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## Participation in Technology-Based Postcompulsory Education

Participation in both college programs and adult education activities has increased in recent decades (Kim and Creighton 1999; Kim et al. forthcoming; U.S. Department of Education 2002). The use of technology in education has also been increasing (Kleiner and Farris 2002; Waits and Lewis 2003), raising the possibility that technology could help increase participation in postcompulsory education overall and/or among groups of adults who traditionally have been underrepresented in education at this level. This Issue Brief addresses a more limited issue: Does technology-based education reach all adults equally, or are traditionally underrepresented or overrepresented adults more likely to be the beneficiaries of this type of education? It is important to note that this analysis cannot determine the extent to which participation is affected by learners' choices, their access to offerings, or the availability of offerings.

The data for this analysis come from the 2001 Adult Education and Lifelong Learning Survey of the National Household Education Surveys Program (AELL-NHES) at the National Center for Education Statistics (NCES). This survey asks about adults' participation in the following formal learning activities: English as a second language (ESL) classes, adult basic education classes, apprenticeship programs, postsecondary education programs (leading to a credential), postsecondary courses,<sup>1</sup> and other courses. Technology-based learning was defined as learning activities that involve instruction using computers, computer conferencing, or instruction over the Internet or World Wide Web.<sup>2</sup> Participation in full-time postsecondary credential programs (which typically is excluded from NCES analyses of adult education) is included in this analysis. However, participation in adult basic education, ESL, and apprenticeship programs is excluded because the survey did not ask about the use of technology for these activities. (About 4 percent of all adult education participants were excluded from this analysis because they participated in only these activities.)

To obtain more valid data on participation in ESL classes, the AELL-NHES survey was administered in both Spanish and English. However, this dual language administration makes the Hispanic AELL-NHES sample non-comparable to other racial/ethnic groups, since the Hispanic sample includes non-English (Spanish) speakers while the other (non-Hispanic) racial/ethnic groups consist of only English speakers. In particular, to the extent that non-English speakers utilize technology-based education to a different degree than English speakers, including Spanish speakers but not other non-English speakers would bias the comparisons of Hispanics and other groups. To create comparable racial/ethnic groups, the

analysis in this brief was restricted to the English-speaking sample. Although this restriction means that the Hispanic sample does not represent all Hispanics (as is the case in analyses based on the full AELL-NHES sample), it does create an English-speaking Hispanic sample that is comparable to the English-speaking Asian sample, English-speaking Black sample, etc.<sup>3</sup>

Using these definitions and population (of English speakers), 49 percent of adults participated in postcompulsory learning activities in 2001, and 54 percent of these participants engaged in at least one activity that used technology (table 1). Looking at the types of activities engaged in, 12 percent of adults participated in a postsecondary credential program, 11 percent in a postsecondary course (separate from a credential program), and 38 percent in a course outside of postsecondary education. Technology was used as an instructional tool most often for postsecondary credential programs (used by 65 percent of these participants), followed by postsecondary courses (47 percent of participants) and, finally, other types of courses (43 percent of participants).

**Table 1. Percent of adults who participated in a postcompulsory education activity and percent of participants for whom at least one activity used technology, overall and by type of activity, English-speakers only: 2000-01**

Activity	Percent of adults participating in activity	Percent of participants for whom at least one activity used technology
All activities	49.0	53.6
Postsecondary credential program	11.7	64.7
Postsecondary course	10.9	47.1
Other (non-postsecondary) course	38.0	42.5

NOTE: Detail sums to more than 49.0 because adults may have participated in more than one type of activity.

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

The left-hand column in table 2 shows the percent of adults with various characteristics who participated in postcompulsory learning activities. This analysis is consistent with previous studies that have found that each of the following groups participate in adult education and/or postsecondary education at relatively low rates: males (vs. females) (Jacob 2002), Blacks (vs. Whites) (Jacobson et al. 2001), those from rural areas (vs. urban areas) (Ingels et al. 2002), those in lower status jobs (vs. higher status jobs)

**Table 2. Percent of adults who participated in a postcompulsory education activity and percent of participants who were in a technology-based activity, by various characteristics, English-speakers only: 2000–01**

Characteristics	Percent of adults who participated in postcompulsory activity	Percent of participants in technology-based activity
<b>Total</b>	49.0	53.6
<b>Sex</b>		
Male	45.4	57.4
Female	52.2	50.5
<b>Race/ethnicity</b>		
White, non-Hispanic	49.3	53.2
Black, non-Hispanic	44.2	49.7
Hispanic	51.3	56.6
Other	52.1	61.0
<b>Occupation</b>		
Not working	25.6	38.7
Trades	34.2	46.7
Sales, service, or support	56.8	53.1
Professional	74.5	61.6
<b>Education level</b>		
High school or less	29.5	40.4
Some college/associate degree	62.8	58.2
Bachelor's degree or higher	69.0	59.1
<b>Household income</b>		
\$20,000 or less	30.1	46.0
\$20,001–\$35,000	40.0	47.0
\$35,001–\$50,000	50.1	51.9
\$50,001–\$75,000	58.4	53.4
\$75,001 and above	61.8	60.8
<b>Locality</b>		
Urban	52.6	55.4
Suburban	44.0	55.6
Rural	42.8	47.2

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

(Creighton and Hudson 2002), those with lower levels of education (vs. higher levels of education) (Creighton and Hudson 2002), and those from lower income or socioeconomic levels (vs. higher income or socioeconomic levels) (Creighton and Hudson 2002; Ingels et al. 2002).

To explore in greater depth which groups of adults are more or less likely to participate in technology-based education, one must take into account differences in participation rates in postcompulsory education generally. For example, a finding that females participate in technology-based education at the same rate as males would have different implications if females participated in all activities at a lower rate than males or at a higher rate than males. In effect, the question of interest is whether there are differences in who participates in technology-based versus non-technology-based education activities. To examine this question, one can compare the proportions of *participants* of each type (e.g., male vs. female) who

are in technology-based education. If, for example, a higher proportion of male participants compared to female participants is in technology education, this would suggest that technology-based education is reaching relatively more men than women (accounting for each group's overall participation level).

The right-hand column in table 2 shows the percent of participants with various characteristics who were in activities that used technology-based instruction. Although females were more likely than males to participate in postcompulsory education, male participants were more likely than female participants to be in technology-based activities. Fifty-seven percent of male participants were in activities that involve technology compared to 51 percent of female participants. This difference in participation in technology-based activities may reflect many influences, including gender differences in occupations or in learning preferences.<sup>4</sup> Also, although Blacks participated in postcompulsory education at a lower rate than Whites, no difference was detected in the likelihood of Black or White participants being in a technology-based activity. (The apparent differences between Whites and their Black and Hispanic counterparts in table 2 are not statistically significant, possibly due to relatively small sample sizes).<sup>5</sup>

Technology could be used specifically to reach adults in rural areas. However, participants in rural areas were less likely to be in technology-based activities than were participants in suburban or urban areas (table 2). Forty-seven percent of participants in rural areas were enrolled in technology-based education activities compared to about 55 percent of participants in suburban and urban areas.

Moreover, education and occupation groups that historically have been underrepresented in adult education remain underrepresented among participants who are in technology-based activities.<sup>6</sup> For example, 40 percent of participants who have no more than a high school education were in technology-based activities compared to almost 60 percent of those with some college or with at least a bachelor's degree (table 2). Participants who are not working participated in technology-based activities at a lower rate than all groups of working adults (39 vs. 47 percent or more), and those working in the trades participated at a lower rate than those in other occupation groups (47 vs. 53 and 62 percent). At the same time, education, occupation, and income groups traditionally overrepresented in postcompulsory education are overrepresented among participants who are in technology-based activities. For example, 62 percent of professional workers who participated in learning were in technology-based activities compared to no more than 53 percent of those in other occupation groups. Participants with household incomes above \$75,000 were more likely than all lower income groups to be in technology-based activities; 61 percent of those with household earnings above \$75,000 were in these activities compared to 46 to 53 percent of those in other income categories.

## Conclusion

The relatively widespread use of technology in education comes at a time when postcompulsory education is increasing. None-

theless, patterns of participation in postcompulsory learning are similar now to what they were in the past (e.g., college-educated adults were more likely than other adults to participate in 2000–01 and in previous years). Further, with the exception of men and racial/ethnic minorities, groups under- or overrepresented in postcompulsory education tend to be correspondingly represented among those who participate in technology-based education rather than in non-technology-based education. These differences in participation in technology activities can arise from many sources, including differences in access to or availability of learning opportunities, personal interests and motivation, professional requirements, and other labor market incentives and opportunities. A better understanding of why these participation differences exist can help shed light on the potential and the limitations of technology as a tool for both increasing participation in learning and addressing possible inequities in participation.

## Footnotes

<sup>1</sup>Postsecondary education programs were defined as all activities listed in the two credential program sections (“college or university degree program” and “vocational or technical diploma program”) of the survey; postsecondary courses were defined as all courses taken for college credit and all courses that had a postsecondary institution as the instructional provider.

<sup>2</sup>The survey questions also asked about instruction using (1) television, video, or radio and (2) other types of technology. Because the focus of this analysis is new technologies, these instructional methods were not counted as technology-based instruction. Also, because the analysis focuses only on formal instruction, the use of technology for self-instruction (included in the “work-related informal learning” section of the AELL-NHES) is not part of this analysis.

<sup>3</sup>The following statistics demonstrate the effects of including non-English-speaking Hispanics. In the population of English and Spanish speakers, Hispanics participated in postcompulsory education at a lower rate than (non-Hispanic) Whites (36 and 49 percent, respectively). When the sample is restricted to those who completed the survey in English (i.e., to English speakers), no differences are detected in the participation rates for Whites and Hispanics (49 and 51 percent, respectively). This restriction reduces the size of the Hispanic sample by roughly 40 percent, from 1,234 to 773 (unweighted). Otherwise, this analysis covers the AELL-NHES population of civilian, non-institutionalized adults age 16 or older who are not in compulsory education.

<sup>4</sup>For example, although females are more likely than males to use computers at work, males use their computers at work in more varied ways than do females (analysis of Current Population Survey, September 2001, unpublished data). Females have also been found to have less positive attitudes toward computers than do males (Mitra, LaFrance, and McCullough 2001; Kadrijevič 2000; Whitley 1997).

<sup>5</sup>Technology does seem to be reaching the “Other” race/ethnicity group (which is 54 percent Asian) more than Whites; 61 percent of “Other” participants were in technology-based activities compared to 53 percent of White participants.

<sup>6</sup>Findings were mixed for participants with the lowest level of income (\$20,000 or less). No significant differences were detected between participants with the lowest level of income and those whose income was at the next two levels (\$20,001–\$35,000 and \$35,001–\$50,000), but participants at the lowest income level participated in technology-based activities at a lower rate than those at the highest two income levels (\$50,001–\$75,000 and \$75,001 or more).

## References

- Creighton, S., and Hudson, L. (2002). *Participation Trends and Patterns in Adult Education: 1991 to 1999* (NCES 2002–119). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Ingels, S.T., Curtin, T.R., Kaufman, P., Alt, M.N., and Chen, X. (2002). *Coming of Age in the 1990s: The Eighth-Grade Class of 1988 12 Years Later* (NCES 2002–321). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Jacob, B.A. (2002). Where the Boys Aren’t: Non-cognitive Skills, Returns to School and the Gender Gap in Higher Education. *Economics of Education Review*, 21: 589–598.
- Jacobson, J., Olsen, C., Rice, J.K., Sweetland, S., and Ralph, J. (2001). *Educational Achievement and Black-White Inequality* (NCES 2001–061). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Kadrijevič, D. (2000). Gender Differences in Computer Attitude Among Ninth-Grade Students. *Journal of Educational Computing Research*, 22(2): 145–154.
- Kim, K., and Creighton, S. (1999). *Participation in Adult Education in the United States: 1998–99* (NCES 2000–027). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Kim, K., Hagedorn, M.C., Williamson, J., and Chapman, C. (forthcoming). *Participation in Adult Education and Lifelong Learning 2000–01*. U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Kleiner, A., and Farris, E. (2002). *Internet Access in U.S. Public Schools and Classrooms: 1994–2001* (NCES 2002–018). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Mitra, A., LaFrance, B., and McCullough, S. (2001). Differences in Attitudes Between Women and Men Toward Computerization. *Journal of Educational Computing Research*, 25(3): 227–244.
- U.S. Department of Education. (2002). *The Condition of Education 2002* (NCES 2002–025). Washington, DC: U.S. Government Printing Office.
- Waits, T., and Lewis, L. (2003). *Distance Education at Degree-Granting Postsecondary Institutions: 2000–2001* (NCES 2003–017). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Whitley, B.E., Jr. (1997). Gender Differences in Computer-Related Attitudes and Behavior: A Meta-Analysis. *Computers in Human Behavior*, 13(1): 1–22.

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