$20,001–\$35,000	12,436	58	2.6
\$35,001–\$50,000	13,735	66	2.2
\$50,001–\$75,000.....	19,970	76	1.5
\$75,001 or more.....	24,785	75	1.4

¹ Employer support includes providing instruction, providing classes at workplace, providing classes during work hours, and paying for or reimbursing expenses for classes, programs, or courses.

² For the purpose of this report, marital status was coded as follows. Respondents who reported being married are coded as “Married.” Respondents living in households with another adult member (over age 16) and who were separated, divorced, widowed, or never married were asked if they were currently living with a partner. If the respondents reported that they were living with a partner, they are coded as “Living with a partner, not married” regardless of their current marital status (i.e., separated, divorced, widowed, and never married). Respondents not living with a partner or living in households with no other adults who reported being separated, divorced, or widowed are coded as “Separated/divorced/widowed.” Respondents not living with a partner or living in households with no other adults who reported never having been married are coded as “Never married.”

³ **Professional or managerial occupations** include executive and managerial occupations, engineers, natural scientists, social scientists, teachers, health diagnosing, registered nurses, writers, health technologies; **service, sales, or support occupations** include technologists, marketing and sales occupations, administrative support, service occupations, miscellaneous occupations; **trades occupations** include agricultural occupation, mechanics, construction occupations, precision production occupation, production working occupations, transportation and laborer occupations.

NOTE: s.e. is standard error. Because of rounding, percents may not sum to 100. Includes participating adults who worked for pay or income in the previous 12 months.

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

Household Income. Participating adults whose household incomes were more than \$50,000 received employer support at higher rates (75 to 76 percent) than adults with household incomes of \$50,000 or less (48 to 66 percent).

Multivariate Analysis of Employer Support

Table 5 shows the results of a logistic regression analysis examining characteristics associated with reports of receiving any employer support for educational activities. This analysis is designed to examine whether the relationships observed in the bivariate analysis are also observed when characteristics are analyzed simultaneously. Participants ages 66 and older were less likely to receive employer support than those in any of the younger age groups. The youngest group of participating adults (ages 16 to 30) was less likely to receive employer support than adults ages 31 to 40, and those ages 41 to 50; however, they were more likely to receive employer support than adults ages 66 and older. Those who had not completed a high school diploma were less likely to report receiving employer support than those with a high school diploma, those with some college but no college degree, and those with a college degree or more education.

White participants were more likely to report receiving employer support than were Black or Hispanic adults. Participants who were married, separated, divorced or widowed, or unmarried and living with a partner were more likely to receive support than those who were never married. Those in professional or managerial occupations, working for large employers (i.e., 500 or more employees), and with occupational requirements for continuing education were also more likely to have reported receiving employer support for participation in educational activities in the 12 months prior to the interview.

Participating adults with household incomes of \$20,000 or less and those with incomes of \$20,001 to \$35,000 were less likely to receive employer support than were adults from households with incomes of \$50,001 to \$75,000 or \$75,001 or more.

Table 5. Results of logistic regression analysis of adult characteristics and receipt of any employer support for participating in adult education activities by selected demographic, educational, and occupational characteristics: 2000–01

Characteristic	Parameter estimate	s.e.	Odds ratio
Age (Reference category: 41 to 50 years old)			
16 to 30 years old.....	-0.28	0.13	0.75*
31 to 40 years old.....	0.02	0.13	1.02
51 to 65 years old.....	-0.36	0.22	0.69*
66 years and older.....	-1.13	0.25	0.32*
Sex (Reference category: Female)			
Male.....	0.03	0.10	1.03
Race/ethnicity (Reference category: White, non-Hispanic)			
Black, non-Hispanic.....	-0.28	0.14	0.75*
Hispanic.....	-0.41	0.13	0.66*
Other, non-Hispanic.....	0.09	0.20	0.92
Educational attainment (Reference category: Bachelor's degree or higher)			
Less than high school.....	-0.83	0.26	0.43*
High school diploma or its equivalent.....	-0.18	0.13	0.84
Some college.....	0.04	0.12	1.04
Marital status ¹ (Reference category: Never married)			
Married.....	0.28	0.13	1.32*
Living with a partner, unmarried.....	0.48	0.21	1.62*
Separated/divorced/widowed.....	0.37	0.15	1.44*
Employment /Occupation ² (Reference category: Professional or managerial)			
Service, sales, or support.....	-0.37	0.10	0.69*
Trades.....	-0.53	0.16	0.59*
Employer size (Reference category: 500 employees or more)			
1–24 employees.....	-1.48	0.10	0.23*
25–499 employees.....	-0.25	0.11	0.78*
Continuing education requirements (Reference category: Yes)			
No.....	-0.31	0.11	1.37*
Household income (Reference category: \$75,001 or more)			
\$20,000 or less.....	-0.50	0.19	0.61*
\$20,001–\$35,000.....	-0.30	0.15	0.74*
\$35,001–\$50,000.....	-0.16	0.14	0.85
\$50,001–\$75,000.....	0.16	0.11	1.17

* $p < .05$.

¹For the purpose of this report, marital status was coded as follows. Respondents who reported being married are coded as “Married.” Respondents living in households with another adult member (over age of 16) and who were separated, divorced, widowed, or never married were asked if they were currently living with a partner. If the respondents reported that they were living with a partner, they are coded as “Living with a partner, not married” regardless of their current marital status (i.e., separated, divorced, widowed, and never married). Respondents not living with a partner or living in households with no other adults who reported being separated, divorced, or widowed are coded as “Separated/divorced/widowed.” Respondents not living with a partner or living in households with no other adults who reported never having been married are coded as “Never married.”

² **Professional or managerial occupations** include executive and managerial occupations, engineers, natural scientists, social scientists, teachers, health diagnosing, registered nurses, writers, health technologies; **service, sales or support occupations** include technologists, marketing and sales occupations, administrative support, service occupations, miscellaneous occupations; **trades occupations** include agricultural occupation, mechanics, construction occupations, precision production occupation, production working occupations, transportation and laborer occupations.

NOTE: s.e. is standard error.

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

Employer Support for Various Types of Activities

The extent to which participants reported receiving employer support varied considerably by type of educational activity (table 6). Forty percent of adults who were enrolled in college or university degree programs reported receiving some type of support from their employers. Among those in college or university degree programs, the most frequently reported form of employer support was reimbursement or payment of tuition and fees or books and other materials (30 percent). Five to 7 percent of participants reported other types of employer support.

Lee, Clery, and Carroll (1999) examined ways in which employers assisted their employees in continuing their education, including attending postsecondary education institutions. They found that employers tended to support work-related programs in preference to degree programs. The AELL-NHES:2001 findings indicate that while 40 percent of college degree program participants did receive some support from their employers, 82 percent of participants in work-related courses received employer support. The most common types of employer support among work-related course participants were reimbursement or payment of course costs (74 percent) and taking courses during paid work hours (70 percent). In addition, 49 percent of participants in work-related courses reported taking these courses at their workplaces, and 46 percent reported that their employers provided course instruction.

Employer Requirements to Participate in Education and Training

An employer requirement to take courses or classes may serve as a stimulus for employed adults to participate in adult education activities. Six percent of participants in college or university degree programs reported that they were required to take the degree programs by their employers (table 6). About half of employed adults who took part in work-related courses were required by their employers to take one or more courses.

Summary

The receipt of employer support was reported by 68 percent of adult education participants who had worked in the previous 12 months, including 82 percent of those who took work-related courses, and 40 percent of those who were enrolled in college or university degree programs. The most common form of employer support for college programs was the reimbursement of tuition, fees, and other expenses. Among participation in work-related courses, both reimbursement of costs and taking courses during paid work hours were frequent types of employer support. The receipt of employer support was associated with being White; being married or separated, divorced or widowed; having higher educational attainment; having higher household income; having a professional or

managerial occupation; working for a large employer; and having an occupational requirement for continuing education.

Table 6. Number of participants in college or university degree programs and in work-related courses, and percent receiving various types of employer support: 2000–01

Type of employer support/incentives	College or university degree programs		Work-related courses	
	Estimate	s.e.	Estimate	s.e.
Number of participating adults (in thousands)	8,781	405	59,084	932
Received any type of employer support	40%	2.8	82%	0.9
Employer provided instruction	#	#	46	1.0
Took educational activities at workplace.....	7	1.2	49	1.0
Took educational activities during work hours while being paid	5	0.9	70	1.0
Received reimbursement or payment for tuition, books, and materials	30	2.4	74	1.0
Required by employer to take educational activities ¹	6	1.2	50	0.8

Estimate rounds to zero or zero cases in sample.

¹Indicates a requirement by an employer for whom the adult worked while taking the course(s).

NOTE: s.e. is standard error. Includes participating adults who worked for pay or income at the time of taking programs, courses, or classes. Because categories are not mutually exclusive (i.e., some respondents reported more than one type of support), percents may not sum to 100.

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

Reasons for Participation in Work-Related Courses

Numerous studies have explored the social, psychological, and economic reasons adults participate in adult education activities. While reasons or motivations vary depending on the participants' age, sex, and prior educational attainment, an analysis of data from the 1995 NHES adult education survey (Kopka and Peng 1994) showed 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.

In AELL-NHES:2001, participants in work-related courses were asked to report the reasons for their participation. Table 7 shows the percentages of participants in work-related courses who reported

each reason for participating in work-related courses during the 12-month period prior to the interview. Some adults took multiple courses and respondents could choose more than one reason for each of the courses they took. As a result, the percentages of participants giving each reason sums to more than 100.

Table 7. Number and percent of participants in work-related courses who cited various reasons for participation in work-related courses: 2000–01

Reasons for participation in work-related courses	Participants in work-related courses	
	Estimate	s.e.
Total number of adults (in thousands).....	59,084	932
To maintain or improve skills or knowledge.....	95%	0.5
To learn new skills or methods not already known	84	0.9
To get a raise or promotion.....	22	0.8
To get a new job with a different employer.....	10	0.6
To get or keep a state, industry, or company certificate or license	38	1.1
Required to take the course(s) ¹	62	1.0
Other reasons	22	0.9

¹ Requirements may include those of an employer or other professional, legal, or license/certification requirements.

NOTE: s.e. is standard error. Because respondents could report more than one reason for each of the courses they took, percents sum to more than 100.

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

Ninety-five percent of the participants in work-related courses reported that they took courses to maintain or improve skills or knowledge, while 84 percent of the participants reported taking courses to learn new skills or methods. A majority of participants also reported that they took work-related courses because they were required to take them by their employers or to meet professional, legal, or licensing or certification requirements (62 percent). Thirty-eight percent of the respondents reported that they took work-related courses to obtain or maintain a state, industry, or company certificate or license. Other reasons for participation included getting a raise or promotion (22 percent), getting a new job with a different employer (10 percent), or other reasons (22 percent).

Work-Related Informal Learning Activities

In the foregoing sections, participation in relatively formal, structured educational activities has been examined. However, learning also takes place in informal ways. Volpe, Marsick, and Watkins (1999) summarized themes from informal learning research, reporting that informal learning is often integrated with work and daily routines, may not be highly conscious, may be haphazard and influenced by chance, and may be associated with the knowledge and learning activities of others in the person's environment.

Informal learning is regarded as a major source of the acquisition of new knowledge and skills in the workplace; Bruce, Aring, and Brand (1998) stated that critical skills for worker and company productivity acquired by informal learning comprise as much as 70 percent of all workplace learning. Merriam and Caffarella (1999) agreed that adults often acquire new skills, information, and beliefs in an informal way beyond the limits of established programs.

Respondents to the NHES:2001 were asked about their participation in a variety of work-related informal learning activities during the 12-month period prior to the interview. Work-related informal learning includes receiving supervised training or mentoring, self-paced study using manuals or video tapes, self-paced study using a computer, attending "brown bag" or informal presentations, attending conferences, or reading professional journals or magazines. Some of these informal learning activities may be undertaken by an adult regardless of his or her employment status. However, supervised training or mentoring on the job is, of course, available only to those who are employed.

As shown in table 8, nearly two-thirds of adults (or about 125 million) reported participating in work-related informal learning activities. Forty three percent of all adults reported reading professional journals or magazines, and 30 percent of adults reported being engaged in self-paced study using books, manuals, or video tapes. Smaller percentages of adults engaged in self-paced study using computer-based software, attended "brown-bags" or other informal presentations, or attended conferences or conventions (20 percent to 25 percent). Among adults who worked in the past 12 months, 46 percent received supervised training or mentoring.

Age. Consistent with research and findings for several types of formal activities, older adults (those ages 66 and older) were less likely to participate in work-related informal learning overall compared with younger adults. In general, adults under age 50 were more likely to engage in each type of work-related informal learning (21 percent to 58 percent) than were older adults (4 percent to 44 percent).

Sex. Males were more likely than females to take part in work-related informal learning overall (67 percent and 59 percent, respectively). Also, males were more likely to participate in each type of work-related informal learning activities than were females, with the exception of receiving supervised training or mentoring.

Race/Ethnicity. In contrast to findings concerning some formal educational activities reported elsewhere in this report, White adults were more likely than Hispanic adults to participate in informal learning activities overall (64 percent and 57 percent respectively). No such differences were observed when comparing Black adults with White or Hispanic adults.

Where there were differences in participation in specific informal learning activities by race/ethnicity, White adults were generally more likely to participate than others. There were no race/ethnicity differences observed in reports of receiving supervised training or mentoring and engaging in self-paced study using books, manuals or video tapes. White adults were more likely than Hispanic adults to report attending “brown-bags” or other informal presentations and attending conferences (20 and 25 percent versus 15 and 20 percent, respectively). White adults were more likely than Black and Hispanic adults to report reading professional journals or magazines (45 percent versus 38 and 34 percent, respectively). Both White and Black adults were more likely than Hispanics to report engaging in self-paced study using computer-based software (22 and 20 percent, respectively versus 15 percent).

Prior Educational Attainment. As with formal learning activities, adults with education after high school were more likely to participate in work-related informal learning activities overall. This is consistent with the pattern of higher participation rates for educational activities overall and for participation in work-related courses and personal interest courses noted earlier. Participation in each type of informal learning activity increased as adults’ prior educational attainment increased, with the exception of the receipt of supervised training or mentoring. For this activity, adults with at least some college education had higher rates of participation than adults with a bachelor’s degree or higher.

Employment and Occupations. Those who were employed were more likely to take part in work-related informal learning (62 percent to 91 percent) than those who did not work in the past 12 months (28 percent). Those adults in professional or managerial occupations were more likely to participate in work-related informal learning activities overall. Adults employed in the trades (14 percent to 38 percent) were less likely to participate in specific types of work-related informal learning activities than were those in professional or managerial occupations or those in service, sales, or support occupations (21 percent to 77 percent).

Table 8. Number of adults and rates of participation in selected work-related informal learning activities, by selected demographic, educational, and occupational characteristics: 2000–01

Characteristic	Total adults (in thousands)	Any work-related informal learning activities		Used self-paced study using books, procedures manuals, or video tapes		Used self-paced study using computer-based software		Attended “brown bag” or informal presentations		Attended conferences or conventions		Read professional journals or magazines		Received supervised training or mentoring ¹	
	Number	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Total	198,803	63	0.6	30	0.5	21	0.5	20	0.5	25	0.4	43	0.5	46	0.8
Age															
16 to 30 years old	46,905	72	1.3	36	1.3	24	1.1	21	1.4	26	1.1	38	1.3	58	1.6
31 to 40 years old	41,778	71	1.1	35	1.2	25	1.1	24	1.1	30	1.3	50	1.1	46	1.2
41 to 50 years old	41,255	73	1.5	37	1.4	28	1.4	25	1.2	31	1.2	54	1.4	43	1.7
51 to 65 years old	39,523	58	1.2	26	1.0	20	1.0	18	0.8	24	0.8	44	1.2	35	1.4
66 years and older	29,342	28	1.1	9	0.7	5	0.6	4	0.5	6	0.6	22	1.1	22	2.6
Sex															
Male	94,955	67	0.9	34	0.8	23	0.7	21	0.6	29	0.7	48	0.9	44	1.0
Female	103,848	59	0.8	27	0.6	20	0.7	18	0.6	21	0.6	38	0.7	49	1.1
Race/ethnicity															
White, non-Hispanic	144,147	64	0.7	29	0.6	22	0.6	20	0.6	25	0.5	45	0.6	46	0.9
Black, non-Hispanic	22,186	61	1.7	30	1.7	20	1.5	19	1.5	25	1.5	38	1.9	50	2.2
Hispanic	21,537	57	2.2	30	2.5	15	1.1	15	1.4	20	1.5	34	2.0	45	2.3
Other	10,932	63	2.9	37	2.9	24	2.1	20	1.9	26	2.3	42	2.8	40	2.9
Educational attainment															
Less than high school	31,343	34	1.8	16	1.8	5	0.8	4	0.9	8	0.9	16	1.4	35	2.7
High school diploma or its equivalent	64,606	52	1.1	22	0.9	14	0.8	12	0.7	16	0.8	28	0.9	40	1.4
Some college	52,559	72	1.1	36	1.2	27	1.2	21	1.0	25	0.9	48	1.1	52	1.4
Bachelor’s degree or higher	50,295	84	0.8	42	0.9	36	1.0	38	1.2	46	1.1	73	1.0	50	1.0
Employment/Occupation²															
Employed in the past 12 months															
Professional or managerial	42,230	91	0.8	47	1.2	39	1.3	41	1.2	52	1.4	77	1.0	49	1.3
Service, sales, or support	65,298	73	1.0	36	1.0	25	0.8	21	1.0	27	0.9	43	1.0	48	1.0
Trades	37,722	62	1.8	29	1.5	15	1.2	14	1.1	17	1.3	33	1.3	38	1.7
Not employed in the past 12 months	53,553	28	1.0	11	0.7	8	0.6	4	0.4	6	0.5	22	0.9	†	†
Marital status³															
Married	121,455	63	0.7	31	0.6	22	0.6	21	0.6	26	0.6	46	0.7	43	1.1
Living with a partner, not married	14,009	69	2.1	36	2.6	23	2.0	21	1.9	25	2.1	42	2.5	51	2.4
Separated/divorced/widowed	30,503	49	1.3	23	1.1	15	1.1	14	0.8	17	1.0	35	1.3	40	1.7
Never married	32,836	70	1.3	32	1.4	23	1.2	20	1.2	25	1.4	39	1.3	56	1.8
Household income															
\$20,000 or less	40,246	41	1.4	20	1.0	8	0.9	8	0.7	11	0.8	22	1.9	38	1.9
\$20,001–\$35,000	38,876	56	1.2	27	1.2	16	0.9	13	0.9	16	0.8	33	1.7	47	1.7
\$35,001–\$50,000	33,035	65	1.5	31	1.2	19	1.0	18	1.2	23	1.3	42	1.8	47	1.8
\$50,001–\$75,000	40,725	70	1.1	33	1.2	29	1.3	24	1.0	29	1.1	50	1.6	49	1.6
\$75,001 or more	45,922	78	1.0	38	1.0	32	1.2	32	1.1	40	1.1	63	1.3	46	1.3

† Not applicable.

¹ Questions about supervised training or mentoring were only asked of adults who were employed during the 12 months period prior to the interview.

² **Professional or managerial occupations** include executive and managerial occupations, engineers, natural scientists, social scientists, teachers, health diagnosing, registered nurses, writers, health technologies; **service, sales, or support occupations** include technologists, marketing and sales occupations, administrative support, service occupations, miscellaneous occupations; **trades occupations** include agricultural occupation, mechanics, construction occupations, precision production occupation, production working occupations, transportation and laborer occupations.

³ For the purpose of this report, marital status was coded as follows. Respondents who reported being married are coded as “Married.” Respondents living in households with another adult member (over age 16) and who were separated, divorced, widowed, or never married were asked if they were currently living with a partner. If the respondents reported that they were living with a partner, they are coded as “Living with a partner, not married” regardless of their current marital status (i.e., separated, divorced, widowed, and never married). Respondents not living with a partner or living in households with no other adults who reported being separated, divorced, or widowed are coded as “Separated/divorced/widowed.” Respondents not living with a partner or living in households with no other adults who reported never having been married are coded as “Never married.”

NOTE: s.e. is standard error. Percentage for supervised training/mentoring is based on adults who worked in the past 12 months. Other estimates are based on all adults. Because of rounding, percents may not sum to 100.

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

Marital Status. Adults who were never married or unmarried and living with a partner were more likely than married adults to participate in work-related informal learning overall (70 and 69 percent versus 63 percent), while adults who were separated, divorced or widowed were least likely to participate (49 percent). In addition, separated, divorced, and widowed adults were generally among the least likely to participate in each type of information education activity. The exceptions were supervised training or mentoring on the job, where no differences were detected between separated, divorced, and widowed adults and married adults, and reading professional journals or magazines, where no differences were detected between never-married adults and those who were separated, divorced, or widowed.

Household Income. Adults with higher household incomes (over \$35,000) were also more likely to participate in work-related informal learning activities overall. Generally, higher household income was associated with participation in each type of informal learning activity.²²

Summary

The NHES:2001 findings confirm the assertions in the literature about the ubiquity of work-related informal learning. Two-thirds of all adults reported that they had participated in some type of work-related informal learning in the previous 12 months. The patterns of association between adult characteristics and participation in informal learning largely mirror those for formal educational activities in important ways. Notably, higher educational attainment and working in professional or managerial occupations are associated with higher rates of participation in work-related informal learning.

²² While, for the most part, higher income is associated with participation in each type of informal educational activity, there are cases in which no differences were detected between some income categories for a particular type of activity. This is sometimes true of contiguous income categories. For example, for participation in self-paced study using books and manuals, no difference was found between income categories \$20,001 to \$35,000 and \$35,001 to \$50,000.

Summary and Discussion

This report has presented an overview of participation in adult education. Forty-six percent of adults participated in a formal adult education activity during a 12-month period from early 2000 to early 2001. This rate is comparable to the 45 percent participation rate observed in 1999 (Kim and Creighton 2000). More adults participated in work-related courses (30 percent) than in any other type of formal educational activity, and 21 percent participated in personal interest courses. A much smaller percentage of adults participated in college and university degree programs on a part-time basis (4 percent), and few adults participated in English as a Second Language, basic skills education, vocational or technical diploma or degree programs, or apprenticeship programs (1 percent each).

Who Participates in Adult Education?

If one statement can characterize the participation of adults in educational activities, it is the following: Those adults who have education beyond high school, who are employed, who have professional or managerial occupations, and who have higher household incomes are more likely to participate in educational activities than are other adults. This pattern of relationships is consistent with the literature on adult education participation. More than 35 years ago, Johnstone and Rivera's (1965) profile of adult learners included adults who had at least a high school diploma or equivalent, were employed, and had a higher than average household income. More recent research has also documented the association between prior educational attainment and participation in educational activities (Bureau of Labor Statistics 1993, Frazis et al. 1998, Hight 1998, Kim and Creighton 2000; Creighton and Hudson 2002) and between employment or occupation and participation (Kim et al. 1995, Kim and Creighton 2000; Creighton and Hudson 2002). The relationships of prior educational attainment, employment/occupation, and household income to adult education participation were found consistently for participation overall, in college or university degree programs, in work-related courses, and in personal interest courses.

In contrast to the consistent relationship of socioeconomic characteristics to participation overall and in college or university degree programs on a part-time basis, work-related courses, and personal interest courses, demographic characteristics such as age, sex, and marital status varied in their relationships to participation in different types of adult education activities. For example, adults enrolled in college or university degree programs were more likely to be in the youngest age group (ages 16–30), but participation in work-related courses was less likely among the youngest (ages 16–30) and oldest (ages 66 and older) adults. Personal interest participation rates varied little by age group.

While women had higher rates of participation than did men overall (consistent with the observation of Merriam and Caffarella 1999), there was variability across adult education activities. No differences were found between men and women in participation in work-related courses, but women were more likely to participate in college or university degree programs on a part-time basis and in personal interest courses. The difference in rates of part-time participation between males and female in college and university degree programs was very small, however; thus, the higher overall participation for women generally reflects their greater participation in personal interest courses.

Characteristics of Participation

The selected features of participation examined in this analysis demonstrate the diversity of adult education experiences. Adults who participated in college or university degree programs on a part-time basis, in work-related courses, and in personal interest courses reported a wide range of hours of instruction, costs associated with participation, instructional providers, and the use of automated technology in instruction. To some extent, the variation in these features of participation reflects the structural aspects of the three types of adult education activities in which adults were most commonly engaged. College or university degree programs generally involve significant commitments of time and money. In contrast, work-related and personal interest courses vary considerably in duration and some are brief. Some involve no cost to the individual participant, particularly for work-related courses for which participants receive employer support, whereas others do involve some cost. Participants in all three of these types of adult education may take varying numbers of courses in a given 12-month period, also contributing to variability in the costs and hours reported.

Adults participated in educational activities provided by a wide range of instructional providers. Participants in work-related courses most often reported taking courses from business or industry. Participants in personal interest courses reported a wide range of providers, of which the most common was a group of “other” providers that included community and religious organizations, libraries, and tutors or personal instructors.

The role of automated technology in instruction also varied across types of adult education activity. The use of computers for instruction was reported by about half of those who participated in college or university degree programs on a part-time basis and half of those who participated in work-related courses. This is consistent with the findings of Bassi and Van Buren (1998), who reported that about half of employers reported using computers for training purposes. Television, video, and radio were also reported as instructional modes by about half of work-related participants.

Employer Support for Participation

About two-thirds of employed adults who participated in any adult education activities received some form of employer support, including 40 percent of employed participants in college or university degree programs and 82 percent of employed participants in work-related courses. Race/ethnicity, education, household income, and occupation were found to be important factors related to receipt of employer support. Specifically, White adults, those with higher educational attainment, those with higher household incomes, and those in professional and managerial occupations were more likely to receive employer support. This is consistent with the findings of previous researchers (Altonji and Speltzer 1991; Bureau of Labor Statistics 1993; Frazis, et al. 1998; Lee, Clery, and Carroll 1999; Lynch and Black 1998). In addition, adults working for larger employers (500 employees or more) were more likely to receive support for their educational activities.

Work-Related Informal Learning

Adult education researchers have suggested that informal learning is a major source of knowledge acquisition (Bruce, Aring, and Brand 1998; Merriam and Caffarella 1999). Nearly two-thirds of adults reported in the AELL survey that they had taken part in informal learning related to work. Consistent with the findings concerning participation in formal learning activities, prior educational attainment, employment, and occupational status were associated with participation in work-related informal learning activities. Those with higher levels of education were more likely to report participating in some forms of informal learning, as were those in professional or managerial occupations. In addition, race/ethnicity, household income and marital status were also associated with participation in work-related informal learning. White adults, those who were never married, adults who were unmarried and living with a partner, and adults with higher household incomes were generally more likely to participate in work-related informal learning activities.

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Appendix: Survey Methodology and Data Reliability

The 2001 National Household Education Surveys Program (NHES:2001) is a telephone survey conducted by the U.S. Department of Education's National Center for Education Statistics (NCES). Data collection took place from January 2 through April 14 of 2001. The sample is nationally representative of all civilian, noninstitutionalized persons in the 50 states and the District of Columbia. This sample was selected using random digit dial (RDD) methods, and the data were collected using computer-assisted telephone interviewing (CATI) technology. This section provides a brief description of the study methodology; further details appear in Hagedorn et al. (2002).

In the 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 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 changes from previous estimates of participation in adult education activities overall and participation by educational activity (using data from the AE-NHES:1995 and AE-NHES:1999). The requirements to estimate participation by race/ethnicity and by prior educational attainment (i.e., less than high school or high school and higher) were also considered in the design of the sampling approach; further details appear in Hagedorn et al (2002). The sample included both participants and nonparticipants in educational activities.

In the AELL interview, information was collected about demographic characteristics, participation in a wide range of educational activities in the previous 12 months, and labor force participation. The only person who could respond to the AELL interview was the sampled adult him/herself. Multiple attempts were made to complete interviews with persons not available at the time of selection. Interviews were conducted in both English and Spanish. This report is based on the 10,873 completed AELL interviews.

Measuring Participation in Adult Education

The measurement of adult education participation is, of course, dependent upon the specific definition of adult education used for the analysis, such as adult basic education, work-related educational activities, personal interest courses, or a broad range of activities. Beyond the definition of adult education participation, the ways in which questions are asked may lead to differences in the observed responses. Respondents were asked about their participation in the following eight educational activities: English as a second language, basic skills education or GED preparation classes, college or university degree programs, vocational or technical diploma programs, apprenticeship programs, work-related

courses, personal interest courses, and work-related informal learning activities. In the AELL interview, respondents were asked about the many types of educational activities in the above listed order. Because respondents could not know the types of activities that would be addressed in later sections of the interview, they may have reported activities in the first section of the interview in which they appeared to fit even though the activity may have been more appropriately reported in a later section (this phenomenon is known as an order effect). In this report, activities are classified according to the way in which they were reported. Alternative approach to the analyses of these data could include classifying educational activities based on whether respondents took them for work-related reasons or personal interest reasons or based on the type of provider (e.g., college or university, business, government, etc.).

The calculation of adult education participation rates can also be influenced by study definitions. As noted in the introduction to this report, full-time attendance in college or vocational degree or diploma programs has not generally been considered by the field to be adult education. The overall participation rate of 46 percent presented in this report includes the estimated 92 million adults who participated in the educational activities described in the previous paragraph during the previous 12 months, but does not include those whose only participation was in a college or vocational degree or diploma program on a full-time basis. If these full-time college or vocational participants are included, the overall participation rate in formal adult education is 49 percent and includes an estimated 98 million adults.

Data Reliability

Estimates produced using data from the NHES:2001 are subject to two types of error, sampling and nonsampling 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 unit¹ and item nonresponse, the differences in respondents' interpretations of the meaning of the questions, response differences related to the particular time the survey was conducted, and mistakes in data preparation.

¹ In the AELL-NHES:2001, unit nonresponse is defined as the percent of sampled adults who do not complete the survey.

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 random digit dial (RDD) surveys because so little is known about the sampled telephone numbers with which contact has not been made. An important source of nonsampling error for a telephone survey is the failure to include persons who do not live in households with telephones. Ninety-five 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. A second source of noncoverage error for the AELL-NHES:2001 related to estimates of ESL participation. The AELL interviews were conducted in English and Spanish. Persons who did not speak either of these languages were not interviewed. As a result, the AELL-NHES:2001 likely underrepresents 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 socially desirable response. 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 1990). Although response bias may affect the accuracy of the results, 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.

Response Rates

In the 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 AELL-NHES:2001, 77.2 percent or 10,873 adults completed the interview. Thus, the overall response rate for the AELL interview is 53.4 percent (the product of the Screener response rate and the AELL completion rate).

A nonresponse bias analysis was undertaken to examine nonresponse and the potential bias associated with nonresponse in NHES:1999 (Nolin et al. 2000). Because the NHES:2001 and NHES:1999 survey administrations were very similar in terms of their target populations, contact procedures, and salience, it is likely that any nonresponse bias present in NHES:2001 estimates would be similar to nonresponse bias in estimates from NHES:1999. Thus the results of the NHES:1999 nonresponse bias study can be used to assess the potential for nonresponse bias in NHES:2001.

The nonresponse bias study involved an examination of response rates as a whole and for various subgroups, an analysis to determine characteristics that were 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.

The analysis of nonresponse bias showed no evidence of bias in estimates from the NHES:1999 Parent, Youth, and Adult Education Surveys. The statistical adjustments used in weighting may have corrected at least partially for biases that might have existed due to differential nonresponse. Of course, nonresponse bias may still be present in other variables that were not studied. In NHES:2001, the largest component of nonresponse was nonresponse to the Screener. With the use of a CHAID analysis to create the nonresponse adjustment cells that were used to adjust for Screener nonresponse, there is evidence from the NHES:1999 nonresponse bias analysis study to suggest that there is little nonresponse bias attributable to Screener nonresponse.

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. As shown in exhibit 1, 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 (for example, CRCERT3, CRPROV3, CRPTFT3, CRCRSNU3, etc.) are relatively low.² These items pertained to few respondents (only 8 cases) and a single nonresponse under these circumstances has a large effect on the item response rates. Items with missing data were imputed using a hot-deck procedure in which cells are formed that contain cases with similar characteristics and a donor value is used to impute the missing value. (Additional information about hot-deck imputation can be found in Rao and Shao (1992)). The estimates included in this report are based on the imputed data.

² In the AELL, information was collected on each college or university degree program in which the respondent participated. The maximum number of programs reported was three (8 respondents). A record was created for each of these programs, with variables ending in 1 for the first program, ending in 2 for the second program, and ending in 3 for the third program. The variables with relatively lower response rates that are noted here are all from the third degree programs reported by the respondents.

Exhibit 1. Item response rates for variables used in the analysis

Variable	Label	Number applicable	Item response rate
IBGRADE	AA1-HIGHEST GRADE/YEAR SCHOOL COMPLETED	10,873	99.53
IBGRAD1	AA1-ACTUAL GRADE 0-8 COMPLETED	608	97.20
IBGRAD2	AA1-ACTUAL GRADE 9-11 COMPLETED	942	98.83
IBVOC DIP	AA1OV-RECEIVED VOC/TECH DIPLOMA	1,915	99.32
IBDIPL	AA2-HAS HS DIPLOMA/GED	4,709	99.87
IBDIPLYR	AA3-HS DIPLOMA/GED IN LAST 12 MONTHS	6,000	99.90
IBHSREQ	AA4-COMPLETED HS REQUIREMENTS	9,377	99.45
IBWORK12	AA6-WORK AT JOB IN PAST 12 MONTHS	10,873	99.97
ESLANG	AB1-TOOK ESL CLASSES	1,636	99.94
BSIMPROV	AC1A-BASIC SKILLS CLASSES	2,058	99.85
BSGED	AC1B-GED PREPARATION CLASSES	2,058	99.76
BSHSEQUV	AC1C-OTHER HS EQUIVALENCY PROGRAM	2,058	99.90
CRDEGREE	AD1-COL OR UNIV DEGREE PROGRAM	10,873	99.99
CRPOSTDG	AD3-ENROLLED IN POST-DEGREE PROGRAM	3,377	99.64
CRCERT1	AD7-GET/KEEP CERTIFICATE/LICENSE-1	1,188	99.24
CRCERT2	AD7-GET/KEEP CERTIFICATE/LICENSE-2	120	96.67
CRCERT3	AD7-GET/KEEP CERTIFICATE/LICENSE-3	8	87.50
CRPROVE1	AD14-INSTRUCTION PROVIDER WAS EMPLOYER-1	1,034	99.81
CRPROVE2	AD14-INSTRUCTION PROVIDER WAS EMPLOYER-2	112	96.43
CRPROVE3	AD14-INSTRUCTION PROVIDER WAS EMPLOYER-3	7	71.43
CRPTFT1	AD17-ENROLLED PART-TIME/FULL-TIME/BOTH-1	1,188	99.33
CRPTFT2	AD17-ENROLLED PART-TIME/FULL-TIME/BOTH-2	120	88.33
CRPTFT3	AD17-ENROLLED PART-TIME/FULL-TIME/BOTH-3	8	75.00
CRCRSNU1	AD19-NUMBER OF COURSES TOOK IN PRGM-1	1,188	98.74
CRCRSNU2	AD19-NUMBER OF COURSES TOOK IN PRGM-2	120	90.00
CRCRSNU3	AD19-NUMBER OF COURSES TOOK IN PRGM-3	8	75.00
CRCRDHR1	AD20-TOTAL CREDIT HRS ENROLLED-1	1,188	93.10
CRCRDHR2	AD20-TOTAL CREDIT HRS ENROLLED-2	120	82.50
CRCRDHR3	AD20-TOTAL CREDIT HRS ENROLLED-3	8	62.50
CRINTV1	AD22A-INSTR BY TV/VIDEO/RADIO-1	1,166	99.83
CRINTV2	AD22A-INSTR BY TV/VIDEO/RADIO-2	116	90.52
CRINTV3	AD22A-INSTR BY TV/VIDEO/RADIO-3	8	75.00
CRINCOM1	AD22B-INSTR BY COMPUTER-1	1,166	99.74
CRINCOM2	AD22B-INSTR BY COMPUTER-2	116	90.52
CRINCOM3	AD22B-INSTR BY COMPUTER-3	8	75.00
CRINCON1	AD22C-INSTR BY COMPUTER CONFERENCING-1	1,166	99.74
CRINCON2	AD22C-INSTR BY COMPUTER CONFERENCING-2	116	90.52
CRINCON3	AD22C-INSTR BY COMPUTER CONFERENCING-3	8	75.00
CRINWWW1	AD22D-INSTR BY INTERNET/WWW-1	1,166	99.74
CRINWWW2	AD22D-INSTR BY INTERNET/WWW-2	116	90.52
CRINWWW3	AD22D-INSTR BY INTERNET/WWW-3	8	75.00
CRINOTH1	AD22E-INSTR BY OTHER TECHNOLOGY-1	1,166	100.00

Exhibit 1. Item response rates for variables used in the analysis (continued)

Variable	Label	Number applicable	Item response rate
CRINOTH2	AD22E-INSTR BY OTHER TECHNOLOGY-2	116	100.00
CRINOTH3	AD22E-INSTR BY OTHER TECHNOLOGY-3	8	100.00
CRTUITO1	AD25A-PERSONAL EXPENSE FOR TUITION/FEE-1	1,188	94.11
CRTUITO2	AD25A-PERSONAL EXPENSE FOR TUITION/FEE-2	120	87.50
CRTUITO3	AD25A-PERSONAL EXPENSE FOR TUITION/FEE-3	8	75.00
CRMATLS1	AD25B-PERSONAL EXPENSE FOR BOOKS/MTLS-1	1,188	96.63
CRMATLS2	AD25B-PERSONAL EXPENSE FOR BOOKS/MTLS-2	120	88.33
CRMATLS3	AD25B-PERSONAL EXPENSE FOR BOOKS/MTLS-3	8	75.00
CREMPRE1	AD28-EMPLOYER REQUIRED TO TAKE PRGM-1	874	99.77
CREMPRE2	AD28-EMPLOYER REQUIRED TO TAKE PRGM-2	81	92.59
CREMPRE3	AD28-EMPLOYER REQUIRED TO TAKE PRGM-3	7	71.43
CREMPSU1	AD29-EMPLOYER SUGGESTED TO TAKE PRGM-1	805	99.63
CREMPSU2	AD29-EMPLOYER SUGGESTED TO TAKE PRGM-2	76	92.11
CREMPSU3	AD29-EMPLOYER SUGGESTED TO TAKE PRGM-3	7	71.43
CRWRKPL1	AD30-TOOK PRGM AT WORKPLACE-1	874	99.77
CRWRKPL2	AD30-TOOK PRGM AT WORKPLACE-2	81	92.59
CRWRKPL3	AD30-TOOK PRGM AT WORKPLACE-3	7	71.43
CRWRKHR1	AD31-TOOK PRGM DURING WORK HRS-1	874	99.66
CRWRKHR2	AD31-TOOK PRGM DURING WORK HRS-2	81	92.59
CRWRKHR3	AD31-TOOK PRGM DURING WORK HRS-3	7	71.43
CREMPAI1	AD32-BEING PAID WHILE TAKING PRGM-1	874	99.54
CREMPAI2	AD32-BEING PAID WHILE TAKING PRGM-2	81	92.59
CREMPAI3	AD32-BEING PAID WHILE TAKING PRGM-3	7	71.43
CREMPTU1	AD33A-EMPLOYER PAID TUITION/FEE-1	874	99.54
CREMPTU2	AD33A-EMPLOYER PAID TUITION/FEE-2	81	92.59
CREMPTU3	AD33A-EMPLOYER PAID TUITION/FEE-3	7	71.43
CREMPMA1	AD33B-EMPLOYER PAID BOOKS/MTLS-1	874	99.54
CREMPMA2	AD33B-EMPLOYER PAID BOOKS/MTLS-2	81	92.59
CREMPMA3	AD33B-EMPLOYER PAID BOOKS/MTLS-3	7	71.43
CRVOC DIP	AE1-VOCATIONAL OR TECHNICAL DIPLOMA PRGM	10,873	99.96
VOCERT1	AE5-GET/KEEP CERTIFICATE/LICENSE-1	249	100.00
VOCERT2	AE5-GET/KEEP CERTIFICATE/LICENSE-2	11	100.00
VOPROVE1	AE12-INSTRUCTION PROVIDER WAS EMPLOYER-1	205	100.00
VOPROVE2	AE12-INSTRUCTION PROVIDER WAS EMPLOYER-2	9	100.00
VOPTFT1	AE15-ENROLLED PART-TIME/FULL-TIME/BOTH-1	249	96.39
VOPTFT2	AE15-ENROLLED PART-TIME/FULL-TIME/BOTH-2	11	100.00
VOCRSNU1	AE17-NUMBER OF COURSES TOOK IN PRGM-1	249	96.79
VOCRSNU2	AE17-NUMBER OF COURSES TOOK IN PRGM-2	11	100.00
VOINTV1	AE20A-INSTR BY TV/VIDEO/RADIO-1	244	100.00
VOINTV2	AE20A-INSTR BY TV/VIDEO/RADIO-2	11	100.00
VOINCOM1	AE20B-INSTR BY COMPUTER-1	244	99.59
VOINCOM2	AE20B-INSTR BY COMPUTER-2	11	100.00

Exhibit 1. Item response rates for variables used in the analysis (continued)

Variable	Label	Number applicable	Item response rate
VOINCON1	AE20C-INSTR BY COMPUTER CONFERENCING-1	244	99.18
VOINCON2	AE20C-INSTR BY COMPUTER CONFERENCING-2	11	100.00
VOINWWW1	AE20D-INSTR BY INTERNET/WWW-1	244	99.59
VOINWWW2	AE20D-INSTR BY INTERNET/WWW-2	11	90.91
VOINOTH1	AE20E-INSTR BY OTHER TECHNOLOGY-1	244	100.00
VOINOTH2	AE20E-INSTR BY OTHER TECHNOLOGY-2	11	100.00
VOTUITO1	AE23A-PERSONAL EXPENSE FOR TUITION/FEE-1	249	95.58
VOTUITO2	AE23A-PERSONAL EXPENSE FOR TUITION/FEE-2	11	100.00
VOMATLS1	AE23B-PERSONAL EXPENSE FOR BKS/MTLS-1	249	94.78
VOMATLS2	AE23B-PERSONAL EXPENSE FOR BKS/MTLS-2	11	100.00
VOEMPRE1	AE26-EMPLOYER REQUIRED TO TAKE PRGM-1	173	99.42
VOEMPRE2	AE26-EMPLOYER REQUIRED TO TAKE PRGM-2	7	100.00
VOEMPSU1	AE27-EMPLOYER SUGGESTED TO TAKE PRGM-1	136	99.26
VOEMPSU2	AE27-EMPLOYER SUGGESTED TO TAKE PRGM-2	4	100.00
VOWRKPL1	AE28-TOOK PRGM AT WORKPLACE-1	173	97.69
VOWRKPL2	AE28-TOOK PRGM AT WORKPLACE-2	7	100.00
VOWRKHR1	AE29-TOOK PRGM DURING WORK HRS-1	173	98.84
VOWRKHR2	AE29-TOOK PRGM DURING WORK HRS-2	7	100.00
VOEMPAI1	AE30-BEING PAID WHILE TAKING PRGM-1	173	99.42
VOEMPAI2	AE30-BEING PAID WHILE TAKING PRGM-2	7	100.00
VOEMPTU1	AE31A-EMPLOYER PAID TUITION/FEE-1	173	99.42
VOEMPTU2	AE31A-EMPLOYER PAID TUITION/FEE-2	7	100.00
VOEMPA1	AE31B-EMPLOYER PAID BOOKS/MTLS-1	173	99.42
VOEMPA2	AE31B-EMPLOYER PAID BOOKS/MTLS-2	7	100.00
APPRENTI	AF1-APPRENTICESHIP PROGRAM	10,873	99.89
WRRSSKI1	AH2A-MAINTAIN OR IMPROVE SKILLS/KNOWDG-1	3,764	99.68
WRRSSKI2	AH2A-MAINTAIN OR IMPROVE SKILLS/KNOWDG-2	2,010	99.95
WRRSSKI3	AH2A-MAINTAIN OR IMPROVE SKILLS/KNOWDG-3	1,125	99.64
WRRSSKI4	AH2A-MAINTAIN OR IMPROVE SKILLS/KNOWDG-4	625	99.68
WRNWSKI1	AH2B-LEARN NEW SKILLS OR METHODS-1	3,764	99.65
WRNWSKI2	AH2B-LEARN NEW SKILLS OR METHODS-2	2,010	99.90
WRNWSKI3	AH2B-LEARN NEW SKILLS OR METHODS-3	1,125	99.64
WRNWSKI4	AH2B-LEARN NEW SKILLS OR METHODS-4	625	99.68
WRRSRAI1	AH2C-GET A RAISE OR PROMOTION-1	3,764	99.73
WRRSRAI2	AH2C-GET A RAISE OR PROMOTION-2	2,010	99.90
WRRSRAI3	AH2C-GET A RAISE OR PROMOTION-3	1,125	99.64
WRRSRAI4	AH2C-GET A RAISE OR PROMOTION-4	625	99.68
WRRSNEW1	AH2D-GET A NEW JOB-1	3,764	99.73
WRRSNEW2	AH2D-GET A NEW JOB-2	2,010	99.85
WRRSNEW3	AH2D-GET A NEW JOB-3	1,125	99.73
WRRSNEW4	AH2D-GET A NEW JOB-4	625	99.68
WRRSCER1	AH2E-GET/KEEP CERTIFICATE/LICENSE-1	3,764	99.60
WRRSCER2	AH2E-GET/KEEP CERTIFICATE/LICENSE-2	2,010	99.75

Exhibit 1. Item response rates for variables used in the analysis (continued)

Variable	Label	Number applicable	Item response rate
WRRSCER3	AH2E-GET/KEEP CERTIFICATE/LICENSE-3	1,125	99.73
WRRSCER4	AH2E-GET/KEEP CERTIFICATE/LICENSE-4	625	99.68
WRRSREQ1	AH2F-BECAUSE IT WAS REQUIRED-1	3,764	99.76
WRRSREQ2	AH2F-BECAUSE IT WAS REQUIRED-2	2,010	99.85
WRRSREQ3	AH2F-BECAUSE IT WAS REQUIRED-3	1,125	99.56
WRRSREQ4	AH2F-BECAUSE IT WAS REQUIRED-4	625	99.52
WRRSOTH1	AH2G-SOME OTHER REASON-1	3,764	99.79
WRRSOTH2	AH2G-SOME OTHER REASON-2	2,010	99.90
WRRSOTH3	AH2G-SOME OTHER REASON-3	1,125	99.73
WRRSOTH4	AH2G-SOME OTHER REASON-4	625	99.68
WRPRTYP1	AH3-TYPE OF INSTRUCTION PROVIDER-1	3,764	98.80
WRPRTYP2	AH3-TYPE OF INSTRUCTION PROVIDER-2	2,010	99.15
WRPRTYP3	AH3-TYPE OF INSTRUCTION PROVIDER-3	1,125	98.84
WRPRTYP4	AH3-TYPE OF INSTRUCTION PROVIDER-4	625	99.20
WRPROVE1	AH4-INSTRUCTION PROVIDER WAS EMPLOYER-1	3,312	99.76
WRPROVE2	AH4-INSTRUCTION PROVIDER WAS EMPLOYER-2	1,799	99.89
WRPROVE3	AH4-INSTRUCTION PROVIDER WAS EMPLOYER-3	1,018	99.61
WRPROVE4	AH4-INSTRUCTION PROVIDER WAS EMPLOYER-4	565	99.29
WRINTV1	AH8A-INSTR BY TV, VIDEO, OR RADIO-1	3,764	99.81
WRINTV2	AH8A-INSTR BY TV, VIDEO, OR RADIO-2	2,010	99.95
WRINTV3	AH8A-INSTR BY TV, VIDEO, OR RADIO-3	1,125	99.47
WRINTV4	AH8A-INSTR BY TV, VIDEO, OR RADIO-4	625	99.36
WRINCOM1	AH8B-INSTR BY COMPUTER-1	3,764	99.84
WRINCOM2	AH8B-INSTR BY COMPUTER-2	2,010	99.95
WRINCOM3	AH8B-INSTR BY COMPUTER-3	1,125	99.64
WRINCOM4	AH8B-INSTR BY COMPUTER-4	625	99.36
WRINCON1	AH8C-INSTR BY COMPUTER CONFERENCING-1	3,764	99.73
WRINCON2	AH8C-INSTR BY COMPUTER CONFERENCING-2	2,010	99.85
WRINCON3	AH8C-INSTR BY COMPUTER CONFERENCING-3	1,125	99.64
WRINCON4	AH8C-INSTR BY COMPUTER CONFERENCING-4	625	99.52
WRINWWW1	AH8D-INSTR BY INTERNET/WWW-1	3,764	99.81
WRINWWW2	AH8D-INSTR BY INTERNET/WWW-2	2,010	99.90
WRINWWW3	AH8D-INSTR BY INTERNET/WWW-3	1,125	99.56
WRINWWW4	AH8D-INSTR BY INTERNET/WWW-4	625	99.52
WRINOTH1	AH8E-INSTR BY OTHER TECHNOLOGY-1	3,764	99.95
WRINOTH2	AH8E-INSTR BY OTHER TECHNOLOGY-2	2,010	99.95
WRINOTH3	AH8E-INSTR BY OTHER TECHNOLOGY-3	1,125	100.00
WRINOTH4	AH8E-INSTR BY OTHER TECHNOLOGY-4	625	100.00
WRTUITO1	AH11A-PERSONAL EXPENSES FOR COURSES-1	3,764	98.83
WRTUITO2	AH11A-PERSONAL EXPENSES FOR COURSES-2	2,010	99.05
WRTUITO3	AH11A-PERSONAL EXPENSES FOR COURSES-3	1,125	99.11
WRTUITO4	AH11A-PERSONAL EXPENSES FOR COURSES-4	625	98.88
WRMATLS1	AH11B-PERSONAL EXPENSES FOR BOOKS/MTLS-1	3,764	98.65

Exhibit 1. Item response rates for variables used in the analysis (continued)

Variable	Label	Number applicable	Item response rate
WRMATLS2	AH11B-PERSONAL EXPENSES FOR BOOKS/MTLS-2	2,010	99.05
WRMATLS3	AH11B-PERSONAL EXPENSES FOR BOOKS/MTLS-3	1,125	99.02
WRMATLS4	AH11B-PERSONAL EXPENSES FOR BOOKS/MTLS-4	625	98.72
WREMPRE1	AH14-EMPLOYER REQUIRED TO TAKE COURSE-1	3,201	99.53
WREMPRE2	AH14-EMPLOYER REQUIRED TO TAKE COURSE-2	1,758	99.72
WREMPRE3	AH14-EMPLOYER REQUIRED TO TAKE COURSE-3	996	99.50
WREMPRE4	AH14-EMPLOYER REQUIRED TO TAKE COURSE-4	556	99.82
WREMPSU1	AH15-EMPLOYER SUGGESTED TO TAKE COURSE-1	1,736	99.77
WREMPSU2	AH15-EMPLOYER SUGGESTED TO TAKE COURSE-2	950	99.58
WREMPSU3	AH15-EMPLOYER SUGGESTED TO TAKE COURSE-3	534	99.63
WREMPSU4	AH15-EMPLOYER SUGGESTED TO TAKE COURSE-4	296	100.00
WRWRKPL1	AH16-TOOK COURSE AT WORKPLACE-1	3,201	99.69
WRWRKPL2	AH16-TOOK COURSE AT WORKPLACE-2	1,758	99.83
WRWRKPL3	AH16-TOOK COURSE AT WORKPLACE-3	996	99.30
WRWRKPL4	AH16-TOOK COURSE AT WORKPLACE-4	556	99.82
WRWRKHR1	AH17-TOOK COURSE DURING WORK HRS-1	3,201	99.53
WRWRKHR2	AH17-TOOK COURSE DURING WORK HRS-2	1,758	99.54
WRWRKHR3	AH17-TOOK COURSE DURING WORK HRS-3	996	99.40
WRWRKHR4	AH17-TOOK COURSE DURING WORK HRS-4	556	99.82
WREMPAI1	AH18-BEING PAID WHILE TAKING COURSE-1	3,201	99.50
WREMPAI2	AH18-BEING PAID WHILE TAKING COURSE-2	1,758	99.72
WREMPAI3	AH18-BEING PAID WHILE TAKING COURSE-3	996	99.30
WREMPAI4	AH18-BEING PAID WHILE TAKING COURSE-4	556	99.82
WREMPMU1	AH19A-EMPLOYER PAID TUITION/FEE-1	3,201	98.25
WREMPMU2	AH19A-EMPLOYER PAID TUITION/FEE-2	1,758	98.86
WREMPMU3	AH19A-EMPLOYER PAID TUITION/FEE-3	996	98.29
WREMPMU4	AH19A-EMPLOYER PAID TUITION/FEE-4	556	98.38
WREMPMA1	AH19B-EMPLOYER PAID BOOKS/MTLS-1	3,201	98.06
WREMPMA2	AH19B-EMPLOYER PAID BOOKS/MTLS-2	1,758	98.81
WREMPMA3	AH19B-EMPLOYER PAID BOOKS/MTLS-3	996	98.29
WREMPMA4	AH19B-EMPLOYER PAID BOOKS/MTLS-4	556	98.56
WROREQ	AH20A-REQUIRED BY EMPLOYER	315	99.68
WROCOLL	AH20B-TAUGHT BY COLLEGE/UNIVERSITY	353	99.15
WROPAY	AH20C-EMPLOYER PAID ALL/PART OF COST	315	99.68
WROTIME	AH20D-EMPLOYER GAVE TIME OFF WITH PAY	315	100.00
WROCERT	AH20E-TO GET/KEEP CERTIFICATE/LICENSE	353	99.72
WROTECH	AH20F-TAUGHT BY USING TECHNOLOGY	353	99.72
SAPRTYP1	AI2-TYPE OF INSTRUCTION PROVIDER-1	2,682	99.44
SAPRTYP2	AI2-TYPE OF INSTRUCTION PROVIDER-2	870	99.66
SAINTV1	AI7A-INSTR BY TV/VIDEO/RADIO-1	2,682	99.66
SAINTV2	AI7A-INSTR BY TV/VIDEO/RADIO-2	870	99.77
SAINCOM1	AI7B-INSTR BY COMPUTER-1	2,682	99.63
SAINCOM2	AI7B-INSTR BY COMPUTER-2	870	99.66

Exhibit 1. Item response rates for variables used in the analysis (continued)

Variable	Label	Number applicable	Item response rate
SAINCON1	AI7C-INSTR BY COMPUTER CONFERENCING-1	2,682	99.40
SAINCON2	AI7C-INSTR BY COMPUTER CONFERENCING-2	870	99.54
SAINWWW1	AI7D-INSTR BY INTERNET/WWW-1	2,682	99.66
SAINWWW2	AI7D-INSTR BY INTERNET/WWW-2	870	99.43
SAINOTH1	AI7E-INSTR BY OTHER TECHNOLOGY-1	2,682	99.89
SAINOTH2	AI7E-INSTR BY OTHER TECHNOLOGY-2	870	100.00
SATUITO1	AI9A-PERSONAL EXPENSES FOR TUITION/FEE-1	2,682	97.46
SATUITO2	AI9A-PERSONAL EXPENSES FOR TUITION/FEE-2	870	97.47
SAMATLS1	AI9B-PERSONAL EXPENSES FOR BOOKS/MTLS-1	2,682	98.06
SAMATLS2	AI9B-PERSONAL EXPENSES FOR BOOKS/MTLS-2	870	97.59
SAINCBK1	AI10-TUITION/FEES INCLUDE BOOKS/MTLS-1	854	96.14
SAINCBK2	AI10-TUITION/FEES INCLUDE BOOKS/MTLS-2	300	97.67
ILMENTOR	AJ1A-RECEIVED SUPERVISED TRAINING	7,879	99.77
ILSELF	AJ1B-SELF-PACED STUDY-BOOKS/MANUALS	10,873	99.77
ILCOMP	AJ1C-SELF-PACED STUDY-COMP SOFTWARE	10,873	99.82
ILBBAG	AJ1D-BROWN-BAG OR INFORMAL PRESENT	10,873	99.71
ILCONF	AJ1E-CONFERENCES OR CONVENTIONS	10,873	99.79
ILOMAG	AJ1F-READ PROFESSIONAL PUBLICATIONS	10,873	99.82
ILOTH	AJ1G-OTHER LESS FORMAL LEARNING	10,873	99.57
ILCERT	AJ2-GET/KEEP CERTIFICATE/LICENSE	7,179	99.64
ADOBMM	AK1-MONTH OF BIRTH	10,873	97.53
ADOBYY	AK1-YEAR OF BIRTH	10,873	97.48
ARACE	AK3-RACE	10,873	98.31
AOTHRACE	AK4-OTHER RACE	1,013	97.63
AHISPANI	AK5-HISPANIC ORIGIN	10,873	98.81
AMARSTAT	AK6-CURRENT MARITAL STATUS	10,873	99.09
ALIVWITH	AK6OV-LIVING WITH PARTNER	2,186	98.63
HINCOME	AL17OV-TOTAL HH INCOME RANGE 2	10,873	78.26
NUMPEEP	AK20-EMPLOYER SIZE	7,879	95.38
EARNAMT	AK21-AMOUNT OF EARNINGS	7,879	81.67
EARNUNT	AK21-UNIT OF EARNINGS	7,879	81.57
CONTREQ	AK25-REQUIRED CONTINUING EDUCATION	10,873	97.29
SEX	GENDER AT SCREENER	10,873	99.99
WRCLSHR1	WORK-REL CRSE TOTAL HRS/YEAR-1	3,764	98.54
WRCLSHR2	WORK-REL CRSE TOTAL HRS/YEAR-2	2,010	99.00
WRCLSHR3	WORK-REL CRSE TOTAL HRS/YEAR-3	1,125	99.29
WRCLSHR4	WORK-REL CRSE TOTAL HRS/YEAR-4	625	99.04
SACLSHR1	PERSONAL INTEREST COURSE TOTAL HRS-1	2,682	96.09
SACLSHR2	PERSONAL INTEREST COURSE TOTAL HRS-2	870	97.13
FSOC	OCCUPATION CODE (SOC)	7,879	98.30

Sampling Errors

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

The standard error is a measure of the variability due to sampling when estimating a statistic; standard errors for estimates presented in this report were computed using a jackknife replication method. 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.

Standard errors for all of the estimates are presented in the tables. These standard errors can be used to produce confidence intervals. For example, an estimated 46 percent of adults participated in some type of formal adult education in the previous 12 months (not including full-time degree or diploma programs only), and this figure has an estimated standard error of 0.5. Therefore, the estimated 95 percent confidence interval for this statistic is approximately 45 to 47 percent ($46 \pm 1.96 (0.5)$).

All of the estimates in this report are based on weighting the observations using the probabilities of selection of the respondents and other adjustments to partially account for nonresponse and coverage bias. Weights were developed to produce unbiased and consistent estimates of the national totals. In addition to properly weighting the responses, special procedures for estimating the statistical significance of the estimates were employed because the NHES:2001 data were collected using a complex sample design. Complex sample designs result in data that violate some of the assumptions that are normally used to assess the statistical significance of results from a simple random sample. Frequently, the standard errors of the estimates from these surveys differ from what would be expected if the sample was a simple random sample and the observations were independent and identically distributed random variables.

Statistical Tests for Bivariate Analyses

The tests of significance used in this analysis are based on Student's t statistics for the comparison of individual estimates and for bivariate relationships.³ To test the differences between estimates, unbiased estimates of standard errors were used, derived by jackknife replication methods. To test for a difference between two subgroups in the population proportion having a particular characteristic, say P_1 versus P_2 , the test statistic is computed as:

$$T = \frac{p_2 - p_1}{\sqrt{[s.e.(p_1)]^2 + [s.e.(p_2)]^2}},$$

where p_i is the estimated proportion of subgroup i ($i = 1, 2$) having the particular characteristic and $s.e.(p_i)$ is the standard error of that estimate.

For the aforementioned comparison, the decision rule is to reject the null hypothesis (i.e., that there is no difference between the two groups in the population in terms of the proportion having the characteristic) if $|T| > t_{\frac{\alpha}{2};df}$, where $t_{\frac{\alpha}{2};df}$ is the value such that the probability that a Student's t random variable with df degrees of freedom exceeds that value is $\alpha/2$.

As the number of comparisons at the same significance level increases, it becomes more likely that at least one of the estimated differences will be significant merely by chance, that is, it will be erroneously identified as different from zero. Even when there is no statistical difference between the means or percentages being compared, there is a 5 percent chance of getting a significant F or t value from sampling error alone. As the number of comparisons increases, the chance of making this type of error also increases. In order to reduce the likelihood of this type of error (a Type I error), when comparing more than two subgroups, a Bonferroni adjustment was used in order to cap the overall Type I error rate at α . With the Bonferroni adjustment, the test statistic value is compared to the critical value $t_{\frac{\alpha}{2k};df}$, where k is the number of comparisons. All the differences cited in this report are significant at the 0.05 level of significance after a Bonferroni adjustment.

³ For some bivariate analyses, e.g. testing the association of overall participation with age or income, bivariate logistic regression analyses were conducted in addition to the t-tests. See the discussion on multivariate analyses for more information on logistic regression.

Multivariate Analyses

To determine the association between two variables, tests such as Student's t can be used. However, when examining the associations among more than two variables, multivariate statistical tests must be employed. Multivariate tests allow researchers to examine simultaneously the association of independent variables with the dependent variable.

When the dependent variable is continuous, a common multiple regression technique is ordinary least squares (OLS) regression. However, when the dependent variable is dichotomous, a more appropriate technique is logistic regression. In logistic regression, the binary nature of the dependent variable requires a different interpretation of results than is the case with OLS regression. Specifically, the regression coefficients for the independent variables indicate the change in the natural log of the odds (the "log odds") of the presence of the characteristic (event) being analyzed. The odds of any event is defined as the probability of the event divided by the probability of the absence of the event:

$$\frac{P(event)}{1 - P(event)}$$

Odds can be computed for any proportion. For example, in table 1, the percentage of adults with a continuing education requirement who participate in adult education, overall is .64. The odds of participating in adult education for an adult with a continuing education requirement is computed as: $.64/(1-.64) = 1.78$. The odds of an adult without a continuing education requirement participating in overall adult education is $.40/([1-.40]) = .67$.

A comparison of odds is often made using an "odds ratio." The odds ratio of participation by continuing education requirement vs. no continuing education requirement is $1.78/.67 = 2.66$. This means that the odds of participating in overall adult education are 2.66 times higher for those adults with a continuing education requirement than for those with no continuing education requirement.

The results of logistic regression are often discussed in terms of the odds ratios. A logistic regression equation is often expressed as the natural log of the odds:

$$\text{Log}\left[\frac{P(event)}{1 - P(event)}\right] = \beta_0 + \beta_1 X_1 + \dots + \beta_p X_p$$

where the subscript p represents the number of independent variables. The equation can also be equivalently expressed as the odds:

$$\frac{P(event)}{1 - P(event)} = e^{\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p}$$

In the analyses for this report, discussions focus on the direction of the associations between the independent and dependent variables, rather than the estimated odds ratio or log odds. Thus, in tables 2 and 5, the regression coefficients of the log odds are given. The interpretation of the direction of the association between the independent and dependent variables from logistic regression is similar to that for OLS regression. If a statistically significant logistic regression coefficient is greater than zero, the variable is associated with an increase of the odds of the event. If a statistically significant logistic regression coefficient is less than zero, the variable is associated with a decrease in the odds of the event. If a regression coefficient is not statistically significantly different than zero, there is no association with the odds of the event.

Interpreting the regression coefficients for a categorical independent variable is always done in contrast to the reference category. For example, in table 2, there are four categories for race/ethnicity: White, Black, Hispanic and Other. White adults are the reference category for this variable. That is, the regression coefficients for the three other categories are meaningful in comparison to White. Again, using the same example from table 2, the significant coefficient 0.28 for Hispanics indicates that Hispanics are more likely to participate in overall adult education than are White adults.

Additional tests were performed to examine significant differences between categories in the regression analysis. For example, adults age 66 and older were compared to other age groups besides the reference group of age 41 to 50. These tests were conducted using the Wald F statistic produced by the WesVar Complex Samples software.

For more detail about logistic regression analysis, see Agresti (1990), Menard (1995), and Hosmer and Lemeshow (1989). For specific information about the use of replication methods to fit logistic regression analysis to complex sample survey data, see Mohadjer, Yansaneh, and Brick (1996).