



# Computer and Internet Use by Students in 2003

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## Statistical Analysis Report

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## Highlights

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This report uses data from the *Current Population Survey, October 2003 School Enrollment and Computer Use Supplement* to examine the use of computers and the Internet by American children enrolled in nursery school and students in kindergarten through grade 12, age 3 and older.<sup>1</sup> The report examines the overall rate of use (that is, the percentage of individuals in the population who are users), the ways in which students<sup>2</sup> use the technologies, where the use occurs (home, school, and other locations), and the relationships of these aspects of computer and Internet use to demographic and socioeconomic characteristics such as students' age and race/ethnicity and their parents' education and family income. All statistical comparisons in this report were tested for significance at the 95 percent confidence level ( $p < .05$ ), and all reported differences are statistically significant and are five percentage points or larger, unless otherwise noted.

This report confirms that patterns of computer and Internet use seen in previous research (DeBell and Chapman 2003) are observed in more recent data representing a different population than has been described previously. Key findings are as follows:

- **Most students use computers and a majority use the Internet** (table 1). About 91 percent (53 million persons) of children age 3 and over and in nursery school through grade 12 use computers,<sup>3</sup> and about 59 percent (35 million persons) use the Internet.

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<sup>1</sup> Current Population Survey interviews were conducted in about 56,000 households in October 2003 and collected information regarding 29,075 persons age 3 and older enrolled in nursery school or grades K through 12. One respondent per household was interviewed and that respondent provided information about the household and about individual household members, including information about computer and Internet use. Because a household's respondent may not have full information regarding computer and Internet use by other members of the household, this method is a potential source of error in the data, though there is no way to quantify the possible error. The overall response rate on the survey was 86.9 percent.

<sup>2</sup> Data on "nursery school" enrollment may not reflect enrollment in all kinds of early childhood programs and may include enrollment in programs that education experts would not call schools. For example, some day care programs that do not have a curriculum may be reported as nursery school, and some programs that have a curriculum may not be reported. Because the CPS questionnaire asks about enrollment in "school," this report refers to the population enrolled in nursery school through the 12th grade as "students" for ease of presentation. It is correct to regard this population as children enrolled in programs reported as nursery school, kindergarten, or grades 1 through 12.

<sup>3</sup> Computer users are identified by three CPS questions that ask if the household member uses computers at home, at school, or at his or her main job. Because estimates of overall computer use do not include people who use computers only at locations other than home, work, and school (such as libraries or friends' homes), the estimates may slightly understate the total number of people who use computers at any location.

- **Use begins early** (figure 1, table 1). About two-thirds of children in nursery school and 80 percent of kindergartners use computers, and 97 percent of students in grades 9–12 do so. About 23 percent of children in nursery school use the Internet, and this number rises to 50 percent by grade 3 and to 79 percent in grades 9–12.
- **Public school students and private school students differ in their use of these technologies.** Private school students are more likely than public school students to use computers at home (76 percent compared to 66 percent; table 3), but public school students are more likely to use computers and the Internet at school (table 6) and overall (table 1).
- **There is a “digital divide”** (table 1). Computer and Internet use are divided along demographic and socioeconomic lines. Use of both technologies is higher among Whites than among Blacks and Hispanics.<sup>4</sup> Students living with more highly educated parents are more likely to use these technologies than those living with less well educated parents, and those living in households with higher family incomes are more likely to use computers and the Internet than those living in lower income households.
- **Schools help bridge the digital divide.** Many disadvantaged students use the Internet only at school (table 7). Among the group of students who access the Internet at only one location (20 percent of students), 60 percent of those from families in poverty and 63 percent of those whose parents have not earned at least a high school credential do so at school.<sup>5</sup> In comparison, 33 percent of those from families not in poverty and 24 percent of those with at least one parent who attended graduate school do so only at school. This illustrates the role of schools in bridging the digital divide (table 7).
- **Disability status, metropolitan status, and family/household type are associated with the digital divide.** Consistent with the findings of previous research (U.S.

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<sup>4</sup> “White,” “Black,” “Asian,” “American Indian,” and “More than one race” refer to White non-Hispanic; Black non-Hispanic; Asian or Pacific Islander, non-Hispanic; American Indian, Aleut, or Eskimo, non-Hispanic; and More than one race, non-Hispanic, respectively, and are used throughout this report for ease of presentation. Hispanics may be of any race.

<sup>5</sup> Households with reported income in categories below the poverty threshold for their household size (as defined by the Census Bureau for 2003) were classified as poor, and households with income above the poverty threshold were classified as not poor. For details of the poverty definition, see Appendix A: Methodological and Technical Notes.

Department of Commerce 2002; DeBell and Chapman 2003), students without a physical disability are more likely than their disabled peers to use computers and the Internet. When not controlling for other factors, students from two-parent households are more likely to use the Internet than those from single-parent households,<sup>6</sup> and students living outside of central cities are more likely to use the Internet than those living in central cities. However, when controlling for other factors such as family income and parental education, the association of household type with computer and Internet use is not statistically significant, and the association of Internet use with residence outside of metropolitan areas is not statistically significant (table 2).

- **There are no differences between the sexes in overall computer or Internet use rates.** In contrast to the 1990s, when boys were more likely than girls to use computers and the Internet, overall computer and Internet use rates for boys and girls are now about the same (table 1).
- **There are large demographic and socioeconomic differences in the use of home computers** (table 3). Whites and Asians are more likely to use computers at home than are Blacks, Hispanics, and American Indians. Thirty-seven percent of those from families with incomes below \$20,000 use computers at home, compared to 88 percent of those living in families with annual incomes over \$75,000. The gap between students whose parents have the least and the most education is similar to the income gap; while 35 percent of those whose parents did not complete high school use computers at home, 88 percent of those living with at least one parent who has attended graduate school use a computer at home. At school, these gaps are narrower, as the use of computers at school is more equal overall.
- **Use of home computers is common for playing games, working on school assignments, and connecting to the Internet.** A majority (56 percent) of students use home computers to play games (table 5). Forty-seven percent use computers to complete school assignments and 45 percent use computers to connect to the Internet.

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<sup>6</sup> The categories for family/household structure include “male-headed single-householder” and “female-headed single-householder.” “Single father” and “single mother” (or “single parent,” when referring to both) are used for ease of presentation. Some single-householders include nonrelatives or relatives other than the father or mother such as a grandfather or grandmother.

Sixty-two to 69 percent of students in grades 6 through 12 use home computers to complete school assignments, 54-64 percent to connect to the Internet, and 57-61 percent to play games.

- **Differences in how computers are used often are larger than overall differences in rates of use.** In the population of students enrolled in nursery school through grade 12, there is a 13-percentage-point gap in computer use between students from households where no parent has received a high school credential and those from households where at least one parent has some graduate school education (table 1). The difference between these groups' use of computers for word processing is 34 percentage points, and the difference for using computers to complete school assignments is 37 points (table 5).
- **Home and school are common locations for Internet access.** About 45 percent of students access the Internet from home, and 43 percent access the Internet from school (table 6).
- **Considering all locations, use of the Internet is common for work on school assignments, e-mail, and games.** About 46 percent of students use the Internet to complete school assignments, while 36 percent use the Internet for e-mail or instant messaging and 38 percent use it to play games (table 8A).

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## Introduction

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This report describes computer and Internet use by children enrolled in nursery school and students in kindergarten through grade 12 who are age 3 or older.<sup>1</sup> The purpose of this report is to examine rates of use (that is, the percentage of individuals in the population who are users), how these technologies are used, where they are used, and how subgroups within the population may differ in their use of these technologies. The following research questions are answered:

- What percentage of students uses computers and what percentage uses the Internet?
- Does students' use differ by grade level and by socioeconomic and demographic characteristics such as race/ethnicity, family income, and parents' educational attainment?
- What percentage of students use computers at home and at school?
- For what activities do students use computers at home?
- Where do students use the Internet?
- How many students use the Internet in only one place, and how do single-location users differ from other users?
- What do students do on the Internet?
- How do students' Internet activities vary by their demographic and socioeconomic characteristics?

Data for this report come from the *Current Population Survey (CPS), October 2003 Computer and Internet Use Supplement*. The CPS is a sample survey representative of the civilian noninstitutional population in the United States. The survey is conducted in approximately 56,000 households. In October 2003 information was collected regarding 29,075 children enrolled in nursery school and students in kindergarten through 12th grade. This sample

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<sup>1</sup> Data on "nursery school" enrollment may not reflect enrollment in all kinds of early childhood programs and may include enrollment in programs that education experts would not call schools. For example, some day care programs that do not have a curriculum may be reported as nursery school, and some programs that have a curriculum may not be reported. Because the CPS questionnaire asks about enrollment in "school," this report refers to the population enrolled in nursery school through the 12th grade as "students" for ease of presentation. It is correct to regard this population as children enrolled in programs reported as nursery school, kindergarten, or grades 1 through 12.

represents 58.3 million children. A member of each household who is at least 15 years old provides information about household members. As a result of this data collection method, data regarding computer and Internet use by students were not collected directly from students in most cases, but from another member of the student's household. It is possible that this proxy reporting method introduces some error to the data, but it is not possible to quantify the potential error. The overall unweighted response rate on the survey was 86.9 percent. For further detail about CPS survey methods, see Appendix A: Methodological and Technical Notes.

This report follows an earlier NCES report on a similar topic, *Computer and Internet Use by Children and Adolescents in 2001* (DeBell and Chapman 2003).<sup>2</sup> The earlier report differs from the present report by examining children and adolescents age 5-17, whether or not they were enrolled in school, while the present report examines children who are age 3 or older and are reported as enrolled in nursery school through grade 12. Many of the same patterns and differences noted in the earlier report are found in the present report. However, it is important to note the difference in the populations examined. There is substantial overlap between the two populations, but they are not the same, so comparisons between the estimates in the two reports must be made with caution.<sup>3</sup> To permit direct comparisons of computer and Internet use in 2003 and 2001, appendix table B-4 provides estimates of computer and Internet use by children and adolescents age 5-17 in 2003 and in 2001, regardless of their enrollment status.

The remainder of this introductory section presents background information on the significance of computer and Internet use. The next section provides an overview of current usage rates and user characteristics. Subsequent sections then examine rates of computer use at home and at school, home computer activities, Internet access locations, and Internet activities. A methodological appendix provides details about the data and statistical methods. All

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<sup>2</sup> Portions of this report are reprinted from the earlier version (DeBell and Chapman 2003), with updates, or from an Issue Brief presenting summary statistics for 2003 (DeBell 2005).

<sup>3</sup> The population examined here (age 3 and older, enrolled in nursery school through grade 12) includes 55 percent of children age 3 to 4, 97 percent of children age 5 through 17, 28 percent of 18-year-olds, 7 percent of 19-year-olds, 2 percent of 20-year-olds, and very few older adults still enrolled in primary or secondary school (the percentage rounds to zero). The present report focuses on the student population because it was collected during the school year and provides reliable estimates of enrolled students. The previous report focused on the school-age population because its data were collected in September when some children may have been on summer vacation.

differences discussed in this report are statistically significant at the  $p < .05$  level, and all reported differences are five percentage points or larger, unless otherwise noted.<sup>4</sup>

### **Background: Significance of Computer and Internet Use**

Students' computer and Internet activities and rates of use are of interest for several reasons. Use of computers and the Internet has been associated with improvements in people's education, labor market prospects, and everyday lives. Since these technologies have the potential to improve access to information, to help get tasks done better or more quickly, and to facilitate communication (see National Research Council 1999), computer and Internet use rates are indicators of the standard of living. Since the use of computers helps students gain computer literacy, use rates may indicate how well prepared the current generation of students will be to enter a workforce where computer literacy is in demand (U.S. Department of Education 1999b). Computer use may also promote cognitive development in both children and adults, specifically in the area of visual intelligence, where certain computer activities—particularly games—may enhance the ability to monitor several visual stimuli at once, to read diagrams, recognize icons, and visualize spatial relationships (Greenfield et al. 1994a, 1994b; Subrahmanyam and Greenfield 1994; also see Weikart 1995; Thelen 1996; Healy 1999). Other findings suggest that computer use may have a positive influence on student motivation at the elementary and secondary levels (Schofield 1997) and, depending on how computers are used, has the potential to improve academic performance (Niemiec and Walberg 1992; Bangert-Drowns 1993; Christmann, Badgett, and Lucking 1997; Holden 1998; Wegerif 2004).

While high use rates are positive indicators in the domains mentioned above, they may also indicate risks for negative outcomes. To the extent that time spent using computers displaces time spent on athletics and other physical activity, extensive computer use may contribute to a sedentary lifestyle that puts children at risk for obesity and associated health problems (Hill and Peter 1998; Attewell, Suazo-Garcia, and Battle 2003; also see Ho and Lee

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<sup>4</sup> The five-percentage-point reporting criterion was based upon a judgment that smaller differences may not be meaningful even if they are statistically significant. Due to the large sample size of the CPS, many differences smaller than five percentage points are statistically significant.

2001). Use of computer game controls or keyboards also entails a risk of injury from repetitive motion (Laester, Maxwell, and Hedge 1998; Oates, Evans, and Hedge 1998; Harris and Straker 2000; Macgregor 2000). Other concerns include the potential for Internet use to increase social isolation among adolescents (Kraut et al. 1998; Sanders et al. 2000) and the potential for violent games to cause increases in hostility and aggression (Chambers and Ascione 1987; Schutte et al. 1988; Irwin 1995; Kirsh 1998; van Schie 1998; also see Scott 1995). Such games are also believed by some to desensitize players to violence and to other people's suffering (Grossman 1995; Grossman and DeGaetano 1999); others view the evidence regarding harmful effects of violent games as inconclusive (Olson 2004; Bensley and VanEnwyk 2000). The Internet is also a medium that exposes or provides access for some young people to several kinds of inappropriate material. This may include pornography and inappropriate advertising (Mitchell, Finkelhor, and Wolak 2003; Thornburgh and Lin 2002; Shields and Behrman 2000), online sexual solicitation (Mitchell, Finkelhor, and Wolak 2003), and the means to acquire cigarettes (Ribisl, Williams, and Kim 2003) or materials to facilitate cheating on school assignments (Lathrop and Foss 2000).

As computer and Internet use become increasingly widespread, larger percentages of the population will both enjoy the potential benefits and be exposed to the associated risks. The potential effects of these technologies on users make it important to describe the populations who are using them and to learn more about how they are being used. This report describes the population of students who may experience both the benefits and risks of computer and Internet use.

## **Use in 2003 and User Characteristics**

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Table 1 shows that in 2003, 91 percent of students in nursery school through grade 12 and age 3 or older (53 million persons) used computers<sup>5</sup> and 59 percent (35 million persons) used

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<sup>5</sup> Computer users are identified by three CPS questions that ask if the subject uses computers at home, at school, or at his or her main job if the subject is employed and age 15 or older. Because estimates of overall computer use do not include people who use computers only at locations other than home, work, and school, such as libraries or community centers, the estimates may slightly understate the total number of people who use computers at any

the Internet. Figure 1 graphs the relationship between grade level and the use of these technologies (data shown in appendix table B-2). Eighty percent of students already use computers by the time they are in kindergarten, and a majority (56 percent) use the Internet in grade 4 (table B-2). Among high school students (grades 9–12), 97 percent use computers and 79 percent use the Internet (table 1).

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location. In addition, the estimates reflect only a dichotomous measure of computer usage, as data on the intensity or frequency of use are not available from the CPS.

Table 1. Percentage of children in nursery school and students in grades K-12 who use computers and the Internet, by student and family/household characteristics: 2003

Characteristic	Number of students (in thousands)	Percent using computers		Percent using the Internet	
		Percent	s.e.	Percent	s.e.
Total	58,273	91	0.3	59	0.4
<b>Student characteristic</b>					
Grade level					
Nursery school	4,928	66	1.5	23	1.3
Kindergarten	3,719	80	1.4	32	1.7
1-5	20,043	91	0.4	50	0.8
6-8	12,522	95	0.4	70	0.9
9-12	17,062	97	0.3	79	0.7
Sex					
Female	28,269	91	0.4	61	0.6
Male	30,005	91	0.4	58	0.6
Race/ethnicity <sup>1</sup>					
White	35,145	93	0.3	67	0.5
Hispanic	10,215	85	1.2	44	1.7
Black	8,875	86	0.9	47	1.4
Asian	2,293	91	1.6	58	2.7
American Indian	346	86	4.8	47	7.0
More than one race	1,400	92	1.9	65	3.3
Physical disability status					
Disabled	646	82	3.3	49	4.3
Not disabled	47,949	91	0.3	61	0.5
School enrollment					
Public	50,653	91	0.3	60	0.5
Private	7,620	86	0.8	54	1.2
<b>Family &amp; household characteristic</b>					
Parent educational attainment					
Less than high school credential	5,691	82	1.1	37	1.4
High school credential	13,804	89	0.6	54	0.9
Some college	16,548	93	0.4	63	0.8
Bachelor's degree	8,590	92	0.6	67	1.1
Graduate education	10,713	95	0.5	73	0.9
Family/household type					
Two-parent married household	40,987	92	0.3	62	0.5
Male householder	3,129	90	1.2	55	1.9
Female householder	13,463	89	0.6	52	0.9
Other arrangement	694	89	2.6	55	4.1
Household language					
Spanish-only	2,840	80	1.6	28	1.8
Not Spanish-only	55,434	91	0.3	61	0.4
Poverty status					
In poverty	10,173	84	1.1	40	1.5
Not in poverty	39,016	93	0.4	66	0.7
Family income					
Under \$20,000	8,815	85	0.8	41	1.1
\$20,000–\$34,999	9,273	87	0.7	50	1.1
\$35,000–\$49,999	7,499	93	0.7	62	1.2
\$50,000–\$74,999	9,834	93	0.5	66	1.0
\$75,000 or more	13,769	95	0.4	74	0.8
Metropolitan status					
Metropolitan, central city	13,229	88	0.6	50	0.9
Metropolitan, not central city	26,670	92	0.4	63	0.6
Non-metropolitan	10,370	91	0.7	59	1.3

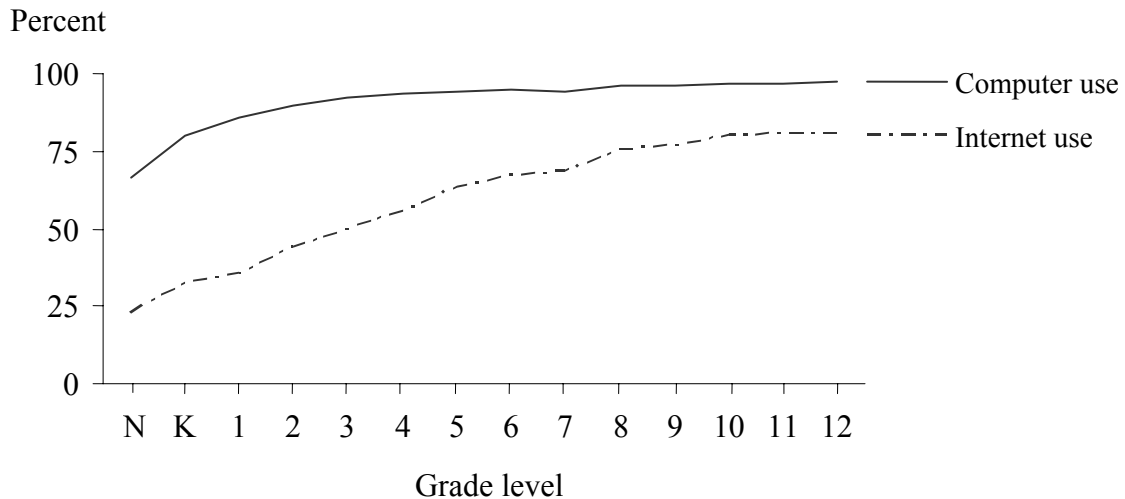
<sup>1</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

NOTE: s.e. is standard error. Detail may not sum to total because of rounding or missing data.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.



Figure 1. Percentage of children in nursery school and students in grades K-12 using computers or the Internet, by grade level: 2003



NOTE: “N” is nursery school. “K” is kindergarten. Population is limited to age 3 and older.  
 SOURCE: U.S. Census Bureau, Current Population Survey (CPS), October 2003.

### Digital Divide and Grade Level Differences

Although the adoption of these technologies has been rapid, it has occurred at disparate rates for different segments of American society. How computers and the Internet are used, and whether they are used at all, often vary by socioeconomic status (assessed in this report with three measures: parent educational attainment, poverty status, and family income) and other characteristics such as race/ethnicity, household composition, and metropolitan status, such that the inequality of use has been termed a “digital divide” (U.S. Department of Commerce 1998; Norris 2001). This is particularly true of adults. While 86 percent of adults with an annual family income over \$75,000 used the Internet in 2003, only 31 percent of adults with an annual family income below \$20,000 did so (table B-1). Large racial/ethnic and educational differences exist as well. Sixty-five percent of White and Asian adults used the Internet, compared to 51 percent of American Indians, 46 percent of Blacks, and 36 percent of Hispanics.<sup>6</sup> About 84

<sup>6</sup> “White,” “Black,” “Asian,” “American Indian,” and “More than one race” refer to White non-Hispanic; Black non-Hispanic; Asian or Pacific Islander, non-Hispanic; American Indian, Aleut, or Eskimo, non-Hispanic; and More than one race, non-Hispanic, respectively, and are used throughout this report for ease of presentation. Hispanics may be of any race.

percent of adults with a bachelor's degree used the Internet, but 47 percent with only a high school education were Internet users, and the rate of Internet use was only 20 percent among adults who had not graduated from high school. As discussed below, this digital divide exists for elementary and secondary school students as well, though many differences are smaller than those found between various groups of adults.

Table 1 shows computer and Internet use rates for students by individual, family, and household characteristics. Looking at individual characteristics, students in grades 9-12 are about 15 percentage points more likely than kindergartners to use computers and about 45 percentage points more likely than kindergartners to use the Internet. Public school students are more likely than private school students to use both technologies. White students are more likely to use these technologies than their Black or Hispanic peers. In addition, those who are not physically disabled are more likely to use computers and the Internet than those with physical disabilities.

The family and household settings children experience are also related to computer and Internet use. Students from two-parent households are more likely to use the Internet than those from single-parent households,<sup>7</sup> and those living with a parent who has attended graduate school are more likely to use both technologies than those living with no parent who has graduated from high school. In addition, those living in households where a language other than Spanish is spoken are more likely to use computers and the Internet than those living in Spanish monolingual homes. Students in families with the highest incomes are more likely to use computers and the Internet than those in families with the lowest incomes. Students who live outside of central cities are more likely to use the Internet than those living in central cities.

A closer look at these differences provides a better picture of the magnitude of the differences in technology use between certain groups of students. For instance, the rate of computer use for Black students is 7 percentage points lower than that of their White peers, and

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<sup>7</sup> The categories for family structure in the CPS data are “two parent, male-headed single-householder, female-headed single-householder, and other arrangement.” When referring to the single householder categories, we use “single parent” or “single father” and “single mother” for ease of presentation. Some single-householders include non-relatives or relatives other than the father or mother such as a grandfather or grandmother.

the difference in Internet use is even more pronounced at 21 percentage points. Differences between Whites and Hispanics are similar (8 percentage points and 23 percentage points, respectively). Approximately 82 percent of students from households where no parent has graduated from high school use computers and 37 percent of them use the Internet. In contrast, approximately 95 percent of students from households where at least one parent attended graduate school use computers and 73 percent of them use the Internet. Eighty-four percent of poor students use computers compared to 93 percent of students who are not poor, and the difference in Internet use is even larger.<sup>8</sup>

There is also a clear difference in students' computer and Internet use in households where Spanish is the only language spoken compared to other households. For students living in households where only Spanish is spoken, the rate of computer use is 11 percentage points lower than those in households where other languages (usually English) are spoken. Internet use by students in Spanish-speaking monolingual households is less than half that of students in other households.

Disabilities are also associated with differences. The differences between disabled and non-disabled children and adolescents are smaller than those found for adults,<sup>9</sup> but they still exist (DeBell and Chapman 2003). Comparing students with and without disabilities, the rates of computer and Internet use are both about 10 percentage points lower for those with disabilities.

One important difference in use has all but disappeared, however. In the past, males have used computers and the Internet at significantly higher rates than females (Clemente 1998; Riccobono 1986) and have reported more experience and skill with these technologies (Schumacher and Morahan-Martin 2001). More recently, as the use of these technologies has become more widespread, this gender gap has closed for both adults and children. Among both adults and youths today there are now no important differences between the sexes in overall

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<sup>8</sup> Households with reported income in categories below the poverty threshold for their household size (as defined by the Census Bureau for 2003) were classified as poor, and households with income above the poverty threshold were classified as not poor. For details of the poverty definition, see Appendix A: Methodological and Technical Notes.

<sup>9</sup> Adults with a disability are roughly half as likely to use the Internet as non-disabled adults and even less likely to have ever used a computer (U.S. Department of Commerce 2000). Adults with visual impairments use computers and the Internet at significantly lower rates than the rest of the adult population (Gerber and Kirchner 2001).

computer or Internet use rates (DeBell and Chapman 2003; U.S. Department of Commerce 2002; Miller, Schweingruber, and Brandenburg 2001, reporting on computers only). Estimates in table 1 and appendix table B-1 are consistent with this pattern.

Many of the characteristics presented in table 1 are related to one another. For example, the average income in two-parent households is higher than the average income in other households (Ricciuti 2004). Since income is also associated with Internet use (table 1), it is reasonable to ask whether the difference in Internet use between single-mother and two-parent households could be explained by lower income in single-mother households. Multiple regression analysis answers questions like this by showing how an independent variable (such as family/household type) is related to the dependent variable (such as Internet use) when other independent variables (such as income) are held constant, or statistically controlled. (For details, see Appendix A: Methodological and Technical Notes.) In order to show the association of each of the characteristics in table 1 with computer and Internet use, two regression analyses were performed in which computer use and Internet use were the dependent variables and the characteristics in table 1 were the independent variables (grade level, sex, race/ethnicity, disability status, public/private enrollment, parent educational attainment, family/household type, household language, poverty status, household income,<sup>10</sup> and metropolitan status). The results are presented in table 2.

The regression analyses (table 2) support several of the key findings about differences that were shown in table 1. Increases in grade level,<sup>11</sup> parental education, and family income are all associated with an increase in a student's odds of using computers and the Internet. That is, children in higher grades are more likely to use the technologies than children in lower grades, children in households with a parent who has completed high school or higher levels of education are more likely to use the technologies than children living with parents who

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<sup>10</sup> Poverty status is a function of income and household size, so the income and poverty variables are related. Multicollinearity diagnostics were run on the regression models, and multicollinearity does not cause misleading results in the reported models. See appendix A for details.

<sup>11</sup> Note that in the regression analyses, grade level is measured as a continuous variable. Groupings were used in the bivariate tables.

Table 2. Logistic regression analyses of student and family/household characteristics and computer and Internet use: 2003

Independent variable	Computer use			Internet use		
	Parameter estimate	Standard error	Odds ratio	Parameter estimate	Standard error	Odds ratio
<b>Student characteristic</b>						
Grade level	0.24 *	0.01	1.27	0.25 *	0.01	1.28
Sex						
Female	reference category			reference category		
Male	-0.01	0.07	0.99	-0.08	0.04	0.93
Race/ethnicity <sup>1</sup>						
White	reference category			reference category		
Hispanic	-0.45 *	0.13	0.64	-0.45 *	0.09	0.64
Black	-0.61 *	0.11	0.54	-0.62 *	0.07	0.54
Asian	-0.41 *	0.19	0.66	-0.43 *	0.12	0.65
American Indian	-0.82	0.45	0.44	-0.66 *	0.33	0.52
More than one race	-0.06	0.26	0.94	0.14	0.16	1.15
Physical disability status						
Not disabled	reference category			reference category		
Disabled	-0.68 *	0.27	0.50	-0.38	0.21	0.68
Missing disability status	0.16	0.10	1.17	-0.40 *	0.06	0.67
School enrollment						
Public	reference category			reference category		
Private	-0.48 *	0.10	0.62	-0.23 *	0.07	0.80
<b>Family &amp; household characteristic</b>						
Parent educational attainment						
Less than high school credential	reference category			reference category		
High school credential	0.32 *	0.13	1.37	0.35 *	0.10	1.42
Some college	0.66 *	0.14	1.94	0.66 *	0.10	1.94
Bachelor's degree	0.61 *	0.16	1.84	0.80 *	0.11	2.23
Graduate education	1.10 *	0.17	3.01	1.03 *	0.11	2.81
Missing parent education	-0.22	0.18	0.80	-0.25	0.14	0.78
Family/household type						
Two-parent married household	reference category			reference category		
Male householder	0.02	0.16	1.02	-0.07	0.10	0.94
Female householder	0.14	0.10	1.15	0.08	0.06	1.09
Other arrangement	0.08	0.32	1.08	0.17	0.20	1.18
Household language						
Not Spanish-only	reference category			reference category		
Spanish-only	-0.31	0.19	0.73	-0.71 *	0.16	0.49
Poverty status						
Not in poverty	reference category			reference category		
In poverty	-0.07	0.17	0.94	-0.32 *	0.12	0.73
Family income						
Under \$20,000	reference category			reference category		
\$20,000–\$34,999	0.05	0.16	1.05	0.05	0.12	1.05
\$35,000–\$49,999	0.46 *	0.21	1.58	0.29 *	0.14	1.34
\$50,000–\$74,999	0.43 *	0.21	1.54	0.38 *	0.14	1.46
\$75,000 or more	0.52 *	0.21	1.68	0.64 *	0.14	1.89
Missing family income <sup>2</sup>	0.10	0.20	1.01	-0.06	0.14	0.94
Metropolitan status						
Metropolitan, central city	reference category			reference category		
Metropolitan, not central city	0.10	0.09	1.10	0.16 *	0.06	1.17
Non-metropolitan	0.15	0.13	1.16	0.07	0.08	1.07
Missing metropolitan status	0.07	0.12	1.07	0.17 *	0.08	1.18
Constant	0.35	0.24	1.41	-1.88 *	0.17	0.15

\* p < .05

<sup>1</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

<sup>2</sup> Missing family income also indicates missing poverty status. For convenience this variable is presented under family income. The reference category for missing family income and poverty status is known family income and known poverty status.

NOTE: The number of cases analyzed is 29,075. Missing data are modeled to retain 11,745 cases for which data are missing for one or more independent variables. Estimates are for students in grade 12 or below and age 3 or older.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

did not complete high school, and children living in families with incomes of \$35,000 or more are more likely to use the technologies than children living in families with incomes below \$20,000. Hispanic and Black students are less likely to use computers and the Internet than White children. In addition, the multivariate analyses suggest that White students are more likely to use both technologies than are Asian students and are more likely to use the Internet than are American Indian students. Private school students are less likely to use computers and the Internet than public school students. Students with disabilities are less likely to use computers than their non-disabled peers, and those from Spanish monolingual households are less likely to use the Internet than those from households where other languages are spoken. Also, no significant differences are observed between boys and girls. In these respects, the overall picture of technology use that is revealed by the regression analyses is similar to the picture suggested by the bivariate analyses in table 1.

One contrast between the results of the regression analyses and the bivariate analyses is that the magnitude of the differences shown in the multivariate analyses of computer and Internet use is often smaller than the magnitude of the differences shown in the bivariate comparisons.<sup>12</sup> For example, the bivariate odds ratios for computer use comparisons of Hispanics to Whites and the highest-to-lowest parent education categories are .41 and 4.06 (not shown in tables<sup>13</sup>), respectively, while the odds ratios in the regression analysis are .54 and 1.68 (table 2). The bivariate odds ratios for Internet use comparisons of Hispanics to Whites and the highest-to-lowest parent education categories are .38 and 4.42, while the odds ratios in the logistic regression analysis are .64 and 1.89. In each of these cases, the odds ratio is closer to 1.00 in the logistic regression analysis than in the bivariate comparison, indicating a weaker association in

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<sup>12</sup> It is to be expected for odds ratios in multiple regression to be closer to 1.00 than bivariate odds ratios because regression controls for other factors. This usually attenuates associations, relative to a bivariate analysis, because variables added to a multiple regression analysis account for some of the association observed in the bivariate comparison.

<sup>13</sup> These bivariate odds ratios are not shown in tables, but they can be calculated from the information shown in tables, subject to rounding error. The odds ratio is the odds of one occurrence divided by the odds of another occurrence. Odds are the probability of an event occurring divided by the probability of non-occurrence. For example, table 1 shows that 93 percent of White students use computers and 85 percent of Hispanic students do so. The odds ratio for the comparison of Hispanic to White computer use equals  $(.85/(1-.85))/(.93/(1-.93)) = .43$ , which means that the odds of a Hispanic student using a computer are .43 times the odds of a White student doing so. The figure of .41 reported in the text is based on unrounded data and thus differs from this estimate of .43 due to rounding in the percentages reported in table 1.

the regression analysis (because an odds ratio of 1.00 indicates no difference) when controlling for the independent variables.

Other differences from table 1 were not found to be statistically significant in the regression analysis. Table 1 shows computer use and Internet use differences between students in single-parent households and students who do not live in single-parent households, and it shows computer use differences between those living in poverty and those not in poverty, but these results are not observed in the regression analysis. At the bivariate level in table 1, these factors are related to computer and Internet use, but when other factors are considered these relationships are no longer significant. This suggests that other characteristics that were controlled for in the regression models, such as family income and parent educational attainment, may account for the differences in students' odds of using computers and the Internet. Notwithstanding the lack of observed statistical significance of certain variables in the regression analysis, it is still important to examine the bivariate statistics for these variables because the bivariate statistics accurately describe the population.<sup>14</sup>

Having looked at the overall rates of computer and Internet use among students and their associations with user characteristics, the next sections describe where and how students use computers and the Internet.

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<sup>14</sup> For example, after controlling for other factors such as family income, family structure is not significantly related to computer and Internet use. However, it is still the case that fewer students from single-parent families use computers and the Internet.

## Home and School Computer Use

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Home and school are the primary locations where students use computers. Table 3 compares the rates of computer use at these two locations. Eighty-three percent of students use computers at school and 68 percent use computers at home. In general, more use computers at school than at home, but among those from households where the highest parental education was a graduate education, and those from families with incomes above \$75,000, the rate of use at home (88 percent in both categories) was similar to the rate of use at school (84 and 86 percent, respectively).

Table 3 reveals that patterns of demographic and socioeconomic differences in the use of home computers parallel those found in the overall use of computers. There are racial/ethnic gaps in home use: 46 percent of Blacks, 48 percent of Hispanics, and 43 percent of American Indians use computers at home, compared to 78 percent of Whites and 74 percent of Asians. There is also a difference in home use between students from the lowest and highest family incomes. Only 37 percent of those from families with incomes less than \$20,000 use computers at home, compared to 88 percent of those living in families with annual incomes over \$75,000. The gap between students whose parents have the least and the most education is similarly large: while 35 percent of those whose parents did not complete high school use computers at home, 88 percent of those living with at least one parent who has attended graduate school use a computer at home.

Table 3 also shows that differences in school computer use are not as pronounced as the differences in home use. While the gap in home computer use by parental education level noted above is 53 percentage points, at school it is 6 percentage points. While the differences in home computer use between students living in two-parent households compared to those living in single-father or single-mother households were 18 and 22 percentage points, respectively, there is little or no difference between these groups in terms of computer use at school. Although there are some differences in school computer use by race/ethnicity, home language, and socioeconomic status (parental education, family income, and poverty), these gaps are narrower than they are for home computer use.



Table 3. Percentage of children in nursery school and students in grades K-12 using computers at home and at school, by student and family/household characteristics: 2003

Characteristic	Number of students (in thousands)	Percent using computers at home		Percent using computers at school	
		Percent	s.e.	Percent	s.e.
Total	58,273	68	0.4	83	0.3
<b>Student characteristic</b>					
Grade level					
Nursery school	4,928	51	1.5	43	1.5
Kindergarten	3,719	60	1.7	67	1.7
1-5	20,043	64	0.7	85	0.5
6-8	12,522	72	0.9	91	0.6
9-12	17,062	75	0.7	91	0.5
Sex					
Female	28,269	68	0.6	84	0.5
Male	30,005	67	0.6	83	0.5
Race/ethnicity <sup>1</sup>					
White	35,135	78	0.5	85	0.4
Hispanic	10,215	48	1.7	80	1.3
Black	8,875	46	1.4	82	1.0
Asian	2,293	74	2.4	79	2.2
American Indian	346	43	6.9	83	5.2
More than one race	1,400	74	3.1	86	2.4
Physical disability status					
Disabled	646	55	4.2	76	3.7
Not disabled	47,949	68	0.5	84	0.4
School enrollment					
Public	50,653	66	0.5	85	0.3
Private	7,620	76	1.1	71	1.1
<b>Family &amp; household characteristic</b>					
Parent educational attainment					
Less than high school credential	5,691	35	1.4	78	1.2
High school credential	13,804	55	0.9	84	0.7
Some college	16,548	72	0.8	86	0.6
Bachelor's degree	8,590	82	0.9	84	0.9
Graduate education	10,713	88	0.7	84	0.8
Family/household type					
Two-parent married household	40,987	74	0.5	83	0.4
Male householder	3,129	56	1.9	83	1.4
Female householder	13,463	52	0.9	84	0.7
Other arrangement	694	49	4.1	84	3.0
Household language					
Spanish-only	2,840	32	1.9	76	1.7
Not Spanish-only	55,434	69	0.4	84	0.3
Poverty status					
In poverty	10,173	39	1.5	80	1.2
Not in poverty	39,016	76	0.7	85	0.6
Family income					
Under \$20,000	8,815	37	1.1	80	0.9
\$20,000–\$34,999	9,273	55	1.1	81	0.9
\$35,000–\$49,999	7,499	71	1.1	86	0.9
\$50,000–\$74,999	9,834	80	0.9	84	0.8
\$75,000 or more	13,769	88	0.6	86	0.6
Metropolitan status					
Metropolitan, central city	13,229	57	0.9	81	0.7
Metropolitan, not central city	26,670	73	0.6	84	0.5
Non-metropolitan	10,370	66	1.2	85	0.9

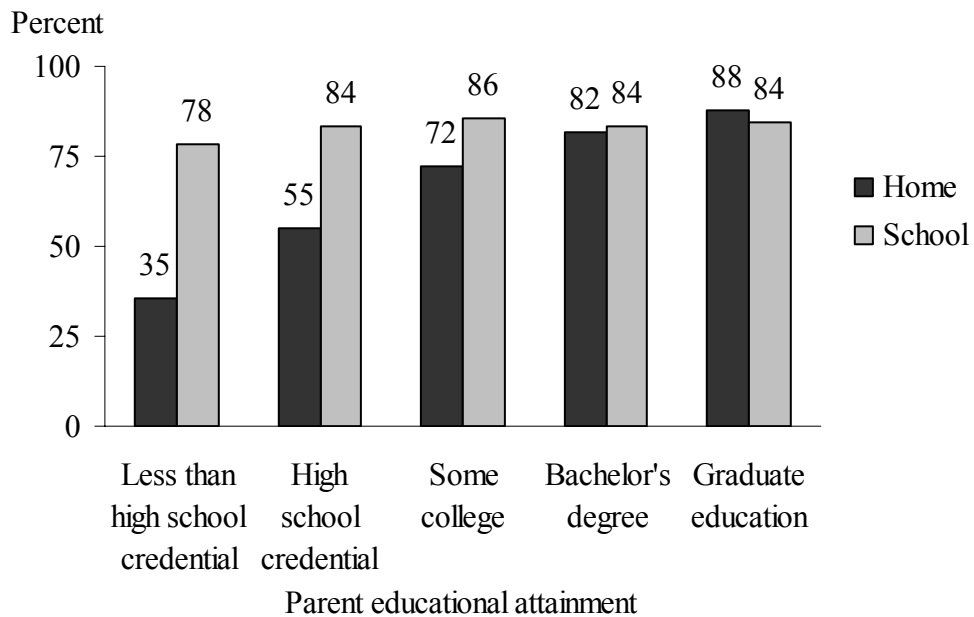
<sup>1</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

NOTE: s.e. is standard error. Detail may not sum to total because of rounding or missing data.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

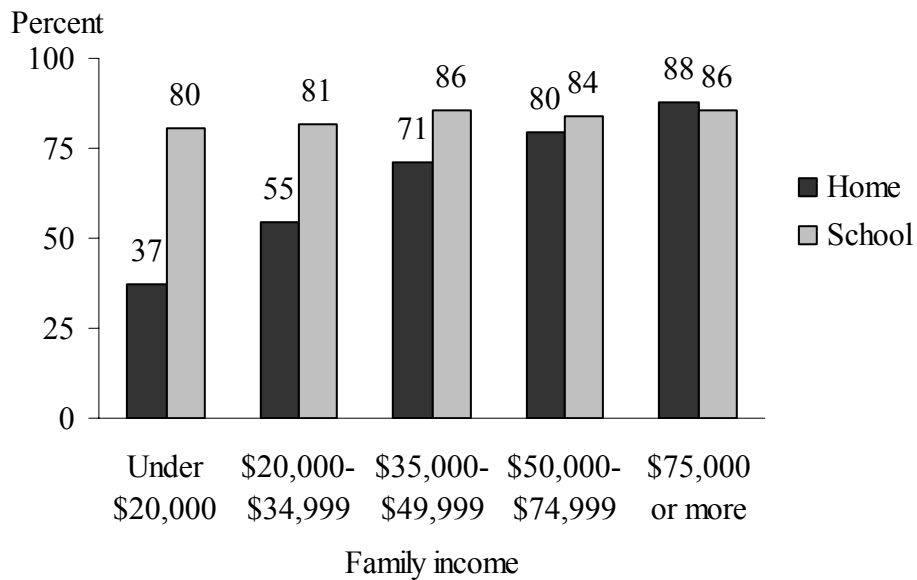
The narrowing of differences in usage rates at school compared to home is illustrated in figures 2, 3, and 4. Figure 2 shows that the percentage of students using computers at home increases as their parents' educational attainment increases, but that the percentage using computers at school is more nearly equal across the levels of parental education. Figure 3 shows the same pattern for family income: home computer use rates increase as family income increases, but use of computers at school remains relatively high across all levels of income. Similarly, figure 4 shows that differences in computer use between racial/ethnic groups tend to be smaller at school than at home.

Figure 2. Percentage of children in nursery school and students in grades K-12 using computers at home and at school, by parent educational attainment: 2003



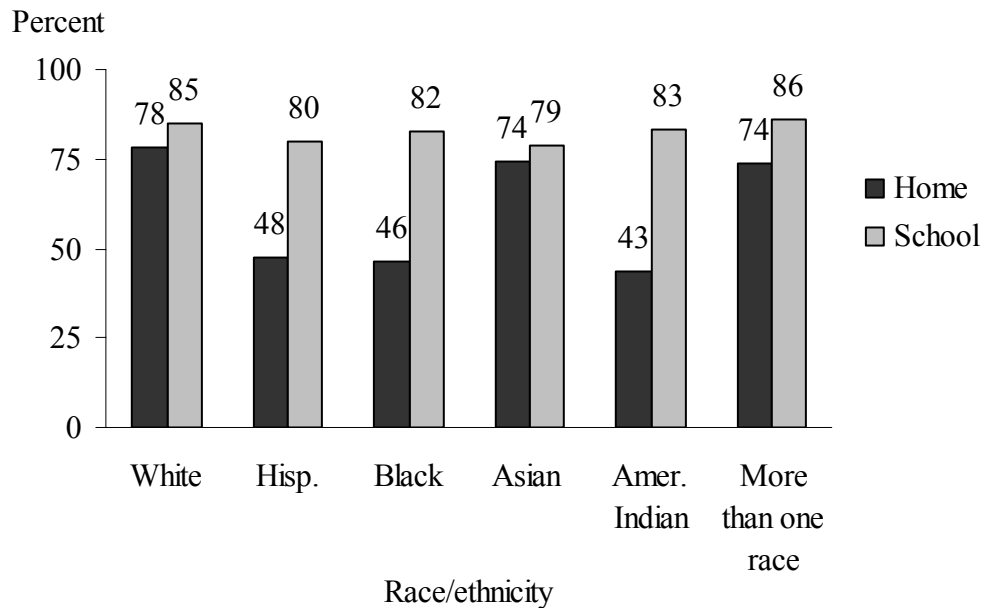
SOURCE: U.S. Census Bureau, Current Population Survey (CPS), October 2003.

Figure 3. Percentage of children in nursery school and students in grades K-12 using computers at home and at school, by family income: 2003



SOURCE: U.S. Census Bureau, Current Population Survey (CPS), October 2003.

Figure 4. Percentage of children in nursery school and students in grades K-12 using computers at home and at school, by race/ethnicity: 2003



SOURCE: U.S. Census Bureau, Current Population Survey (CPS), October 2003.

Although comparisons of many groups reveal smaller differences at school than at home, this general pattern does not hold for comparisons of students in public and private school. Private school students are more likely to use computers at home than public school students are (76 percent compared to 66 percent), but this difference is reversed and increased at school: 85 percent of public school students use computers at school, compared to 71 percent of private school students. One illustration of the public-private difference is that public school students are about as likely to use computers at school as private school students are to use computers anywhere (tables 1 and 3). Private schools have been slower to provide computer access than public schools (see Parsad, Skinner, and Farris 2001; Kleiner and Lewis 2003), and the greater use of computers by public school students at school and overall may reflect greater availability of computers in public schools than in private schools.

Table 4 shows the results of regression analyses of the characteristics associated with computer use at home and at school. As noted in the discussion of table 2, regression analyses can show how an independent variable is related to the dependent variable when other independent variables are held constant, or statistically controlled. The regression analyses show that, when controlling for the listed characteristics, computer use at home is less likely among Hispanic, Black, and American Indian students than it is among White students. Computer use at home is more likely among students whose parents are married and live with the child, whose parents are not in the lowest educational attainment category, and whose family incomes are not in the lowest category. Table 4 also shows that computer use at school is more likely among students attending public schools than among those attending private schools, and that computer use at school is more likely among students with a parent who has attended at least some college than among those without a high school credential. Note that the analysis in table 4 does not account for students' access to computers at home or at school; it analyzes the use of computers in the entire student population, regardless of access.

Table 4. Logistic regression analyses of student and family/household characteristics and computer use at home and at school: 2003

Independent variable	Computer use at home			Computer use at school		
	Parameter estimate	Standard error	Odds ratio	Parameter estimate	Standard error	Odds ratio
<b>Student characteristic</b>						
Grade level	0.12 *	0.01	1.12	0.19 *	0.01	1.21
Sex						
Female	reference category			reference category		
Male	-0.07	0.05	0.93	0.01	0.05	1.01
Race/ethnicity <sup>1</sup>						
White	reference category			reference category		
Hispanic	-0.64 *	0.09	0.53	-0.16	0.11	0.85
Black	-0.90 *	0.07	0.41	-0.14	0.09	0.87
Asian	-0.13	0.13	0.88	-0.46 *	0.14	0.63
American Indian	-1.05 *	0.32	0.35	-0.28	0.40	0.76
More than one race	0.01	0.17	1.01	0.19	0.20	1.21
Physical disability status						
Not disabled	reference category			reference category		
Disabled	-0.20	0.21	0.82	-0.53 *	0.23	0.59
Missing disability status	-0.26 *	0.06	0.77	-0.06	0.08	0.94
School enrollment						
Public	reference category			reference category		
Private	0.01	0.07	1.01	-0.69 *	0.07	0.50
<b>Family &amp; household characteristic</b>						
Parent educational attainment						
Less than high school credential	reference category			reference category		
High school credential	0.29 *	0.10	1.34	0.20	0.12	1.22
Some college	0.89 *	0.10	2.43	0.36 *	0.12	1.43
Bachelor's degree	1.09 *	0.11	2.98	0.32 *	0.13	1.38
Graduate education	1.43 *	0.12	4.16	0.45 *	0.13	1.57
Missing parent education	-0.02	0.13	0.98	-0.25	0.15	0.78
Family/household type						
Two-parent married household	reference category			reference category		
Male householder	-0.36 *	0.10	0.70	-0.03	0.13	0.97
Female householder	-0.22 *	0.06	0.80	0.16 *	0.08	1.17
Other arrangement	-0.43 *	0.19	0.65	0.15	0.26	1.16
Household language						
Not Spanish-only	reference category			reference category		
Spanish-only	-0.46 *	0.15	0.63	-0.21	0.17	0.81
Poverty status						
Not in poverty	reference category			reference category		
In poverty	-0.09	0.11	0.92	-0.11	0.14	0.90
Family income						
Under \$20,000	reference category			reference category		
\$20,000–\$34,999	0.38 *	0.11	1.47	-0.03	0.14	0.97
\$35,000–\$49,999	0.79 *	0.13	2.21	0.15	0.17	1.16
\$50,000–\$74,999	1.03 *	0.14	2.81	0.03	0.17	1.03
\$75,000 or more	1.28 *	0.14	3.61	0.21	0.17	1.23
Missing family income <sup>2</sup>	0.46 *	0.13	1.59	-0.06	0.17	0.94
Metropolitan status						
Metropolitan, central city	reference category			reference category		
Metropolitan, not central city	0.13 *	0.06	1.14	0.08	0.07	1.08
Non-metropolitan	0.04	0.08	1.04	0.17	0.10	1.19
Missing metropolitan status	0.14	0.08	1.15	0.10	0.09	1.11
Constant	-1.02 *	0.17	0.36	0.18	0.20	1.20

\* p < .05

<sup>1</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

<sup>2</sup> Missing family income also indicates missing poverty status. For convenience this variable is presented under family income. The reference category for missing family income and poverty status is known family income and known poverty status.

NOTE: The number of cases analyzed is 29,075. Missing data are modeled to retain 11,745 cases for which data are missing for one or more independent variables. Estimates are for students in grade 12 or below and age 3 or older. SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

## Home Computer Activities

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Children use computers for a wide variety of activities encompassing education, play, and communication, making computers a significant part of young people's lives. Table 5 shows the percentage of all students (including those without home computers) who use home computers for selected activities. Because students without home computers are included in the analysis, the table does not support conclusions about how students with computers use them. By analyzing students with or without home computers, the table shows the percentage of the entire student population using computers at home for selected activities. (See appendix table B-3 for estimates of the percentage of computer users engaged in selected home computer activities.)

A majority of students play computer games, and a majority of 6th-12th-grade students use home computers to complete school assignments and connect to the Internet. A majority of students in grades 9-12 also use home computers for e-mail, and about half use computers for word processing.<sup>15</sup>

The percentage of students using computers for specific activities varies by individual, family, and household characteristics. As shown in table 5, many of the characteristics that are associated with the digital divide (e.g., race/ethnicity, family income, and parent educational attainment) are also associated with differences in the ways children and adolescents use computers at home. In many cases, differences in how computers are used are even more pronounced than the differences in the rates of use. Some differences are seen when considering parent educational attainment. There is a 13-percentage-point gap in computer use between students from households where no parent has received a high school credential and those from households where at least one parent has some graduate school education (table 1). The difference between these two groups' use of computers for word processing is 34 percentage points, and is 37 percentage points for using computers to complete school assignments. The disparity is even larger for the use of home computers to connect to the Internet. Approximately 17 percent of students with the least educated parents use computers to connect to the Internet compared to 63 percent of those living with the most educated parents (a 46 point difference).

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<sup>15</sup> CPS data concerning computer activities were only collected for activities with home computers, not computers at any other location. Questions concerning some applications were only asked for users age 15 and older. These applications were spreadsheets or databases, graphics and design, and managing household records or finances.

Table 5. Percentage of children in nursery school and students in grades K-12 using home computers for specific activities, by student and family/household characteristics: 2003

Student Characteristic	Total number of students (in thousands)	Home computer activity															
		Play games <sup>1</sup>		Complete school assignments		Connect to the Internet		Word processing		E-mail		Graphics, photos, images, audio, video <sup>2</sup>		Spreadsheets or databases <sup>2</sup>		Manage household records or finances <sup>2</sup>	
		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	58,273	56	0.4	47	0.4	45	0.4	32	0.4	31	0.4	—	—	—	—	—	—
<b>Student characteristic</b>																	
Grade level																	
Nursery school	4,928	43	1.5	8	0.8	15	1.1	5	0.7	4	0.6	—	—	—	—	—	—
Kindergarten	3,719	52	1.8	12	1.1	21	1.5	8	0.9	7	0.9	—	—	—	—	—	—
1-5	20,043	56	0.8	35	0.7	34	0.7	19	0.6	16	0.6	—	—	—	—	—	—
6-8	12,522	61	0.9	62	0.9	54	1.0	42	1.0	40	0.9	—	—	—	—	—	—
9-12	17,062	57	0.8	69	0.8	64	0.8	52	0.8	56	0.8	26	0.7	13	0.6	3	0.3
Sex																	
Female	28,269	55	0.6	49	0.6	46	0.6	34	0.6	34	0.6	8	0.3	4	0.2	1	0.1
Male	30,005	57	0.6	46	0.6	44	0.6	30	0.6	29	0.6	8	0.3	4	0.2	1	0.1
Race/ethnicity <sup>3</sup>																	
White	35,145	66	0.5	54	0.6	54	0.6	38	0.6	39	0.6	9	0.3	5	0.2	1	0.1
Hispanic	10,215	37	1.6	34	1.6	26	1.5	20	1.3	16	1.2	4	0.6	2	0.5	1	0.3
Black	8,875	38	1.3	35	1.3	27	1.2	20	1.1	18	1.1	5	0.6	2	0.4	#	0.2
Asian	2,293	54	2.7	52	2.7	46	2.7	36	2.6	33	2.6	9	1.5	5	1.2	1	0.4
American Indian	346	30	6.4	27	6.2	22	5.8	19	5.5	16	5.2	5	3.1	2	1.9	1	1.2
More than one race	1,400	61	3.4	51	3.5	48	3.5	36	3.3	32	3.2	7	1.8	4	1.4	#	0.2
Physical disability status																	
Disabled	646	46	4.2	33	4.0	36	4.1	20	3.4	24	3.6	7	2.1	6	2.1	#	0.3
Not disabled	47,949	57	0.5	48	0.5	46	0.5	32	0.5	32	0.5	8	0.3	4	0.2	1	0.1
School enrollment																	
Public	50,653	55	0.5	48	0.5	45	0.5	32	0.4	31	0.4	8	0.3	4	0.2	1	0.1
Private	7,620	63	1.2	43	1.2	45	1.2	31	1.1	29	1.1	6	0.6	3	0.4	1	0.2

See notes at end of table.

Table 5. Percentage of children in nursery school and students in grades K-12 using home computers for specific activities, by student and family/household characteristics: 2003—Continued

Student Characteristic	Total number of students (in thousands)	Home computer activity															
		Play games <sup>1</sup>		Complete school assignments		Connect to the Internet		Word processing		E-mail		Graphics, photos, images, audio, video <sup>2</sup>		Spreadsheets or databases <sup>2</sup>		Manage household records or finances <sup>2</sup>	
		Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
<b>Family &amp; household characteristic</b>																	
Parent educational attainment																	
Less than high sch. credential	5,691	27	1.3	24	1.2	17	1.1	14	1.0	11	0.9	3	0.5	1	0.3	1	0.2
High school credential	13,804	45	0.9	39	0.9	34	0.9	23	0.8	24	0.8	6	0.4	3	0.3	1	0.2
Some college	16,548	61	0.8	51	0.8	48	0.8	33	0.8	33	0.8	8	0.5	4	0.3	1	0.1
Bachelor's degree	8,590	68	1.1	57	1.2	56	1.2	40	1.1	39	1.1	9	0.7	4	0.5	1	0.2
Graduate education	10,713	74	0.9	61	1.0	63	1.0	48	1.0	44	1.0	11	0.7	5	0.5	1	0.2
Family/household type																	
Two-parent married household	40,987	62	0.5	51	0.5	49	0.5	35	0.5	34	0.5	8	0.3	4	0.2	1	0.1
Male householder	3,129	45	1.9	42	1.9	37	1.9	24	1.7	27	1.7	10	1.2	5	0.8	2	0.5
Female householder	13,463	42	0.9	37	0.9	32	0.9	23	0.8	24	0.8	6	0.4	2	0.3	1	0.2
Other arrangement	694	41	4.0	39	4.0	37	4.0	23	3.5	28	3.7	6	1.9	3	1.5	#	0.5
Household language																	
Spanish-only	2,840	26	1.8	24	1.7	13	1.4	12	1.3	9	1.1	2	0.5	1	0.5	#	0.2
Not Spanish-only	55,434	57	0.5	48	0.5	46	0.5	33	0.4	32	0.4	8	0.2	4	0.2	1	0.1
Poverty status																	
In poverty	10,173	32	1.5	26	1.4	19	1.2	15	1.1	12	1.0	3	0.5	2	0.4	#	0.2
Not in poverty	39,016	64	0.8	53	0.8	52	0.8	37	0.8	37	0.8	9	0.5	4	0.3	1	0.1
Family income																	
Under \$20,000	8,815	31	1.1	25	1.0	19	0.9	15	0.8	12	0.8	3	0.4	2	0.3	#	0.1
\$20,000–\$34,999	9,273	44	1.1	37	1.1	32	1.0	22	0.9	22	0.9	5	0.5	3	0.4	1	0.2
\$35,000–\$49,999	7,499	59	1.2	49	1.2	45	1.2	32	1.2	31	1.2	7	0.6	4	0.5	1	0.2
\$50,000–\$74,999	9,834	66	1.0	55	1.1	54	1.1	36	1.1	37	1.1	9	0.6	4	0.4	1	0.2
\$75,000 or more	13,769	75	0.8	63	0.9	66	0.9	47	0.9	47	0.9	12	0.6	6	0.4	1	0.2
Metropolitan status																	
Metropolitan, central city	13,229	46	0.9	40	0.9	36	0.9	26	0.8	24	0.8	6	0.4	3	0.3	1	0.2
Metropolitan, not central city	26,670	60	0.6	51	0.7	50	0.7	36	0.6	35	0.6	8	0.4	4	0.3	1	0.1
Non-metropolitan	10,370	55	1.3	44	1.3	40	1.3	29	1.2	29	1.2	7	0.7	3	0.5	1	0.2

— Not available. Data were not collected.

# Rounds to zero.

<sup>1</sup> Refers to playing games without using the Internet.<sup>2</sup> Questions about noted computer activities were asked only about persons age 15 and older. Most of these students were in grades 9 and above.<sup>3</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding, missing data, and multiple response. Estimates are for all students age 3 or older in nursery school through grade 12, including those who do not have computers at home. For estimates of the percentage of computer users who use computers for specific activities, see appendix table B-3.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.



There are also some relatively large differences in home computer use activities by race/ethnicity and family income. Whites, Asians, and students of more than one race are more likely than Hispanics, Blacks, and American Indians to use home computers for word processing (36–38 percent versus 19–20 percent), connecting to the Internet (46–54 percent versus 22–27 percent), e-mail (32–39 percent versus 16–18 percent), and completing school assignments (51–54 versus 27–35 percent). Compared to students from families with incomes under \$20,000 annually, students living in families with incomes of \$75,000 or more per year are nearly four times more likely to use e-mail at home (47 versus 12 percent), about three times as likely to use home computers for word processing, and more than twice as likely to use home computers to complete school assignments.

Differences in home computer activities are, in part, a function of home access, and recent research has shown that income differences and race/ethnicity differences in home computer use activities are attenuated when home use is controlled (DeBell and Chapman 2003). For example, since relatively few students living in families with low incomes use computers at home at all, it is not surprising that few of these students use home computers for any given activity.

## Locations of Internet Use

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The high rate at which young people use the Internet is partly attributable to the availability of this technology in schools, where a major effort to move schools online contributed to nearly all public schools (98 percent) having some level of Internet access by 2000 (Cattagni and Farris 2001; U.S. Department of Education 2000). Although a comparable estimate is not available for private schools, they have made major gains as well (Levin, Hurst, and Burns 2000). However, differences among schools persist in student access to computer resources, including student/computer and computer/classroom ratios, both of which affect the availability and convenience of Internet access at school (Parsad, Skinner, and Farris 2001; Rathbun and West 2003).

Although Internet access is nearly universal in schools and is far from universal in homes, students are about equally likely to use home and school as Internet access locations. Among all students, 45 percent access the Internet from home and 43 percent access it from school. Ten percent of students access the Internet from a public library and 9 percent use it at someone else's home (table 6).

Public school students and private school students differ in the rates at which they access the Internet at school. Although public and private school students are equally likely to access the Internet at their home, public school students are more likely to access the Internet at school by 11 percentage points (45 percent compared to 34 percent).

Differences associated with socioeconomic disadvantages in computer and Internet use are apparent in the locations where students log onto the Internet. Computers are used to access the Internet, so it is not surprising that Internet home-use rates are highest among those groups who are most likely to use computers at home. These groups include Asians, Whites, students living with more highly educated parents, those living with two parents, and those from families with higher incomes.

Table 6. Percentage of children in nursery school and students in grades K-12 who use the Internet at specific locations, by student and family/household characteristics: 2003

User characteristic	Number of students (in thousands)	Internet use locations								
		Own home		School		Public library		Someone else's home		
		Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	
Total	58,273	45	0.4	43	0.4	10	0.3	9	0.3	
<b>Student characteristic</b>										
Grade level										
Nursery school	4,928	15	1.1	7	0.8	1	0.3	1	0.4	
Kindergarten	3,719	21	1.5	15	1.3	2	0.6	3	0.6	
1-5	20,043	34	0.7	33	0.7	6	0.4	5	0.3	
6-8	12,522	54	1.0	55	1.0	13	0.7	11	0.6	
9-12	17,062	64	0.8	63	0.8	15	0.6	14	0.6	
Sex										
Female	28,269	46	0.6	44	0.6	10	0.4	9	0.4	
Male	30,005	44	0.6	42	0.6	9	0.4	8	0.3	
Race/ethnicity <sup>1</sup>										
White	35,145	54	0.6	49	0.6	9	0.3	10	0.3	
Hispanic	10,215	26	1.5	31	1.5	9	1.0	5	0.7	
Black	8,875	27	1.2	36	1.3	12	0.9	8	0.7	
Asian	2,293	46	2.7	40	2.7	12	1.8	4	1.1	
American Indian	346	22	5.8	39	6.8	5	3.0	5	3.2	
More than one race	1,400	48	3.5	47	3.5	13	2.3	13	2.3	
Physical disability status										
Disabled	646	36	4.1	35	4.1	10	2.6	16	3.1	
Not disabled	47,949	46	0.5	44	0.5	11	0.3	10	0.3	
School enrollment										
Public	50,653	45	0.5	45	0.5	10	0.3	9	0.3	
Private	7,620	45	1.2	34	1.2	7	0.6	7	0.6	

See notes at end of table.

Table 6. Percentage of children in nursery school and students in grades K-12 who use the Internet at specific locations, by student and family/household characteristics: 2003—Continued

User characteristic	Number of children (in thousands)	Internet use locations							
		Own home		School		Public library		Someone else's home	
		Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
<b>Family &amp; household characteristic</b>									
Parent educational attainment									
Less than high sch. credential	5,691	17	1.1	28	1.3	9	0.8	5	0.6
High school credential	13,804	34	0.9	41	0.9	9	0.5	8	0.5
Some college	16,548	48	0.8	46	0.8	10	0.5	10	0.5
Bachelor's degree	8,590	56	1.2	47	1.2	9	0.7	8	0.6
Graduate education	10,713	63	1.0	51	1.0	10	0.6	11	0.6
Family/household type									
Two-parent married household	40,987	49	0.5	45	0.5	9	0.3	8	0.3
Male householder	3,129	37	1.9	41	1.9	12	1.3	10	1.2
Female householder	13,463	32	0.9	40	0.9	11	0.6	11	0.6
Other arrangement	694	37	4.0	43	4.1	11	2.5	7	2.1
Household language									
Spanish-only	2,840	13	1.4	19	1.6	8	1.1	3	0.7
Not Spanish-only	55,434	46	0.5	45	0.5	10	0.3	9	0.3
Poverty status									
In poverty	10,173	19	1.2	31	1.4	10	0.9	7	0.8
Not in poverty	39,016	52	0.8	47	0.8	10	0.5	10	0.5
Family income									
Under \$20,000	8,815	19	0.9	32	1.1	10	0.7	8	0.6
\$20,000–\$34,999	9,273	32	1.0	38	1.1	11	0.7	9	0.6
\$35,000–\$49,999	7,499	45	1.2	45	1.2	11	0.8	9	0.7
\$50,000–\$74,999	9,834	54	1.1	47	1.1	9	0.6	9	0.6
\$75,000 or more	13,769	66	0.9	52	0.9	9	0.5	11	0.6
Metropolitan status									
Metropolitan, central city	13,229	36	0.9	35	0.9	11	0.6	8	0.5
Metropolitan, not central city	26,670	50	0.7	46	0.7	10	0.4	9	0.4
Non-metropolitan	10,370	40	1.3	46	1.3	7	0.7	8	0.7

<sup>†</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding, missing data, or multiple response. Percentages may exceed 100 because students may use the Internet at more than one location.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Although many users access the Internet at home, several groups of users rely more heavily on access through schools or other locations. Students are more likely to use the Internet at school than at home when they have any of several characteristics: Hispanic or Black race/ethnicity, no parent who attended college, a single-mother head of household, a Spanish-monolingual household, or family income below \$35,000 per year (table 7). Many of these users do not have computers at home (Newburger 2001), while nearly all schools have Internet access, which may explain the tendency of these populations to connect to the Internet from school.

Table 7. Percentage of single-location Internet-using children in nursery school and students in grades K-12 who use the Internet at specific locations: 2003

User characteristic	Number of students (in thousands)	Internet use locations							
		Own home		School		Public library		Someone else's home	
		Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Total	11,651	56	1.0	40	1.0	2	0.3	2	0.3
<b>Student characteristic</b>									
Grade level									
Nursery school	699	71	3.7	23	3.4	2	1.1	4	1.6
Kindergarten	653	62	4.1	30	3.9	2	1.3	6	2.0
1-5	4,345	52	1.6	44	1.6	2	0.4	2	0.4
6-8	2,466	55	2.2	41	2.1	2	0.7	2	0.6
9-12	3,489	58	1.8	39	1.8	2	0.6	1	0.4
Sex									
Female	5,673	56	1.4	40	1.4	2	0.4	2	0.4
Male	5,979	57	1.4	39	1.4	2	0.4	2	0.4
Race/ethnicity <sup>1</sup>									
White	7,467	64	1.2	33	1.2	1	0.3	2	0.3
Hispanic	1,945	43	3.8	50	3.8	4	1.6	3	1.3
Black	1,512	35	3.2	59	3.3	3	1.2	3	1.1
Asian	395	63	6.3	33	6.1	5	2.8	#	0.5
American Indian	80	27	12.9	71	13.2	#	#	2	4.5
More than one race	253	63	7.9	35	7.8	#	#	3	2.6
Physical disability status									
Disabled	92	63	10.9	32	10.6	5	4.7	#	#
Not disabled	9,390	57	1.1	38	1.1	3	0.4	2	0.3
School enrollment									
Public	10,209	54	1.1	42	1.1	2	0.3	2	0.3
Private	1,442	74	2.5	20	2.3	2	0.9	3	0.9

See notes at end of table.

Table 7. Percentage of single-location Internet-using children in nursery school and students in grades K-12 who use the Internet at specific locations: 2003—Continued

User characteristic	Number of children (in thousands)	Internet use locations							
		Own home		School		Public library		Someone else's home	
		Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
<b>Family &amp; household characteristic</b>									
Parent educational attainment									
Less than high sch. credential	961	29	3.2	63	3.4	6	1.6	2	1.0
High school credential	2,738	41	2.0	53	2.1	3	0.7	2	0.6
Some college	3,333	60	1.8	37	1.8	1	0.4	2	0.6
Bachelor's degree	1,837	68	2.3	30	2.3	1	0.6	1	0.4
Graduate education	2,324	73	2.0	24	1.9	1	0.5	2	0.6
Family/household type									
Two-parent married household	8,607	61	1.1	36	1.1	2	0.3	2	0.3
Male householder	569	47	4.5	46	4.5	6	2.1	1	0.9
Female householder	2,346	41	2.2	52	2.2	3	0.8	4	0.9
Other arrangement	130	34	9.0	56	9.4	8	5.1	2	2.9
Household language									
Spanish-only	406	36	5.2	53	5.4	9	3.0	2	1.4
Not Spanish-only	11,245	57	1.0	39	1.0	2	0.3	2	0.3
Poverty status									
In poverty	1,717	30	3.5	60	3.7	6	1.7	4	1.5
Not in poverty	8,121	63	1.7	33	1.6	2	0.5	2	0.5
Family income									
Under \$20,000	1,511	30	2.5	60	2.7	5	1.3	5	1.2
\$20,000–\$34,999	1,702	40	2.6	53	2.6	5	1.1	3	0.9
\$35,000–\$49,999	1,616	57	2.7	40	2.6	1	0.7	1	0.6
\$50,000–\$74,999	2,041	67	2.3	31	2.2	2	0.7	1	0.4
\$75,000 or more	2,968	76	1.7	22	1.7	#	0.2	2	0.6
Metropolitan status									
Metropolitan, central city	2,391	55	2.2	39	2.2	4	0.8	2	0.6
Metropolitan, not central city	5,305	63	1.4	34	1.4	2	0.4	2	0.4
Non-metropolitan	2,230	44	2.8	52	2.8	2	0.8	2	0.8

# Rounds to zero.

<sup>1</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

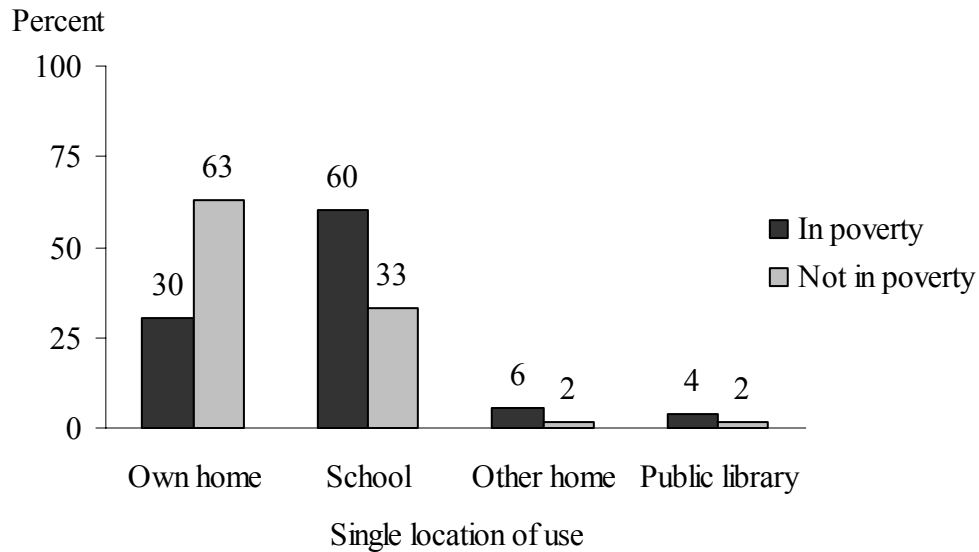
NOTE: s.e. is standard error. Detail may not sum to totals because of rounding or missing data.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Table 7 looks at students who access the Internet through one location only. Such students make up approximately 34 percent of all students who use the Internet and number approximately 11.7 million. Looking at the data in this way helps to more clearly illustrate the role schools play in providing Internet access for students by showing how heavily students from some backgrounds rely on schools for access. The table shows that the home is the most likely point of access among those who access the Internet from only one location. More than half of single-location Internet users rely solely on home access. However, several groups of single-location users—those from households where no parents have education beyond a high school credential, those from monolingual Spanish households, those in poverty, those with family

incomes below \$35,000 per year, those living outside metropolitan areas, and Black and American Indian students—rely more heavily on access to the Internet from school than on access from any other single location. Sixty-three percent of students who have no parent who has earned a high school credential and who have only one point of access for the Internet rely on school facilities for this access. Conversely, 24 percent of students who use the Internet in only one place and who live with parents who attended graduate school do so through school facilities. Among students with a single point of access, those from Spanish-monolingual households are more likely to rely solely on school for access, compared to other students (55 percent compared to 39 percent). Likewise, poor students who use the Internet in only one place were more likely than other students to rely solely on school as an access point (60 percent compared to 33 percent; figure 5).

Figure 5. Percentage of children in nursery school and students in grades K-12 who use the Internet at only one location, by location and poverty status: 2003



SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

## Internet Activities<sup>16</sup>

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The Internet supports a broad range of activities. Students use the Internet as a medium to communicate, to find information, to have fun, and to do homework. While electronic mail is the Internet application most widely used by adults (U.S. Department of Commerce 2000), among students, e-mail (or instant messaging) and playing games are approximately tied for the rank of the second most popular Internet activity, after completing school assignments (table 8A). About 46 percent of students use the Internet for school work, while 36 percent use e-mail or instant messaging and 38 percent play games.

<sup>16</sup> In contrast to the discussion of computer activities, which was limited by the CPS design to activities at home, this discussion of Internet activities applies to activities at any location where the Internet is used. CPS data do not allow separate examination of Internet activities at home or at school.



As shown in table 8A, from 8 to 21 percent of students use the Internet to find information about news, weather, sports, and products, to watch or listen to television, movies, or radio, and to make purchases.<sup>17</sup> Smaller percentages use the Internet for other purposes.

The activities for which students use the Internet vary by grade level. Among children in nursery school and kindergarten, the most common activity is playing games (15 percent in nursery school and 21 percent in kindergarten). Among students in grades 1 through 5, completing school assignments is about as common as playing games (31 and 32 percent, respectively). At higher grade levels, game playing levels off at or below 50 percent, while using the Internet for school assignments and e-mail or instant messaging increase. Completing school assignments is the most common activity for which students in grades 6–8 and 9–12 use the Internet (61 and 73 percent, respectively). E-mail or instant messaging (46 percent) is about as common as playing games (47 percent) in grades 6-8, and is more common than playing games in grades 9–12 (64 percent compared to 49 percent).

Tables 8B and 8C show that patterns of difference in other aspects of the digital divide are reflected in the rates at which students use the Internet for specific applications. Students whose parents have any graduate education or whose family income is \$75,000 or more are roughly twice as likely as students whose parents have not completed high school or whose family income is less than \$20,000 to use the Internet to complete school assignments, and are more than twice as likely to use the Internet to find information. White students, Asian students, and students of more than one race are more likely to use the Internet to complete school assignments than are Hispanic and Black students. White students and students of more than one race are more likely than American Indian students to use the Internet to complete school assignments.

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<sup>17</sup> The large number of Internet use options makes presenting extensive demographic details by type of activity unwieldy. In order to keep the tables to a practical size, characteristics associated with differences in computer use in earlier sections of the report are presented in tables 8A, 8B, and 8C.

Table 8A. Percentage of children in nursery school and students in grades K-12 using the Internet for specific activities, by sex and grade level: 2003

Internet activity	Sex						Grade level									
	All students		Female		Male		Nursery school		Kindergarten		Grade 1-5		Grade 6-8		Grade 9-12	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Completing school assignments	46	0.4	48	0.6	45	0.6	7	0.8	10	1.1	31	0.7	61	0.9	73	0.7
E-mail or instant messaging	36	0.4	39	0.6	33	0.6	6	0.7	8	1.7	19	0.6	46	1.0	64	0.8
Playing games	38	0.4	37	0.6	39	0.6	15	1.1	21	2.5	32	0.7	47	1.0	49	0.8
News/weather/sports	21	0.4	20	0.5	23	0.5	2	0.4	4	1.2	10	0.5	26	0.8	41	0.8
Find information on products	21	0.4	20	0.5	22	0.5	3	0.5	4	1.2	9	0.4	24	0.8	42	0.8
Watch/listen to TV, movies, or radio	13	0.3	13	0.4	13	0.4	2	0.5	4	1.2	6	0.4	15	0.7	24	0.7
Make purchases	8	0.2	7	0.3	9	0.4	1	0.3	1	0.7	3	0.2	7	0.5	19	0.6
Phone calls	1	0.1	1	0.1	1	0.1	#	0.1	1	0.6	1	0.1	1	0.2	2	0.2
Taking a course online	1	0.1	1	0.1	1	0.1	#	0.1	#	0.3	1	0.1	1	0.2	3	0.3
Find government information <sup>1</sup>	—	†	—	†	—	†	—	†	—	†	—	†	—	†	13	0.6
Find health information <sup>2</sup>	—	†	—	†	—	†	—	†	—	†	—	†	3.6	0.4	9	0.5
Find a job <sup>1</sup>	—	†	—	†	—	†	—	†	—	†	—	†	—	†	6	0.4
Online banking <sup>1</sup>	—	†	—	†	—	†	—	†	—	†	—	†	—	†	4	0.4
Trading stocks <sup>1</sup>	—	†	—	†	—	†	—	†	—	†	—	†	—	†	1	0.1

— Not available. Data were not collected.

† Not applicable.

# Rounds to zero.

<sup>1</sup> Questions about noted activities were asked only about persons age 15 and older. Estimates for these activities are for students in grades 9 through 12 who are age 15 or older.

<sup>2</sup> Questions about noted activities were asked only about persons age 12 and older. Estimates for these activities are for students in grades 6 through 12 who are age 12 or older.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding and multiple response.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Table 8B. Percentage of children in nursery school and students in grades K-12 using the Internet for specific activities, by parent educational attainment and race/ethnicity: 2003

Internet activity	Parent educational attainment									
	Less than high school credential		High school credential		Some college		Bachelor's degree		Graduate education	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Completing school assignments	27	1.3	42	0.9	49	0.8	53	1.2	57	1.0
E-mail or instant messaging	15	1.0	30	0.8	38	0.8	44	1.2	48	1.0
Playing games	22	1.2	33	0.9	41	0.8	43	1.2	48	1.0
News/weather/sports	10	0.8	16	0.7	22	0.7	25	1.0	32	1.0
Find information on products	9	0.8	17	0.7	23	0.7	25	1.0	29	0.9
Watch/listen to TV, movies, or radio	6	0.7	10	0.6	14	0.6	13	0.8	18	0.8
Make purchases	2	0.4	5	0.4	8	0.5	10	0.7	13	0.7
Phone calls	1	0.2	1	0.2	1	0.2	1	0.2	1	0.2
Taking a course online	1	0.3	1	0.2	1	0.2	1	0.3	1	0.2

See footnotes at end of table.

Table 8B. Percentage of children in nursery school and students in grades K-12 using the Internet for specific activities, by parent educational attainment and race/ethnicity: 2003—Continued

Internet activity	Race/ethnicity <sup>1</sup>											
	White		Hispanic		Black		Asian		American Indian		More than one race	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Completing school assignments	52	0.6	33	1.6	37	1.3	48	2.3	37	5.6	50	2.9
E-mail or instant messaging	44	0.6	22	1.4	22	1.1	36	2.2	26	5.1	39	2.8
Playing games	44	0.6	25	1.4	30	1.3	37	2.2	27	5.2	40	2.8
News/weather/sports	26	0.5	13	1.1	15	1.0	22	1.9	14	4.1	20	2.3
Find information on products	26	0.5	12	1.1	14	1.0	20	1.8	13	3.9	22	2.4
Watch/listen to TV, movies, or radio	14	0.4	9	1.0	12	0.9	12	1.5	8	3.2	11	1.8
Make purchases	10	0.4	4	0.6	3	0.5	10	1.3	3	2.1	8	1.6
Phone calls	1	0.1	1	0.3	1	0.3	2	0.6	‡	‡	1	0.7
Taking a course online	1	0.1	1	0.4	1	0.3	2	0.6	1	1.0	#	0.4

# Rounds to zero.

‡ Reporting standards not met.

<sup>1</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding and multiple response.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Table 8C. Percentage of children in nursery school and students in grades K-12 using the Internet for specific activities, by family income: 2003

Internet activity	Family income									
	Less than \$20,000		\$20,000– \$34,999		\$35,000– \$49,999		\$50,000– \$74,999		\$75,000 or more	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Completing school assignments	31	1.1	37	1.1	47	1.2	51	1.1	60	0.9
E-mail or instant messaging	18	0.9	27	1.0	36	1.2	41	1.1	51	0.9
Playing games	24	1.0	31	1.0	41	1.2	43	1.1	50	0.9
News/weather/sports	11	0.7	16	0.8	20	1.0	24	0.9	32	0.9
Find information on products	11	0.7	16	0.8	22	1.0	24	0.9	31	0.9
Watch/listen to TV, movies, or radio	7	0.6	10	0.7	12	0.8	14	0.8	18	0.7
Make purchases	3	0.4	5	0.5	7	0.6	8	0.6	14	0.6
Phone calls	1	0.2	1	0.2	1	0.3	1	0.3	1	0.2
Taking a course online	1	0.2	1	0.3	1	0.3	1	0.2	1	0.2

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding and multiple response.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Although the difference between boys and girls in Internet use rates has closed, there are differences by sex in the types of Internet activities. As shown in table 8A, girls are more likely to use the Internet for e-mail. Girls are slightly more likely to use the Internet for school assignments, and boys are slightly more likely to use it for games, shopping, and finding information about news, weather, or sports. Although these differences of 2 or 3 percentage points are small, they are consistent with research on adults' uses of the Internet, which has shown that although gender differences in overall use rates have vanished, gender differences persist in preferences for Internet activities, with men favoring entertainment and women favoring communication and educational assistance (Weiser 2000; also see Odell et al. 2000; Singh 2002). Some recent research on college students has revealed similar differences in Internet activities—women used more e-mail and men used the Web more (Jackson et al. 2001).

## Conclusions

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This report uses data from the October 2003 Current Population Survey (CPS) to examine the use of computers and the Internet by children in nursery school and students in kindergarten through grade 12. The report examines overall technology use, where these technologies are used, how they are used, and the relationships of patterns of use to socioeconomic and demographic characteristics such as age, race/ethnicity, parental education, and family income.

Computer and Internet use by students is widespread and begins at an early age. About 9 in 10 students use computers, and more than half use the Internet. Computer use is more common at lower grade levels than Internet use, but by grades 9-12 more than three quarters of youths are online.

Children and adolescents commonly use computers for playing games, completing school assignments, word processing, e-mail, and connecting to the Internet. Online, the most frequent activities are school work, e-mail, games, and finding news and product information.

There are demographic and socioeconomic differences in the use of these information technologies. Family income and parents' education are both positively associated with computer and Internet use, while living in a Spanish-monolingual household is negatively associated with Internet use. Use of both technologies is higher among Whites than among Blacks and Hispanics, and computer use is higher among the non-disabled than among the disabled. The findings for each of these variables remain statistically significant when controlling for other variables.<sup>18</sup> Consistent with findings from recent studies (e.g., DeBell and Chapman 2003; U.S. Department of Commerce 2002), however, sex differences in rates of computer and Internet use no longer exist.

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<sup>18</sup> Note that the analysis of computer use rates at home is for the entire student population, including those who do not have computers at home.

Looking at where students use computers, more use computers at school than at home. For some groups of students, use at school exceeds use at home by 30 percentage points or more. These groups include Blacks and Hispanics, those whose parents did not complete high school, those living with a single mother, those living in households where Spanish is the only language spoken, and those living in families with incomes below \$20,000 per year. Home use is about as prevalent as school use among students who are members of families with incomes of \$75,000 or more per year, and whose parents earned at least a bachelor's degree.

Schools do appear to help narrow the digital divide in terms of computer use. Differences in the rates of computer use are smaller at school than they are at home when considering such characteristics as race/ethnicity, family income, and parental education.

Although nearly all schools have Internet access and more students use computers at school than at home, the home is as widely used an Internet access location as school. Forty-five percent of students use the Internet at home, compared to 43 percent at school. Highlighting the digital divide, those who rely more heavily on access at school come from households with annual family incomes below \$35,000 and whose parents did not attend college.

While CPS data do support analyses of the use of technology, they do not support analysis of the quality of user experiences, the convenience of access, or the time spent using the technologies overall or for selected activities. Future research could address these issues of quality, convenience, and time, and also continue to study the digital divide to track trends in usage.



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## **Appendix A: Methodological and Technical Notes**

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### **Current Population Survey (CPS) Design**

The CPS is a representative sample survey of all households in the United States. The survey is conducted in approximately 56,000 dwelling units in 754 primary sampling units. Dwelling units are in-sample for 4 successive monthly interviews, out-of-sample for the next 8 months, and then returned to the sample for the following 4 months. The sample frame is a complete list of dwelling-unit addresses at the time of the Census updated by demolitions and new construction and field listings. The population, referred to as the civilian, non-institutionalized population, excludes members of the armed forces, inmates of correctional institutions, and patients in long-term medical or custodial facilities. For details on the CPS methodology, see U.S. Census Bureau, *Technical Paper 63 Revised: Current Population Survey – Design and Methodology*, TP63RV. Washington, DC, 2002.

A member of each household who is at least 15 years old serves as the informant for that household, supplying data for each member of the household. As a result of this data collection method, data regarding computer and Internet use by children and adolescents were not collected directly from the users in most cases, but from another member of the user's household. Because a household's informant may not have full information regarding computer and Internet use by other members of the household (especially when that use occurs at school), this method is a potential source of error in the data.

The CPS includes questions about computer and Internet use only in periodic special supplements on computer and Internet use. In October 2003, supplementary questions regarding computer and Internet use were asked about eligible household members 3 years old and older. Most interviews were conducted by phone using computer-assisted telephone interviewing.

### **Standard Errors and the Accuracy and Precision of Estimates**

The estimates in this report are derived from samples and are subject to two broad classes of error—sampling and nonsampling error. Sampling errors can occur when the data are collected from a sample of a population rather than from the entire population. To the extent that

the sample differs from the population it is supposed to represent, estimates based on a sample can differ from the values that would have been obtained from a universe survey using the same instruments, instructions, and procedures. Nonsampling errors come from a variety of sources and affect all types of surveys, universe as well as sample surveys. Examples of sources of nonsampling error include item wording, data processing error, and reporting error by respondents. In the CPS computer and Internet use supplement, reporting error may occur when household respondents are not fully informed about the computer and Internet use activities of other members of their households. Nonsampling errors may be greater or less than sampling error, but unlike sampling error, the effects of nonsampling error cannot be predicted by statistical theory. As much as possible, procedures are built into surveys in order to minimize nonsampling errors. These may include cognitive tests of survey item wording, designed to ensure that questions will be easily understood by respondents, and quality-control procedures during data editing, designed to catch data processing errors.

The standard error is a measure of the variability due to sampling when estimating a parameter. It indicates how much variance there is in the population of possible estimates of a parameter for a given sample size. Standard errors can be used as a measure of the precision expected from a particular sample. The chances that a sample estimate would differ from a population parameter by less than the standard error are about 68 out of 100; the chances that the difference would be less than 1.96 times the standard error are about 95 out of 100.

Since the CPS sample is not a simple random sample, the methods that are most frequently used to compute standard errors must be adjusted to account for the effects of the sample design. Standard errors for percentages based on CPS data were calculated using the following formula:

$$\text{s.e.} = \sqrt{(b / N)(p)(100 - p)}$$



where  $b$  = the parameter associated with the characteristic,<sup>1</sup>  
 $N$  = the population on which the percentage is based, and  
 $p$  = the percentage ( $0 < p < 100$ ).

For example, where table 1 shows an estimate that 91 percent of students use computers, the standard error is calculated as follows. The variable  $b$  is 4,867 (this can be found in the Census Bureau technical report previously cited); the  $N$  is 58,273,000, and the percentage is 91. Using the formula given above, the standard error is .3.

$$.3 = \sqrt{(4867 / 58,273,000)(91)(100 - 91)}$$

### **Response Rates**

The unweighted response rate for the October 2003 core CPS was 92.7 percent, and the response rate for the computer and Internet use supplement was 93.7 percent, for an overall response rate on the supplement of 86.9 percent.

### **Method and Statistical Procedures for the Comparison of Estimates**

The comparisons in the text have all been tested for statistical significance to ensure that the differences are larger than those that might be expected due to sampling error. Four types of comparisons have been made in the text. All statistical comparisons in this report were tested for significance at the 95 percent confidence level ( $p < .05$ ), and all reported differences are statistically significant, unless otherwise noted. One type of comparison tests the significance of a statistic's relationship to a specified value, such as 50 percent. When the specified value falls outside the confidence interval for the statistic, the statistic is said to be statistically different from the specified value. The confidence interval for an estimate is determined by the following formula:

$$CI = x \pm t (s.e.)$$

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<sup>1</sup> These parameters and their use are explained in U.S. Census Bureau, *Source and Accuracy Statement for the October 2003 CPS Microdata File for Internet and Computer Use in the U.S.*, Washington, DC, 2004. The general purpose of the parameters is to adjust the sampling error calculation to account for the complex sampling procedures used in the Current Population Survey.

where  $x$  = the estimate for which the confidence interval is desired  
 $t$  = the critical value, which is 1.96 for a 95 percent interval  
s.e. = the standard error of the estimate

For example, the statement on page 27 of this report that “more than half of [single-location] Internet users rely solely on home access” was tested as follows:

$$\begin{aligned} \text{CI} &= x \pm t (\text{s.e.}) \\ \text{CI} &= 56 \pm 1.96 (1.0) \\ 54 \text{ to } 58 &= 56 \pm 1.96 \end{aligned}$$

In repeated sampling, the population parameter (i.e., the “true” value) can be expected to fall within the range of the 95 percent confidence interval 95 percent of the time. In the previous example, the true value is expected to be between 54 and 58, so the statement in the text that “more than half of [single-location] Internet users rely solely on home access” is supported. Had the confidence interval included the range 49 to 53, for example, the statement would not have been supported because the range includes the value 50.

The second type of comparison tests the hypothesis that there is a linear relationship between two variables. A bivariate linear regression model is specified, and a statistically significant regression coefficient supports the hypothesis that there is a linear association between the dependent and independent variables. To account for the complex sampling methods of the CPS, a weighted least squares (WLS) regression is used in which the model (e.g., the percentage of children who use computers) is weighted by the variance of the dependent variable (Gujarati 1995).

The third type of comparison tests the statistical significance of the difference of two statistics. The Student’s  $t$  statistic can be used to test the likelihood that the differences between two percentages are larger than would be expected by sampling error alone.

$$t = \frac{P_1 - P_2}{\sqrt{se_1^2 + se_2^2}}$$

where  $P_1$  and  $P_2$  are the estimates to be compared and  $se_1$  and  $se_2$  are their respective standard errors.

For example, the statement on page 7 of this report that “[students] living in households where a language other than Spanish is spoken are more likely to use computers ... than those living in Spanish monolingual homes” was tested as follows. The estimate for the percentage of students living in Spanish monolingual homes who use computers is 80 percent, and the standard error of this estimate is 1.6 percent; the estimate and standard error for students not living in Spanish monolingual homes are 91 percent and 0.3 percent, respectively (table 1). The  $t$  value is -6.76, as shown below.

$$t = \frac{80 - 91}{\sqrt{1.6^2 + 0.3^2}} = -6.76$$

Since the absolute value of  $t$  exceeds the critical value of 1.96, readers can conclude that students who are not living in Spanish monolingual homes are more likely to use computers than those living in Spanish monolingual homes.

The fourth type of comparison is an equivalence test (Rogers, Howard, and Vessey 1993), which determines whether there is any substantive difference between two statistics. This test requires an *a priori* determination of the minimum difference considered substantively important (delta). Equivalence tests in this report were conducted with a delta value of 5 percentage points, meaning that differences smaller than this are not considered meaningful. A delta of 5 percentage points is commensurate with the statistical properties of the data presented in this report and the topics under consideration; considering the sources of non-sampling error that affect survey data, including proxy reporting errors and data processing errors, and the issues addressed in this report, it may not be reasonable to attribute substantive importance to differences smaller than 5 percentage points.

The equivalence test uses one-tailed t-tests to construct a confidence interval for the difference between two statistics. This confidence interval is compared to the minimum substantively significant difference described by delta and negative delta. If the confidence interval is within the range of negative delta and delta—that is, if the upper bound of the confidence interval is less than delta and the lower bound of the interval is more than negative delta—this indicates that the difference between the two statistics is less than the smallest difference that can be considered important, so the two statistics are equivalent.

The formula for the confidence interval of the difference is as follows:

$$CI = p_1 - p_2 \pm t(s.e.)$$

- where  $p_1$  = the first statistic being compared  
 $p_2$  = the second statistic being compared  
 $t$  = the critical value for the desired confidence level<sup>2</sup>  
 $s.e.$  = the standard error of the difference of  $p_1$  and  $p_2$

In this report the estimate of the percentage of female students who use the Internet is 61 percent (s.e. = 0.6) and the estimate for males is 58 percent (s.e. = 0.6). The difference is 2.2 percent (s.e. = 0.9). To test the equivalence of these two statistics when the minimum substantively important difference, delta, is 5 percentage points, compare the confidence interval for the difference to delta. In this case the confidence interval for the difference is –3.1 to –1.3. Since this interval is within the delta interval of –5 to 5, the percentages of male and female students who use computers are about the same.

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<sup>2</sup> For 85 percent confidence in equivalency, using a one-tailed test, the critical value is 1.036. Equivalence tests in this report are conducted at the 85 percent confidence level (while other statistical tests use 95 percent confidence) in order to reduce the likelihood of falsely rejecting the hypothesis that two estimates are equivalent. No single confidence threshold is appropriate for all equivalence tests (Rogers, Howard, and Vessey 1993).

## Logistic Regression Analysis

Regression is a procedure that uses one or more independent variables to predict the values of a dependent variable and to reveal each independent variable's association with the variable being predicted. In the two analyses presented in table 2, computer use and Internet use (the dependent variables) were analyzed using several independent variables that have previously been found to be associated with the use of information technologies.

Logistic regression is a form of regression used when the dependent variable is dichotomous (that is, when it can take only two different values, such as “computer user” or “computer non-user”). In logistic regression, the equation predicts the natural log of the odds (the “log odds”) of an event occurring, such as the sampled individual being a computer user.<sup>3</sup>

The form of the equation is as follows:

$$\text{Log}[P/(1-P)] = B_0 + B_1X_1 + \dots + B_pX_p$$

In this equation, the value  $B_0$  is a constant. The  $X$  values are the observed values of independent variables such as age or income, and the corresponding  $B$  values are parameters indicating the effect of a one-unit change in  $X$  on the log odds of the event. The  $B$  parameters indicate the association between the independent variable and the dependent variable when all the other independent variables are statistically controlled.

*Dichotomous independent variables and the “reference category.”* Most of the independent variables in the logistic regression equations are treated as dichotomous. For example, the six categories of race/ethnicity are included in the regressions as five variables: Black, non-Hispanic; Hispanic; Asian or Pacific Islander, non-Hispanic, American Indian, Aleut, or Eskimo, non-Hispanic; and more than one race, non-Hispanic. White, non-Hispanic is the “reference category.” (The largest group is usually used as the reference category for categorical

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<sup>3</sup> Odds are the probability of an event occurring divided by the probability of it not occurring. For example, consider the data reported in table 1 indicating that 59 percent of students use the Internet. The odds of someone from this population using the Internet are  $(.59)/(1-.59) = 1.44$  to one. This means that a student is 1.44 times more likely to use the Internet than to not use the Internet.

variables, while the lowest-ranked group is usually used as the reference category for ordinal variables. The reference category is coded 0 and other characteristics are coded 1.) The indicated parameter estimate and odds ratio (explained below) are interpreted in comparison with the reference category. For example, since the Hispanic parameter estimate in the computer use analysis is negative (or, since the odds ratio is less than one), this indicates that Hispanics are less likely than Whites (the reference category) to use computers. Similarly, the negative parameter estimate for “Black, non-Hispanic” (or the odds ratio less than one) indicates that a Black child is less likely to use computers than a White child.

*Odds ratio.* The results of the regression analysis include an “odds ratio” for each independent variable. The odds ratio is a widely used measure of effect size for dichotomous data in general (Haddock, Rindskopf, and Shadish 1998) and for logistic regression in particular (Mason et al. 2000). The odds ratio shows each independent variable’s statistical relationship to the dependent variable when all of the other independent variables are held constant. More specifically, it shows how the odds of the dependent variable event occurring (i.e., the odds of a child being a computer user or being an Internet user) change when the independent variable changes. For example, table 2 shows that a child from a family in the highest income group is about twice as likely (in terms of odds, not probability) to use the Internet as a child from a family in the lowest income group, all else being equal. This is indicated by the odds ratio of 1.89 for the highest income category. Table 2 also shows that the odds of a Hispanic child using a computer are about two-thirds as great as the odds of a non-Hispanic White child doing so, as indicated by the odds ratio of .64.

*Continuous independent variables.* Continuous variables do not have a reference category. Grade level is the only continuous variable in this analysis. The odds ratio and parameter estimate for this variable describe the statistical effect of a one-unit change in grade on the dependent variable. For example, the odds ratio shows that a student who is one grade ahead of another student is estimated to be 1.28 times more likely to use computers than the student in the lower grade (table 2), all else being equal.

*Significance tests and CPS sample design.* Significance tests were conducted after adjusting for the effects of the CPS sample design. Since the CPS sample is not a simple random sample, the methods that are normally used to compute the significance of parameter estimates in regression must be adjusted to account for the sample design. Adjustments were made to the weight variable to reflect design effects before the regression analysis was conducted. The new weight variable used in the regression analyses was calculated as follows:

$$w_n = \frac{w}{\bar{w} \times DEFF}$$

where  $w_n$  = the new final weight for a case used in regression  
 $w$  = the original final weight for the case  
 $\bar{w}$  = the mean of the original final weight, or 1828.2756  
 $DEFF$  = the design effect for the case

The DEFF is the square of the factor by which standard errors are inflated due to the characteristics of the complex sample design used in the Current Population Survey. The DEFF equals the product of two parameters that account for race/ethnicity and metropolitan status (which are factors in the CPS sample design) divided by the survey sampling interval, which is 2,128. The parameter for White, non-Hispanic, is 4,687. The parameter for Hispanic is 11,347. The parameter for Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; American Indian and Alaska Native, non-Hispanic, and More than one race, is 6,733. These parameters are increased by a factor of 1.5 for persons living in non-metropolitan areas and are unchanged for persons living in metropolitan areas. The DEFF ranges from 2.20 for a White non-Hispanic child living in a metropolitan area ( $4,687/2,128 = 2.20$ ) to 8.00 for a Hispanic child living in a non-metropolitan area ( $11,347 \times 1.5 / 2,128 = 8.00$ ).

*Multicollinearity.* Multicollinearity means that independent variables in a regression model are correlated with one another. A strong correlation between independent variables increases the variances in parameter estimates and consequently can lead to incorrect results. Multicollinearity in the regression models presented in this report was examined because there is a moderate association between income category and poverty status. These analyses, not shown

here, indicate that multicollinearity does not cause misleading results in the reported regression models.

### **Variables Used in the Analysis**

*Computer use.* Computer users are identified by three CPS questions that ask if the subject uses computers at home, at school, or at his or her main job. “Computer” is not defined for the respondent. Use of computers at any other location, such as community centers, public libraries, or friends’ homes, is not ascertained. Due to this limitation, CPS estimates may slightly understate the total number of people who use computers at any location. Data on the intensity or frequency of use are not available from CPS, so individuals are classified dichotomously as users or non-users.

*Internet use.* Internet users are identified using a variable on the October 2003 CPS file, PRNET1, that the Census Bureau derived from several CPS questions that ask if the subject connects to the Internet or uses e-mail at home or at work, uses the Internet at school, or uses the Internet at any location. In the September 2001 CPS, the variable PRNET1 was derived slightly differently; questions about using e-mail at home and about using the Internet at any location were not included. As a result, a small number of people who should have been counted as Internet users were not counted by PRNET1 on the September 2001 file. Previous publications presenting September 2001 data (e.g., DeBell and Chapman 2003) used the Internet-use variable originally furnished by the Census Bureau. This report’s estimates of Internet use in 2001 (table B-4) are corrected and are calculated in the same way as 2003 estimates. As a result, 2001 estimates of Internet use in this report may differ slightly from previously published estimates. For example, while the percentage of children and adolescents age 5–17 who used the Internet in 2001 was previously estimated to be 59 percent (DeBell and Chapman 2003), this report puts the figure at 60 percent (table B-4). Data on the intensity or frequency of use are not available from CPS, so individuals are classified dichotomously as users or non-users.

*Race/ethnicity.* The race/ethnicity variable is derived from two CPS questions that ask the subject’s race (classified as White, Black, American Indian/Aleut/Eskimo, Asian or Pacific Islander, or any combination of the previous categories) and whether or not he or she is Hispanic.



These data were used to derive a race/ethnicity variable with six mutually exclusive categories: White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; American Indian, Aleut, or Eskimo, non-Hispanic; More than one race, non-Hispanic; and Hispanic. Persons of Hispanic origin may be of any race.

*Physical disability status.* Each student is classified as disabled or not disabled. Subjects who were reported to have any one or more of the following “long-lasting physical conditions” were classified as disabled: “blindness or a severe vision impairment even with glasses or contact lenses;” “deafness or a severe hearing impairment even with a hearing aid;” “a physical condition that substantially limits [the person’s] ability to walk or climb stairs;” or “a condition that makes it difficult to type on an ordinary typewriter or traditional computer keyboard.” Note that it is not possible to infer that children and adolescents identified as disabled in this report receive any services or accommodation as a result of disability.

*School enrollment.* Students were reported as attending either a public school or a private school.

*Parent educational attainment.* The CPS collects data about the highest level of school completed or the highest degree received for each person over the age of 15, as well as information about graduate or professional coursework since completing a bachelor’s degree. These data were collapsed into an education variable with categories corresponding to five levels of educational attainment: less than a high school diploma, a high school diploma or equivalent (GED), some college education but no bachelor’s degree (including people with an associate’s degree), college degree (i.e., people with a bachelor’s degree), and graduate education beyond a bachelor’s degree, including people who have taken graduate coursework but have not earned a degree. These data were then grouped by parent-child relationship and the highest level of education achieved by either parent residing with the child was assigned as the level of parent educational attainment. Those children and adolescents who do not reside with a parent are dropped from the analysis of parental education, and parents who do not live with their children are not included in the computation of parent educational attainment.

*Family/household type.* Each household in the sample is classified as one of four types. In a “two-parent married household” the student lives with a married couple. In “male householder” or “female householder” households the student lives with an unmarried male or female adult—usually the father or mother, respectively. Children and adolescents whose housing arrangements fit none of these categories are classified as an “other arrangement.”

*Household language.* The CPS household language variable HUSPNISH classifies households according to whether or not Spanish is the only language spoken by all members of the household who are 15 years of age or older.

*Family income.* Family income is derived from a single question asked of the household respondent. Income includes money from all sources including jobs, business, interest, rent, social security payments, and so forth that was received in the preceding 12 months. The income of all family members 15 years old and over is included. Income is reported in sixteen categories ranging from “less than \$5,000” to “\$150,000 or more.” For convenience in tabular presentation, these categories were collapsed to five: under \$20,000, \$20,000-\$34,999, \$35,000-49,999, \$50,000-\$74,999, and \$75,000 or more.

*Poverty status.* Poverty status is deduced from household size and reported household income categories. Households with reported income in categories below the poverty threshold for their household size (as currently defined by the U.S. Census Bureau for 2003) were classified as poor, and those households with income categories above the poverty threshold were classified as not poor. Some households reported income in a range that straddles the poverty threshold. It is likely that some of these households meet the Census Bureau definition of poverty and that some do not, but the CPS data do not allow discrimination between poor and non-poor status for these households. For the purposes of this analysis, all households in an income category that straddles a poverty threshold were classified as poor. For example, the poverty threshold for a family of three persons including one related child is currently \$14,680, and a family of three that reported an income in the category “\$12,500 to \$14,999” is classified as poor in this analysis.

*Metropolitan status.* The location of each subject's residence is considered metropolitan and part of a central city, metropolitan and not part of a central city, or non-metropolitan. Metropolitan status is defined by the Office of Management and Budget and indicates that an area has a total population of at least 75,000 in New England or 100,000 elsewhere and also contains a place with a population of at least 50,000 or an area that meets the Census Bureau's definition of an "urbanized" area. Metropolitan areas often include several counties and may include territory in more than one state. Central cities usually are one or more of the most populous areas in each metropolitan area.

## Appendix B: Supplemental Tables

Table B-1. Percentage of adults who use computers and the Internet, by adult and family/household characteristics: 2003

Characteristic	Number of adults (in thousands)	Percent using computers		Percent using the Internet	
		Percent	s.e.	Percent	s.e.
Total (persons age 18 and over)	213,426	64	0.5	59	0.5
<b>Adult characteristic</b>					
Age					
18-29	46,146	73	0.4	69	0.5
30-39	41,291	73	0.5	69	0.5
40-49	44,427	72	0.5	67	0.5
50-64	47,179	64	0.5	59	0.5
65 and over	34,385	28	0.5	25	0.5
Sex					
Female	110,966	64	0.3	60	0.3
Male	102,460	63	0.3	59	0.3
Race/ethnicity <sup>1</sup>					
White	150,508	69	0.3	65	0.3
Hispanic	26,565	41	1.0	36	1.0
Black	23,685	52	0.8	46	0.8
Asian	9,366	69	1.2	65	1.3
American Indian	1,029	54	4.0	51	4.0
More than one race	2,273	69	2.5	64	2.6
Physical disability status					
Disabled	19,133	30	0.7	28	0.7
Not disabled	161,625	66	0.3	63	0.3
Educational attainment					
Less than high school credential	32,558	24	0.5	20	0.5
High school credential	68,720	52	0.4	47	0.4
Some college	57,601	77	0.4	72	0.4
Bachelor's degree	27,180	86	0.5	84	0.5
Graduate education	27,367	90	0.4	89	0.4
<b>Family &amp; household characteristic</b>					
Household language					
Spanish-only	7,954	23	1.0	18	0.9
Not Spanish-only	205,472	65	0.2	61	0.2
Poverty status					
In poverty	23,321	35	1.0	32	0.9
Not in poverty	148,815	71	0.4	67	0.4
Family income					
Under \$20,000	32,165	33	0.6	31	0.6
\$20,000–\$34,999	34,427	51	0.6	46	0.6
\$35,000–\$49,999	26,720	69	0.6	63	0.6
\$50,000–\$74,999	34,143	79	0.5	75	0.5
\$75,000 or more	44,770	89	0.3	86	0.4
Metropolitan status					
Metropolitan, central city	51,336	59	0.5	55	0.5
Metropolitan, not central city	93,018	69	0.3	65	0.3
Non-metropolitan	39,072	56	0.7	51	0.7

<sup>1</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race. NOTE: s.e. is standard error. Detail may not sum to totals because of rounding or missing data. The adult population described here includes all persons age 18 or older, including students enrolled in grade 12 or below who are 18 or older.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Table B-2. Percentage of children in nursery school and students in grades K-12 using computers and the Internet, by grade level: 2003

Characteristic	Number of children (in thousands)	Percent using computers		Percent using the Internet	
		Percent	s.e.	Percent	s.e.
Total	58,273	91	0.3	59	0.4
<b>Grade level</b>					
Nursery school	4,928	66	1.5	23	1.3
Kindergarten	3,719	80	1.4	32	1.7
Grade 1	4,120	86	1.2	35	1.6
Grade 2	3,902	90	1.1	44	1.7
Grade 3	4,045	92	0.9	50	1.7
Grade 4	3,881	94	0.9	56	1.7
Grade 5	4,096	94	0.8	63	1.6
Grade 6	4,149	95	0.8	67	1.6
Grade 7	4,212	94	0.8	68	1.6
Grade 8	4,161	96	0.6	76	1.4
Grade 9	4,457	96	0.6	77	1.4
Grade 10	4,118	97	0.6	80	1.3
Grade 11	4,126	97	0.6	80	1.3
Grade 12	4,361	97	0.5	81	1.3

NOTE: s.e. is standard error. Detail may not sum to total because of rounding.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Table B-3. Percentage of home computer users among children in nursery school and students in grades K-12, using home computers for specific activities, by student and family/household characteristics: 2003

Computer user characteristic	Total number of students (in thousands)	Home computer activity															
		Play games <sup>1</sup>		Complete school assignments		Connect to the Internet		Word processing		E-mail		Graphics, photos, images, audio, video <sup>2</sup>		Spreadsheets or databases <sup>2</sup>		Manage household records or finances <sup>2</sup>	
		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	39,364	83	0.4	70	0.5	66	0.5	47	0.5	47	0.5	—	—	—	—	—	—
<b>Student characteristic</b>																	
Grade level																	
Nursery school	2,502	84	1.6	16	1.6	29	2.0	10	1.3	9	1.2	—	—	—	—	—	—
Kindergarten	2,214	88	1.5	20	1.8	36	2.2	13	1.5	11	1.4	—	—	—	—	—	—
1-5	12,802	87	0.6	55	1.0	53	1.0	30	0.9	25	0.8	—	—	—	—	—	—
6-8	8,983	85	0.8	87	0.8	76	1.0	59	1.1	55	1.1	—	—	—	—	—	—
9-12	12,863	76	0.8	92	0.5	85	0.7	68	0.9	75	0.8	34	0.9	17	0.7	4	0.4
Sex																	
Female	19,315	81	0.6	72	0.7	67	0.7	50	0.8	49	0.8	11	0.5	6	0.4	1	0.2
Male	20,050	85	0.5	68	0.7	65	0.7	44	0.8	43	0.8	11	0.5	6	0.4	1	0.2
Race/ethnicity <sup>3</sup>																	
White	27,535	84	0.5	69	0.6	69	0.6	48	0.7	50	0.7	12	0.4	6	0.3	1	0.1
Hispanic	4,854	78	2.0	71	2.2	55	2.4	41	2.4	35	2.3	8	1.3	5	1.1	2	0.7
Black	4,096	82	1.6	75	1.8	58	2.0	43	2.0	39	2.0	10	1.2	4	0.8	1	0.4
Asian	1,699	73	2.8	70	2.9	63	3.0	48	3.1	45	3.1	12	2.0	7	1.6	1	0.6
American Indian	150	69	9.8	63	10.2	50	10.6	44	10.5	38	10.3	12	6.9	4	4.2	2	3.0
More than one race	1,031	83	3.0	70	3.7	66	3.8	48	4.0	44	4.0	10	2.4	5	1.8	#	0.4
Physical disability status																	
Disabled	358	84	4.2	59	5.6	64	5.5	37	5.5	43	5.7	12	3.7	12	3.7	#	0.5
Not disabled	32,774	83	0.4	70	0.5	67	0.6	47	0.6	47	0.6	11	0.4	5	0.3	1	0.1
School enrollment																	
Public	33,605	83	0.4	72	0.5	67	0.6	48	0.6	47	0.6	12	0.4	6	0.3	1	0.1
Private	5,759	84	1.0	57	1.4	59	1.4	41	1.4	39	1.4	8	0.8	4	0.6	1	0.3

See notes at end of table.

Table B-3. Percentage of home computer users among children in nursery school and students in grades K-12, using home computers for specific activities, by student and family/household characteristics: 2003—Continued

Computer user characteristic	Total number of students (in thousands)	Home computer activity															
		Play games <sup>1</sup>		Complete school assignments		Connect to the Internet		Word processing		E-mail		Graphics, photos, images, audio, video <sup>2</sup>		Spreadsheets or databases <sup>2</sup>		Manage household records or finances <sup>2</sup>	
		Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
<b>Family &amp; household characteristic</b>																	
Parent educational attainment																	
Less than high sch. credential	2,012	77	2.0	68	2.3	48	2.4	38	2.3	31	2.2	7	1.2	4	0.9	2	0.7
High school credential	7,616	82	1.0	71	1.1	62	1.2	41	1.2	44	1.2	10	0.7	5	0.5	1	0.2
Some college	11,991	84	0.7	71	0.9	67	0.9	45	1.0	46	1.0	12	0.6	6	0.5	1	0.2
Bachelor's degree	7,006	83	1.0	69	1.2	69	1.2	49	1.3	48	1.3	11	0.8	5	0.6	1	0.3
Graduate education	9,425	84	0.8	70	1.0	71	1.0	55	1.1	50	1.1	13	0.7	6	0.5	1	0.2
Family/household type																	
Two-parent married household	30,327	83	0.5	69	0.6	67	0.6	47	0.6	46	0.6	11	0.4	6	0.3	1	0.1
Male householder	1,751	80	2.1	74	2.3	66	2.5	44	2.6	49	2.6	19	2.0	8	1.4	4	1.0
Female householder	6,946	81	1.0	71	1.2	62	1.3	45	1.3	46	1.3	11	0.8	5	0.6	1	0.3
Other arrangement	341	84	4.3	79	4.8	76	5.0	48	5.9	57	5.8	12	3.8	7	3.0	1	1.2
Household language																	
Spanish-only	922	79	2.9	73	3.2	42	3.5	38	3.5	26	3.1	5	1.6	4	1.4	1	0.7
Not Spanish-only	38,443	83	0.4	70	0.5	67	0.5	47	0.6	47	0.6	11	0.3	6	0.3	1	0.1
Poverty status																	
In poverty	3,973	82	1.9	67	2.4	49	2.5	39	2.4	32	2.3	7	1.3	4	1.0	1	0.5
Not in poverty	29,599	84	0.7	70	0.8	69	0.8	48	0.9	48	0.9	12	0.6	6	0.4	1	0.2
Family income																	
Under \$20,000	3,301	82	1.4	67	1.8	50	1.9	40	1.8	33	1.8	8	1.0	4	0.7	1	0.4
\$20,000–\$34,999	5,056	82	1.2	68	1.4	59	1.5	40	1.5	41	1.5	9	0.9	5	0.7	1	0.3
\$35,000–\$49,999	5,333	84	1.1	69	1.4	63	1.4	45	1.5	43	1.5	10	0.9	5	0.6	1	0.3
\$50,000–\$74,999	7,819	83	0.9	69	1.1	68	1.1	46	1.2	47	1.2	12	0.8	5	0.5	1	0.2
\$75,000 or more	12,064	85	0.7	72	0.9	75	0.9	54	1.0	53	1.0	13	0.7	6	0.5	1	0.2
Metropolitan status																	
Metropolitan, central city	7,550	81	1.0	71	1.1	62	1.2	45	1.2	43	1.2	10	0.7	5	0.5	1	0.2
Metropolitan, not central city	19,412	83	0.6	71	0.7	69	0.7	49	0.8	48	0.8	12	0.5	6	0.4	1	0.2
Non-metropolitan	6,815	83	1.2	67	1.5	62	1.6	44	1.6	44	1.6	11	1.0	5	0.7	1	0.3

— Not available. Data were not collected.

# Rounds to zero.

<sup>1</sup> Refers to playing games without using the Internet.

<sup>2</sup> Questions about noted computer activities were asked only about persons age 15 and older. Most of these students were in grades 9 and above.

<sup>3</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding, missing data, and multiple response. Estimates are of the percentage of computer users who use computers for specific activities. For estimates of all students age 3 and older in nursery school through grade 12, including those who do not have computers at home, see table 5.

SOURCE: U.S. Census Bureau, Current Population Survey, October 2003.

Table B-4. Percentage of children and adolescents age 5–17 who use computers and the Internet, by child and family/household characteristics: 2001, 2003

Characteristic	September 2001 <sup>1</sup>					October 2003				
	Number of children (in thousands)	Percent using computers		Percent using the Internet		Number of children (in thousands)	Percent using computers		Percent using the Internet	
		Percent	s.e.	Percent	s.e.		Percent	s.e.	Percent	s.e.
Total (persons age 5–17)	53,013	90	0.3	60	0.5	53,561	91	0.3	62	0.5
<b>Child characteristic</b>										
Age										
5–7	11,990	80	0.8	34	1.0	11,785	83	0.8	36	1.0
8–10	12,455	91	0.6	55	1.0	11,849	92	0.5	55	1.0
11–14	16,493	93	0.5	70	0.8	17,173	94	0.4	71	0.8
15–17	12,075	93	0.5	78	0.9	12,753	95	0.4	80	0.8
Sex										
Female	25,835	90	0.4	60	0.7	26,139	91	0.4	63	0.6
Male	27,178	89	0.4	60	0.7	27,422	92	0.4	61	0.6
Race/ethnicity <sup>2</sup>										
White	33,433	93	0.3	68	0.6	32,279	94	0.3	70	0.6
Hispanic	8,400	79	1.6	39	1.9	9,503	85	1.2	45	1.7
Black	8,275	85	1.1	47	1.5	8,048	87	1.0	48	1.4
Asian	2,268	90	1.5	67	2.2	2,126	90	1.7	59	2.8
American Indian	637	90	2.7	55	4.5	332	87	4.7	45	7.1
More than one race	—	—	—	—	—	1,273	92	2.0	67	3.4
Physical disability status										
Disabled	626	80	3.7	50	4.6	594	80	3.5	49	4.4
Not disabled	45,416	90	0.3	61	0.5	44,100	92	0.3	63	0.5
<b>Family &amp; household characteristic</b>										
Parent educational attainment										
Less than high school credential	5,450	76	1.3	33	1.5	5,344	81	1.2	37	1.4
High school credential	13,611	87	0.7	52	1.0	12,953	90	0.6	55	0.9
Some college	15,665	92	0.5	65	0.9	15,381	94	0.4	65	0.8
Bachelor's degree	6,712	94	0.7	71	1.3	7,891	94	0.6	70	1.1
Graduate education	9,114	96	0.4	76	1.0	9,463	97	0.4	77	0.9
Family/household type										
Two-parent married household	37,230	91	0.3	64	0.6	37,525	93	0.3	65	0.5
Male householder	2,715	87	1.5	56	2.2	2,897	90	1.2	56	2.0
Female householder	12,440	86	0.7	50	1.0	12,522	89	0.6	54	1.0
Other arrangement	628	75	3.9	52	4.6	616	88	2.8	57	4.3
Household language										
Spanish-only	2,549	70	2.1	30	2.1	2,680	80	1.7	29	1.9
Not Spanish-only	50,464	91	0.3	62	0.5	50,881	92	0.3	63	0.5
Poverty status										
In poverty	9,277	80	1.3	39	1.6	9,303	85	1.1	41	1.6
Not in poverty	36,904	93	0.4	67	0.8	35,826	94	0.4	68	0.8
Family income										
Under \$20,000	8,344	80	1.0	38	1.2	8,027	85	0.9	42	1.2
\$20,000–\$34,999	8,852	86	0.8	50	1.2	8,615	88	0.8	52	1.2
\$35,000–\$49,999	7,438	92	0.7	64	1.3	6,993	93	0.7	64	1.2
\$50,000–\$74,999	9,530	94	0.6	69	1.1	9,053	94	0.5	69	1.1
\$75,000 or more	12,018	96	0.4	77	0.9	12,441	96	0.4	78	0.8
Metropolitan status										
Metropolitan, central city	12,249	85	0.7	51	1.0	12,060	88	0.6	53	1.0
Metropolitan, not central city	23,566	91	0.4	64	0.7	24,516	92	0.4	66	0.7
Non-metropolitan	9,609	91	0.8	61	1.4	9,679	92	0.7	61	1.3

— Not available. Data were not collected.

<sup>1</sup> Revised from previously published estimates. This report's estimates of Internet use in 2001 are calculated in the same way as the 2003 estimates. For details, see the Methodological and Technical Notes section.<sup>2</sup> White, Black, Asian, More than one race, and American Indian respectively indicate White, non-Hispanic; Black, non-Hispanic; Asian or Pacific Islander, non-Hispanic; More than one race, non-Hispanic; and American Indian, Aleut, or Eskimo, non-Hispanic. Hispanics may be of any race. Estimates for race/ethnicity categories in 2001 and 2003 may differ due to differences in question wording.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding or missing data.

SOURCE: U.S. Census Bureau, Current Population Survey, September 2001 and October 2003.