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Young Children's Access to Computers in the Home and at School in 1999 and 2000

U.S. Department of Education
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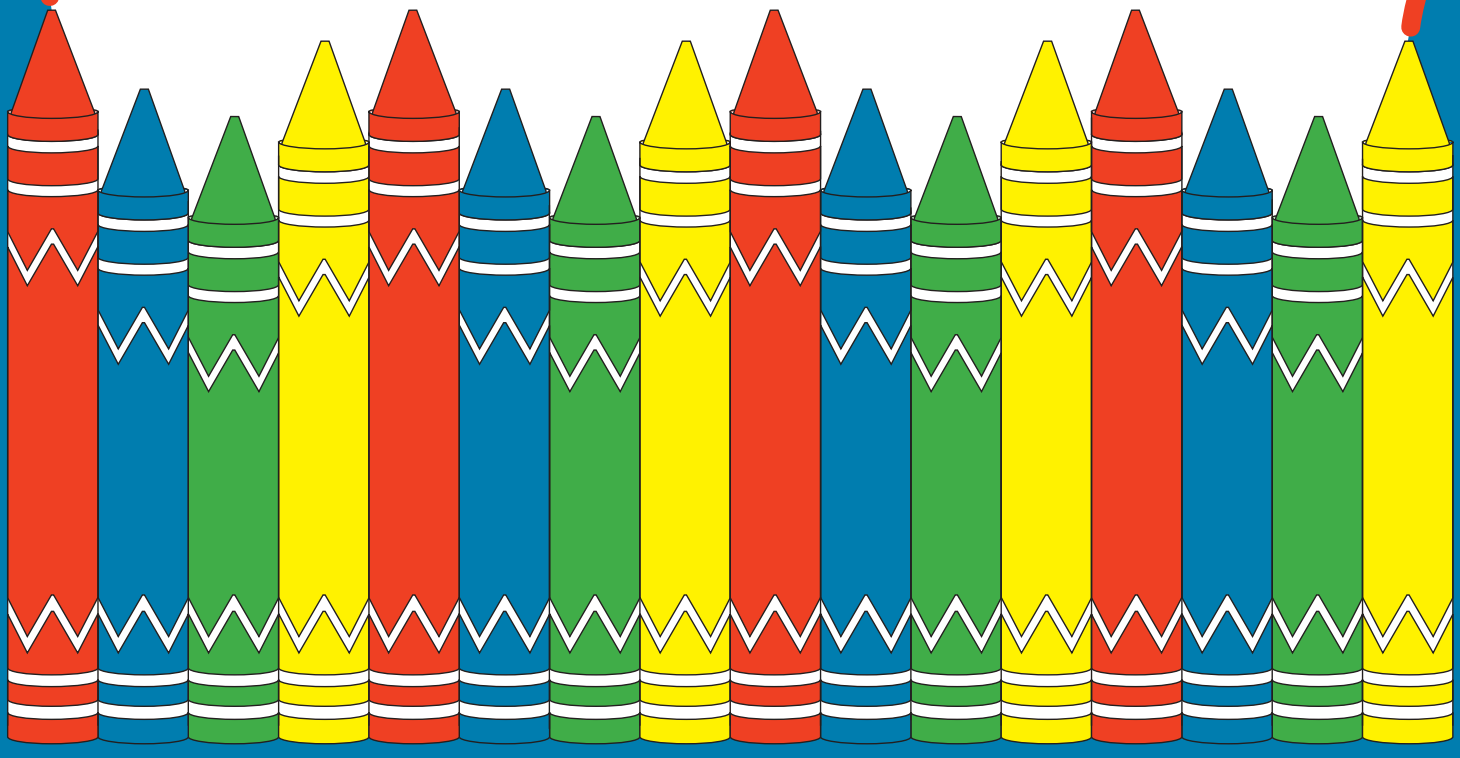
NCES 2003–036



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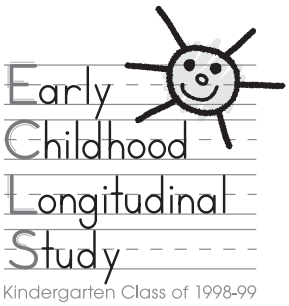

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March 2003

U.S. Department of Education
Institute of Education Sciences
NCES 2003–036

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We wish to acknowledge the support that we have received from the Head Start Bureau of the Administration on Children and Families of the U.S. Department of Health and Human Services; the Economic Research Service of the U.S. Department of Agriculture; the National Institute for Child Health and Human Development; and the U.S. Department of Education's Office of Special Education Programs, Office of English Language Acquisition, and Planning and Evaluation Service.

A special thank you to Kendra Chandler Webb, age 9 (1994), for designing the ECLS logo, and to Westat for aiding in the design of the cover.

Executive Summary

Over the past decade, technology has changed at such a rapid pace that computers and Internet access are fast becoming indispensable features of modern life. Computer literacy and skills are increasingly necessary in a knowledge-based economy. More children are being introduced to computers than ever before, evidenced by the fact that in 2000 65 percent of children had access to a home computer, compared with 32 percent in 1993 (Newburger 1999; 2001). Students' use of computers at school also increased from 61 percent in 1993 to 71 percent in 1997 (Newburger 1999).

As part of the *No Child Left Behind Act of 2001* (NCLB, P.L. 107-110), the Enhancing Education Through Technology (ED Tech) program seeks to improve achievement in elementary and secondary schools through the use of technology, to assist students to become technically literate by the eighth grade, and to ensure that teachers integrate technology into the curriculum to improve student achievement. There are also provisions in the act to provide funding for schools to purchase technology resources to further the program's goals.

As computers become more prevalent and computer skills more necessary, there continues to be a "digital divide" between those with computer access and skills and those without. Already, gaps exist across racial/ethnic groups and family income levels with respect to computer ownership and Internet usage (Economics and Statistics Administration 2000). For instance, a lower percentage of Black and Hispanic households have Internet access in their homes, compared to the national average (Newburger 2001). These differences are less pronounced in schools, where children's access to computers and the Internet are more prevalent. In a 1999 U.S. Department of Education study, almost all public school teachers (99 percent) indicated that computers were available in their schools, and the nationwide ratio of students to instructional computers was about 6 to 1 (Smerdon et al. 2000). The Department also reported that 95 percent of all public schools had access to the Internet in 1999, compared with only 35 percent in 1994 (Snyder and Hoffman 2002).

Few studies have focused exclusively on kindergartners' and first-graders' access to and use of computers in different settings. Reports that exist on students' computer access and use either focus on upper elementary and high school students (Becker 2000), or combine prekindergarten and kindergarten children into one category and elementary school children (grades 1–8) into a second category (Snyder and Hoffman 2002) when reporting information.

The Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K) provides a unique opportunity to describe children's access to and use of computers in their schools, classrooms, and homes as they begin formal schooling. The computer resources identified in this report include access in schools to computer labs, CD-ROMs, local area networks (LAN), and wide area networks (WAN)/Internet; access in classrooms to computer areas and teachers trained in using computers and technology; and access in homes to computers and the Internet. The report also looks at the ways in which young children use computers at home and school. For example, information is provided on children's frequency and types of home computer use, and on the frequency with which children use computers in their classrooms for different instructional purposes. In addition, the report examines changes in computer resources and use from kindergarten to first grade and looks at the relationship between computer resources and computer use.

Children's access to and use of computers in their schools, classrooms, and homes are examined overall and in relation to children's sex, race/ethnicity, socioeconomic status (SES)[1], and disability status. In addition, children's use of computers for various instructional purposes is compared by several characteristics of their teachers and classrooms.

[1]This composite in the ECLS-K database is derived from the following variables: mother/female guardian's education level, father/male guardian's education level, mother/female guardian's occupation, father/male guardian's occupation, and household income.

Research Questions

Data from the ECLS-K are used to examine 10 questions related to young children's access to and use of computers.

Access to Computer Resources

1. What computer resources are available in the schools, classrooms, and homes of kindergartners?
2. Are these resources equally available to girls and boys, economically disadvantaged and advantaged students, and minority and nonminority children?
3. What school and classroom computer resources are available to children from homes with various computer resources?
4. Does the level of computer resources that are available in the schools, classrooms, and homes of young children change from kindergarten to first grade?

Use of Computer Resources

5. How frequently do kindergartners use computers in their classrooms and homes, and for what purposes?
6. Do certain groups of children use computers more often than others in each of these learning environments?
7. Does the frequency of children's use of computers in their homes, classrooms, and schools change from kindergarten to first grade?
8. How frequently do young children use computers over summer vacation?
9. What opportunities do children with and without home computer resources have to use computers in their classrooms?
10. Do children who use computers more often at home also use them more often in their classrooms?

Data Source

The ECLS-K, sponsored by the U.S. Department of Education's National Center for Education Statistics (NCES), is a multisource, multimethod study that focuses on children's early education, beginning with a nationally representative sample of kindergartners in the fall of 1998 and following them through the spring of fifth grade. The ECLS-K includes measures of children's health and socioemotional status, academic achievement, and their family, classroom, school, and community environments. The study collects information directly from the children and their families, teachers, and schools. The full ECLS-K base-year sample is comprised of approximately 22,000 public and private school children who attended over 1,200 kindergarten programs during the 1998–99 school year.

Data for this report are from the kindergarten and first-grade waves of data collection.[2] The first set of results on computer resources (i.e., tables 3, B-1, B-2, and B-3) showed significant differences in kindergartners' computer access by school control (public vs. private). Thus, the majority of the report presents results for public school children so that any variations found in computer access and use related to child and classroom characteristics would not be confounded by school control. The majority of this report is based on 14,666 public school kindergartners and 11,456 public school first-grade children.[3]

Findings

Findings in this report are organized into the two sections identified by the research questions. Part one describes parents, teachers, and school administrators' reports of young children's access to computer resources in their schools, classrooms, and homes. Results are presented for the population of kindergarten and first-grade children and in relation to child and family characteristics. Part two describes ways in which young children were reported to use computers in their classrooms and homes. Results in this section are presented for the

[2]Data for kindergarten children are weighted by the round 2 parent cross-sectional weight, C2PW0; data for summer computer use prior to first grade are weighted by the round 3 parent cross-sectional weight, C3PW0; and first-grade data are weighted by the round 4 cross-sectional parent weight, C4PW0.
[3]Children who repeated kindergarten while in the study were not included in the analysis of first-grade data. Approximately 5 percent of kindergartners were not promoted to first grade by the second year of the ECLS-K data collection.

population of kindergarten and first-grade children and in relation to child, family, teacher, and classroom characteristics. All comparisons made in the text were tested for statistical significance to ensure that differences are larger than might be expected, due to sampling variation. All differences reported were significant at the .05 level.[4]

Young Children's Access to Computers

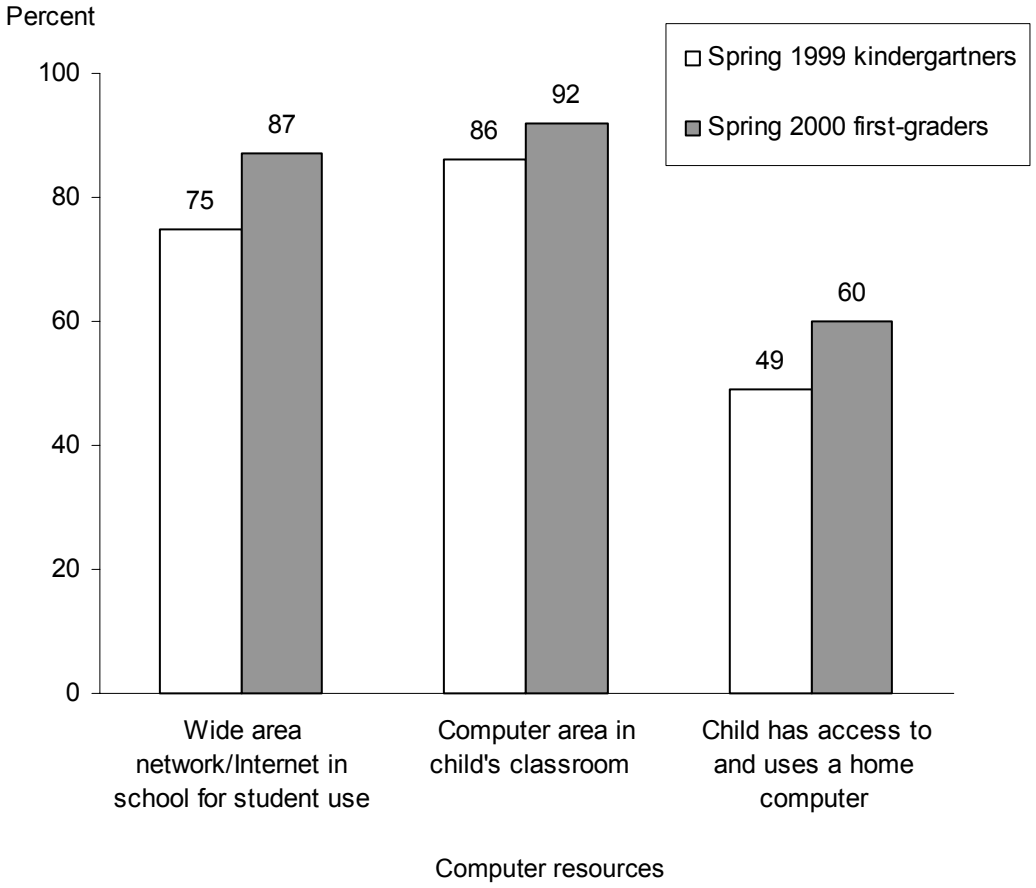
Almost all young children had access to computers, either at home or in their classrooms and schools. However, kindergartners' access to computer resources differed by the type of school they attended (tables 3, B-1, and B-2). Public school kindergartners had greater access to school and classroom resources, whereas private school children had greater access to home computer resources. Focusing on public school children, the findings showed that children's access to most computer resources at school and home increased from kindergarten to first grade (figure A, table 5). Changes in children's access to computer resources may be due not only to the change in grade level but also to the general growth in computer resources from the Spring of 1999 to the Spring of 2000.

School computer resources. For the most part, young children's access to school computer resources did not differ greatly by child and family characteristics (tables B-4, B-6, B-7, B-8, and B-9). However, in kindergarten some minority children and those from lower-SES families were less likely to attend schools that provided Internet access to students than other children. In first grade, children from the lowest SES group continued to have less student access to the Internet in comparison to first-graders in the highest SES group.

Classroom computer resources. Kindergarten and first-grade children in the lowest SES group were less likely to have a computer area in their classroom than children in the highest SES group (tables B-7 and B-11). In kindergarten, access to computer areas in the classroom and to teachers who had attended computer/technology workshops did not differ by children's race/ethnicity. In contrast, Hispanic first-graders were less likely than White first-graders to have a computer area in their classroom, and were less likely than White and Black first-graders to have teachers who had attended a computer/technology workshop during the school year.

[4]Not all statistically significant differences are discussed in this report. Due to the large sample size, many differences (no matter how substantively minor) are statistically significant. Thus, only differences of 5 percent or more between groups are reported, unless an activity is very infrequent (e.g., Internet use) or a resource is rarely available (e.g., Internet access).

Figure A. Percent of public school children who had access to various computer resources in their schools, classrooms, and homes: Kindergarten of spring 1999 and first grade of spring 2000



SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999 and Spring 2000.

Home computer resources. In kindergarten and first grade, children from low-SES families were least likely to have access to home computers. Black and Hispanic kindergartners and first-graders were less likely to have home computer access than White and Asian/Pacific Islander children (tables 4 and 6). The same patterns were detected for kindergartners' home access to the Internet. Also, in first grade, children with disabilities were less likely to have access to home computers than children without disabilities.

Relationship between home and school computer resources. For the most part, young children's access to school and classroom computer resources did not differ by their level of home computer resources. However, a higher percentage of kindergartners who had access to

and used computers and the Internet at home attended schools that provided Internet access for students, compared to kindergartners without home computer resources (figure 3, table B-8).

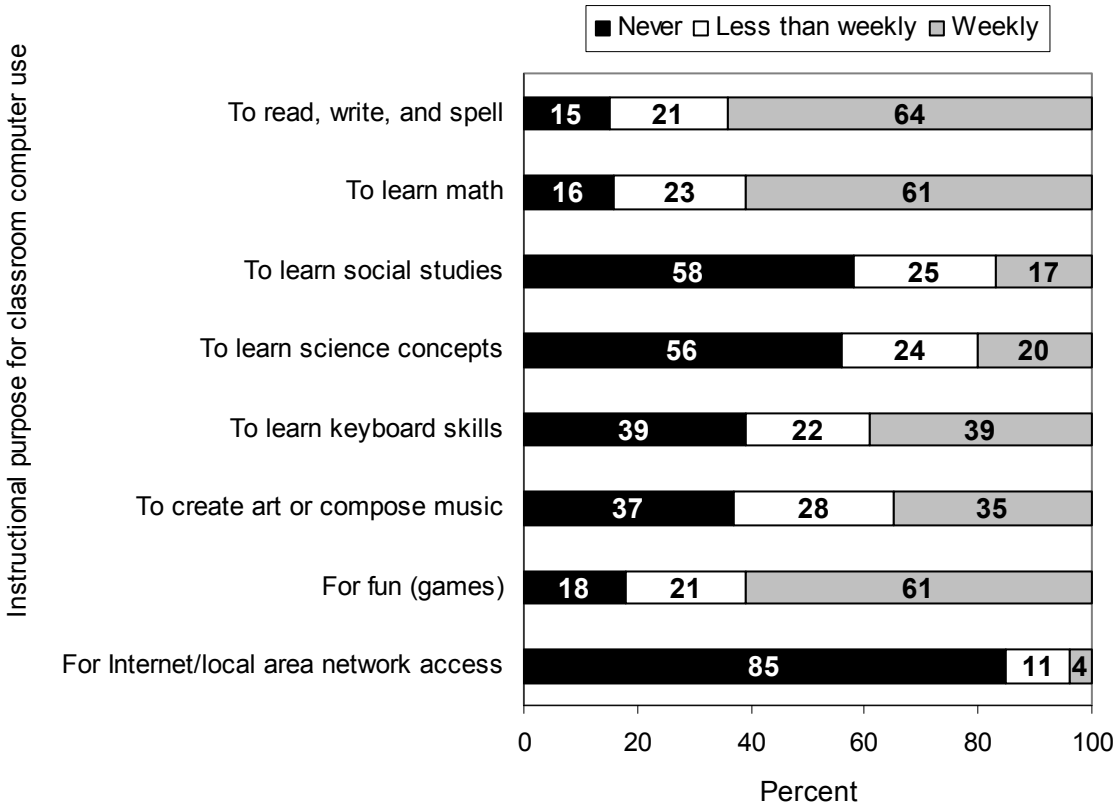
Young Children's Use of Computers

Classroom computer use. The majority of young children in public schools were in classrooms where computers were used for instructional purposes on a weekly basis. The most frequent classroom uses for computers were to learn reading, writing, and spelling; to learn math; and for fun (figure B). Classroom Internet use for young children was not prevalent; 4 percent of public school kindergartners and 9 percent of public school first-graders accessed the Internet on a weekly basis in their classes. Young children's use of computers in the classroom for different instructional purposes tended to vary by teacher and classroom characteristics (tables 8, B-13, and B-14). For instance, kindergartners participating in full-day kindergarten programs and those with computer areas in their classrooms were more likely to be in classes that used the computer on a weekly basis for reading, writing, and spelling; mathematics; social studies; keyboarding instruction; art creation or music composition; and fun than children in part-day kindergarten programs and those without computer areas in their classrooms. Also, kindergartners whose teachers participated in computer/technology workshops and those whose teachers did not spend more than half of the instructional day in teacher-directed, whole-class activities were more likely to be in classes that used the computer on a weekly basis for these purposes than kindergartners whose teachers had not attended computer/technology workshops during the school year or those whose teachers spent more than half of the instructional day in teacher-directed, whole-class activities. These patterns were consistent for first-grade children as well.

Home computer use. Public school children who had access to home computers used them an average of 3 to 4 days a week (tables 9 and 11). Over 85 percent of young children with home computers used them for educational purposes. The frequency with which kindergarten and first-grade children used home computers did not tend to differ by child or family characteristics; however, the purposes for which young children used computers at home varied by children's sex, race/ethnicity, and SES. For example, family SES was positively related to children's use of home computers for educational purposes overall and for those children who had access to home computers. In kindergarten, girls who had access to home computers used them more often for art or drawing programs than boys did. Also, White kindergartners with home computer

access were more likely than Hispanic and Asian/Pacific Islander kindergartners to use them to play with educational programs, and more likely than Black or Hispanic kindergartners to use them for art or drawing programs.

Figure B. Percentage distribution of the frequency that public school kindergartners used computers in their classrooms for different instructional purposes: Spring 1999



SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

In the summer prior to first grade, few public school children used computers in structured summer programs (table 12). However, almost three-quarters of children used home computers in the summer on a weekly basis to play games[5] or for educational purposes (table 14). The percentage of public school children using computers for different purposes in the summer also

[5]Parents were asked how often their child used the computer for games like Nintendo or Sega over a 1-week time period. No definition of "computer" was provided to respondents; thus, it is possible that some parents may have included other noncomputer game devices (e.g., handheld or TV game systems) when responding to the item.

varied by children's sex, race/ethnicity, and SES. In the summer, a higher percentage of boys than girls, and a higher percentage of White than Hispanic children used home computers. Family SES was also positively related to children's summer computer use.

Relationship between home and classroom computer use. Young children's classroom computer use in public schools did not differ based on whether children had home access to computers or the Internet (table 15). In addition, there was no significant relationship between the frequency of home computer use and the frequency of classroom computer use for different instructional purposes for young children attending public schools (tables B-16 and B-17).

Conclusion

Although almost all young children had access to computers, at home or in their classrooms and schools, the differences in the amount of access varied according to children's school type, race/ethnicity, and family SES. Public school kindergartners tended to have greater access to school and classroom computer resources, whereas private school kindergartners had greater access to home computer resources. Young children's access to most computer resources in public schools did not differ greatly by child and family characteristics; however, in kindergarten some minority children, those from lower SES families, and those without home computer resources were less likely to attend schools that provide student access to the Internet. In terms of classroom computer resources, kindergartners and first-graders from the lowest SES group were less likely to have a computer area in their classroom than children in the highest SES group. In first grade, public school Hispanic children were less likely to have access to computers in their classrooms than White children, and Hispanic first-graders were less likely to have teachers who had attended a computer/technology workshop than White and Black first-graders—findings that did not occur in kindergarten. In terms of home computer resources, public school children's access varied by race/ethnicity and family SES, with minority and disadvantaged children being less likely to have home access to computer resources in kindergarten and first grade. Public school children's access to computer resources at school and home tended to increase as they moved from kindergarten to first grade.

Over half of all public school children attended classrooms where computers were used for various instructional purposes at least once a week. Young children's use of computers in their classrooms differed, however, by several classroom characteristics, including kindergarten

program type (part day vs. full day), teachers' attendance at computer/technology workshops during the school year, presence of a computer area in the classroom, and the proportion of time classes spent in teacher-directed, whole-class instruction.

For those public school young children with access to home computers, all children used their home computers an average of about 3 to 4 days each week. However, the purposes for which young children used home computers during the school year and over summer vacation (e.g., to access the Internet, play educational games) varied by children's sex, race/ethnicity, and SES.

The ECLS-K provides a wealth of information on children's cognitive, socioemotional, and physical development from kindergarten through fifth grade across multiple contexts, including the home, classroom, school, and community. Since this report shows differences in computer access and use between public and private school children, additional analyses could focus on child and family characteristic differences within private school settings. Based on the findings from this report, future research could also examine the relationships between children's access to and use of computers in different settings with their academic achievement over time. Also, information on computer resources and use could be further explored at the school and classroom level to identify differences based on characteristics of the schools that young children attend. For example, children's access to school computer resources could be examined in terms of school size, grade range, federal program participation, urbanicity, and region.

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I. Introduction

Over the past decade, technology has changed at such a rapid pace that computers and Internet access are becoming indispensable features of modern life. In September of 2001, over half of U.S. households owned a computer and half of all Americans were using the Internet (Economics and Statistics Administration 2002). Computer literacy and skills are increasingly necessary in a knowledge-based economy. More children are being introduced to computers than ever before, evidenced by the fact that in 2000 65 percent of children had access to a home computer, compared with 32 percent in 1993 (Newburger 1999; Newburger 2001). Students' use of computers at school also increased from 61 percent in 1993 to 71 percent in 1997 (Newburger 1999).

In addition, more children are being introduced to computers at a young age than ever before. For instance, prekindergarten and kindergarten children's use of home computers nearly doubled from 16 percent in 1993 to 30 percent in 1997, and school computer use for this age group increased from 26 percent to 36 percent in the same time period (Snyder and Hoffman 2002).

As computers become more prevalent and computer skills more necessary, there continues to be a "digital divide" between those with computer access and skills and those without. Already, gaps exist across racial/ethnic groups and family income levels with respect to computer ownership and Internet usage (Economics and Statistics Administration 2000). In 2000, 43 percent of Black, non-Hispanic children (ages 3–17) and 37 percent of Hispanic children had a computer in their home, compared to 77 percent of White, non-Hispanic children. In terms of Internet usage in the same year, there was a 21 percentage point difference between Internet access rates for both Blacks and Hispanics compared to the nationwide average (Newburger 2001).

Such differences are less pronounced in schools, where children's access to computers and the Internet are more prevalent. In a 1999 U.S. Department of Education study, almost all public school teachers (99 percent) indicated that computers were available in their schools, and the nationwide ratio of students to instructional computers was about 6 to 1 (Smerdon et al. 2000). The Department also reported that 95 percent of all public

schools had access to the Internet in 1999, compared with only 35 percent in 1994 (Snyder and Hoffman 2002).

The *No Child Left Behind Act of 2001* (NCLB, P.L. 107-110) contains provisions for increasing technology use in schools. The new Enhancing Education Through Technology (ED Tech) program seeks to improve student achievement through the use of technology. The goals of this program are to improve achievement in elementary and secondary schools through the use of technology, to assist students to become technically literate by the eighth grade, and to ensure that teachers integrate technology into the curriculum to improve student achievement. There are also provisions in the act to provide funding for schools to purchase technology resources to further the program's goal.

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This report describes the computer resources available to children as they begin formal schooling. The computer resources identified in this report include access in schools to computer labs, CD-ROMs, local area networks (LAN), and wide area networks (WAN)/Internet; access in classrooms to computer areas and teachers trained in using computers and technology; and access in homes to computers and the Internet. The report also looks at the ways in which young children use computers at home and school. For example, information is provided on children's frequency and types of home

computer use, and on the frequency with which children use computers in their classrooms for different instructional purposes. Children's access to and use of computers in their schools, classrooms, and homes are examined overall and in relation to certain child and family characteristics. In addition, children's use of computers for various instructional purposes is compared by several characteristics of their teachers and classrooms. Details on the child, family, teacher, and classroom characteristics used in this report are included in the *Measures* section of the Introduction.

Research Questions

Data from the ECLS-K are used to examine 10 questions related to young children's access to and use of computers.

Access to Computer Resources

1. What computer resources are available in the schools, classrooms, and homes of kindergartners?
2. Are these resources equally available to girls and boys, economically disadvantaged and advantaged students, and minority and nonminority children?
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4. Does the level of computer resources that are available in the schools, classrooms, and homes of young children change from kindergarten to first grade?

Use of Computer Resources

5. How frequently do kindergartners use computers in their classrooms and homes, and for what purposes?
6. Do certain groups of children use computers more often than others in each of these learning environments?
7. Does the frequency of children's use of computers in their homes, classrooms, and schools change from kindergarten to first grade?
8. How frequently do young children use computers use computers over summer vacation?

9. What opportunities do children with and without home computer resources have to use computers in their classrooms?
10. Do children who use computers more often at home also use them more often in their classrooms?

Data Source

The ECLS-K selected a nationally representative sample of kindergartners in the Fall of 1998 and is following these children through the spring of fifth grade. The study collects information directly from the children and their families, teachers, and schools. The full ECLS-K base-year sample is comprised of approximately 22,000 public and private school children who attended over 1,200 kindergarten programs during the 1998–99 school year. Data for this report are from the ECLS-K kindergarten and first-grade waves of data collection.[6] Tables 1 and 2 show the sample sizes and population counts for the children included in this report.

Tables 1, 2, 3, B-1[7], B-2, and B-3 present data for children attending public and private schools. The data in these tables show significant differences in the computer resources available in the two school sectors, as well as differences in the characteristics of children who attend each type of school. For example, almost three-quarters (74 percent) of public schools with kindergartens had Internet access for students, compared with 41 percent of private schools with kindergartens (table B-1). Also, a higher proportion of Black and Hispanic kindergartners attended public schools than private schools (table 1). As a result, it was decided to only report findings for public schools in the remainder of the report, so that any variations found in computer access and use related to child and classroom characteristics would not be confounded by school sector. Thus, the majority of this report is based on 14,666 Spring 1999 public school kindergartners and 11,456 Spring 2000 public school first-grade children.[8]

[6]Data for kindergarten children are weighted by the round 2 parent cross-sectional weight, C2PW0; data for summer computer use prior to first grade are weighted by the round 3 parent cross-sectional weight, C3PW0; and first-grade data are weighted by the round 4 cross-sectional parent weight, C4PW0.
[7]Tables beginning with a B are located in Appendix B.
[8]Children who repeated kindergarten while in the study were not included in the analysis of first-grade data. Approximately 5 percent of kindergartners were not promoted to first grade by the second year of the ECLS-K data collection.

For the most part, the findings in the report use the child as the unit of analysis. This was done to provide information on the percentage of kindergartners who had opportunities to use different computer resources, as opposed to information on the percentage of schools or teachers that made such resources available for their students. In the first part of *Section II* of the report, summary information is provided on the percentage of schools and teachers that provide various computer resources to kindergartners (tables B-1 and B-2). These results were consistent with the child-level findings (table 3), so tables at the school and teacher level of analysis are not included elsewhere in the report.

The findings of this report are organized into the two sections identified by the research questions. Part one describes parents, teachers, and school administrators' reports of young children's access to computer resources in their schools, classrooms, and homes. Results are presented for the population of kindergarten and first-grade children, and in relation to child and family characteristics. Part two describes ways in which young children were reported to use computers in their classrooms and homes, and also examines the frequency of classroom computer use for different instructional purposes. Results in this section are presented for the population of kindergarten and first-grade children, and in relation to child, family, teacher, and classroom characteristics. All comparisons made in the text were tested for statistical significance to ensure that differences are larger than might be expected, due to sampling variation. All differences reported were significant at the .05 level.[9]

[9]Not all statistically significant differences are discussed in this report. Due to the large sample size, many differences (no matter how substantively minor) are statistically significant. Thus, only differences of 5 percent or more between groups are reported, unless an activity is very infrequent (e.g., Internet use) or resource is rarely available (e.g., Internet access).

Table 1. Sample size, population size, and percent of kindergarten children by school control and by selected school, classroom, and child characteristics: Spring 1999

Selected school, classroom, and child characteristics	Sample size	Population size	Percent		
			All kindergartners	Public school kindergartners	Private school kindergartners
All kindergartners	19,000	3,864,000	100	100	100
School control					
Public	14,700	3,289,000	85	100	0
Private	4,300	575,000	15	0	100
School low-income level[1]					
Less than 50% low-income students	7,100	1,535,000	54	54	†
50% or more low-income students	5,500	1,286,000	46	46	†
Class size					
Less than 18 children	3,800	700,000	21	18	40
18 to 24	9,100	1,945,000	60	63	38
25 or more	3,100	618,000	19	19	21
Child's sex					
Male	9,700	1,996,000	52	52	49
Female	9,300	1,868,000	48	48	51
Child's race/ethnicity					
White, non-Hispanic	10,900	2,220,000	58	55	72
Black, non-Hispanic	2,700	620,000	16	17	9
Hispanic	3,300	734,000	19	20	11
Asian/Pacific Islander	1,300	132,000	3	3	4
Other, non-Hispanic	800	152,000	4	4	4
Child's disability status[2]					
Not disabled	2,400	2,932,000	85	85	87
Disabled	14,500	519,000	15	15	13

† Not applicable.
[1]School low-income level is only available for public schools and is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
NOTE: Detail may not sum to totals due to nonresponse and rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table 2. Sample size, population size, and percent of first-grade children by school control and by selected school, classroom, and child characteristics: Spring 2000

Selected school, classroom, and child characteristics	Sample size	Population size	Percent		
			All first-graders	Public school first-graders	Private school first-graders
All first-graders	14,600	3,513,000	100	100	100
School control					
Public	11,500	2,997,000	87	100	0
Private	3,000	436,000	13	0	100
School low-income level[1]					
Less than 50% low-income students	5,700	1,345,000	55	55	†
50% or more low-income students	4,000	1,085,000	45	45	†
Class size					
Less than 18 children	2,700	556,000	19	17	27
18 to 24	8,100	1,962,000	66	70	43
25 or more	2,300	447,000	15	13	30
Child's sex					
Male	7,400	1,794,000	51	51	49
Female	7,200	1,719,000	49	49	51
Child's race/ethnicity					
White, non-Hispanic	8,600	2,000,000	57	55	72
Black, non-Hispanic	1,900	582,000	17	18	10
Hispanic	2,400	673,000	19	20	12
Asian/Pacific Islander	1,000	127,000	4	4	4
Other, non-Hispanic	600	129,000	4	4	2
Child's disability status[2]					
Not disabled	12,200	2,896,000	82	82	86
Disabled	2,300	607,000	17	18	14

† Not applicable.
[1]School low-income level is only available for public schools and is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
[2] Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
NOTE: Detail may not sum to totals due to nonresponse and rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Measures

Information in this report was collected through parent interviews and teacher and school administrator questionnaires. Below is a brief description of the measures and characteristics used from these information sources. More detailed information on the measures can be found in the *Methodology and Technical Notes* section of this report or in the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99: Base-Year Public-use Data Files User's Manual* (NCES 2001) and the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99: First-grade Public-use Data Files User's Manual* (NCES 2002).

Computer resources. Data were collected from school administrators, teachers, and parents on the types of computer resources available to children. School administrators completed paper and pencil questionnaires that asked questions about the presence of a school computer lab, local area network (LAN) access, CD-ROM drives, and wide area network (WAN, Internet) access, and whether such resources were available to students. School administrators also provided counts on the total number of computers in the school and the number of classrooms with different computer resources. Kindergarten and first-grade teachers also completed paper and pencil questionnaires, in which they identified whether computers were used in the grade they were teaching, whether there was a computer area in their classroom, and whether they had attended a computer/ technology workshop during the school year. Parents of kindergartners and first-graders responded to telephone interviews and provided information on whether there was a home computer that their child used and whether their child accessed the Internet from home.

Computer use. Teachers and parents of the sampled children reported on young children's computer use at school and home. Kindergarten and first-grade teachers indicated the frequency with which children used computers in their classes for several instructional purposes, including to learn reading, writing, or spelling; to learn math; to

learn social studies; to learn science concepts; to learn keyboard skills; to create art or compose music[10]; for fun (games); and for Internet/LAN access.

In spring of 1999 and again in spring of 2000, parents indicated the frequency with which their children used a home computer on a weekly basis, for children who used a computer in the home. In spring of 1999, parents of kindergartners who used home computers also indicated whether their children used the computer to play with educational programs, to play with art or drawing programs, and to access the Internet. In the fall of 1999, parents identified whether their children used computers at summer camp or summer school and also the frequency with which their children used home computers to play games or for educational purposes. In spring of 2000, parents of first-graders who used home computers were asked to provide information on the frequency with which their children used computers for educational purposes. Thus, there were some differences across data collection waves as to the information collected on children's home computer use.

Child and family characteristics. Young children's access to and use of computers in their schools, classrooms, and homes were compared across five child and family characteristics.[11] These included:

- Child's sex (male, female).
- Child's race/ethnicity (White, non-Hispanic; Black, non-Hispanic; Hispanic; Asian/Pacific Islander; Other, non-Hispanic).[12]
- Family socioeconomic status (SES) (lowest 20 percent, middle 60 percent, highest 20 percent). This composite in the ECLS-K database is derived from the following variables: mother/female guardian's education level, father/male guardian's

[10]The original set of items on computer use for instructional purposes included separate items on using the computer to create art or to compose music. The response pattern for these two items was consistent, so a decision was made to combine the two categories into one variable for this report. Children's value on the composite variable was equal to the value of the variable (art or music) with the higher reported frequency.
[11]Many of these variables are composite variables in the ECLS-K Electronic Codebook (ECB). Information on the creation of these composites can be found in Chapter 7 of the *Early Childhood Longitudinal Study, Kindergarten Class of 1998-99: Base Year Public-use Data Files User's Manual (*NCES 2001–029*)* and the *Early Childhood Longitudinal Study, Kindergarten Class of 1998-99: Base Year Public-use Data Files User's Manual (*NCES 2002–134*)*.
[12]White refers to White, non-Hispanic, Black refers to Black, non-Hispanic children, and Other refers to Other, non-Hispanic (i.e., American Indian, Alaska Native, or multiracial) for the remainder of the report.

education level, mother/female guardian's occupation, father/male guardian's occupation, and household income. For this report, the family SES quintile variable was collapsed into three groups representing children in the lowest 20 percent, the middle 60 percent, and the highest 20 percent of the range of SES values. More information on this composite is included in the *Methodology and Technical Notes* section of this report.

- Poverty status (below poverty level, at or above poverty level). This composite variable is derived from household income and the total number of household members. Federal poverty thresholds are used to define households below the poverty level. For instance, in 1998 if a household contained 4 members, and the household income was lower than $16,655, then the household was considered to be in poverty. In most cases, findings for children's access and use of computers by poverty status are consistent with the patterns of significant findings for the three SES groups. Therefore, findings by SES level are reported in both the text and tables, while poverty findings are only presented in the report tables.
- Child's disability status (not disabled, disabled). This composite on the ECLS-K database is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision, or has participated in therapy or programs for children with disabilities.

Teacher/classroom characteristics. Teachers in the study were asked to complete a set of self-administered questionnaires about their background, the characteristics of the students in their classrooms, the organization of their classroom, and their instructional practices. Children's computer use for various instructional purposes is compared by several of these teacher and classroom characteristics. For instance, this report uses teacher-level data on the number of years of teaching experience in the target grade level (kindergarten or first grade) and the teacher's area of certification (i.e., elementary education, early childhood certification, or neither area of certification). Also included is an indicator of whether teachers had attended a computer/technology workshop during the school year. Previous research indicates that teachers' training in technology and their experience with computers may be related to children's opportunities to use computers in their classrooms (Smerdon et al. 2000).

Teachers' use of computers with their classes may also be related to their instructional practices, such as the way they set up their classroom and the way they group children for instruction. This report looks at children's classroom use of computers in relation to whether the teacher had a computer area set up in the classroom. Also, the emphasis teachers placed on teacher-directed, whole-class instruction (whole-class instruction for half of the day or less, whole-class instruction for more than half of the day) is included as a variable for study when examining children's use of computers in their classes.

Children's access to computers in their classes may be limited due to characteristics of their classroom and school. Teachers' use of computers for different instructional purposes are examined in relation to the child's class size (up to 17 children, 18 to 24 children, 25 or more children), the percent of minority children in the child's class (0 to 24 percent, 25 to 49 percent, 50 to 74 percent, 75 percent or more), and the school low-income level (less than 50 percent low-income students, 50 percent or more low-income students).[13]

Limitations

This report provides a detailed description of young children's access and use of computers at their schools and homes. However, there are limitations of the data that the ECLS-K collected on computer resources and computer use. For instance, the school and classroom indicators do not provide direct information on whether the sampled children have access to certain computer resources at school, although they indicate the overall level of school and classroom computer resources available to students in the schools they attend. Similar to the items on computer resources, the items asked of teachers about classroom computer use do not collect data specific to the sampled children's computer use; however, they do provide indicators of the computer use in their classrooms. In addition, the ECLS-K collects data from multiple sources on computer access and use but the survey instruments do not capture specific

[13]Children were identified as attending a low-income school if the percent of free or reduced price lunch-eligible students in the school was 50 percent or more. If data on the percent of free/reduced price lunch-eligible students were missing, data on the school's receipt of schoolwide Title I assistance were used to determine school low-income level. Schools receiving schoolwide Title I assistance were designated as low-income schools. This measure is applicable for public schools only.

information on the quality of young children's computer use or the specific software children are using at school and in their homes.

The ECLS-K data on computer resources and use were provided by children's school administrators, teachers, and parents. As a result, there may be possible response bias due to social desirability. For example, some respondents may indicate that young children use computers more often than they actually do if the respondents believe that frequent computer use is a desirable behavior. Since independent observation of computer resources and use was not part of the study design, it is not possible to examine whether response bias might have an effect on reported estimates.

For some of the research questions in this report, young children's access to and use of computer resources in different settings are compared from kindergarten in the spring of 1999 to the first grade in the spring of 2000. Differences that are detected between the two grade levels may be due to children's change in grade level. For instance, in 1997, 37 percent of prekindergarten and kindergarten children used computers in school, compared with 79 percent of first through eighth grade children (Snyder and Hoffman 2002). Differences detected across grade levels may also be attributed to the growth of computer resources from 1999 to 2000. For example, the percent of public elementary schools with Internet access increased significantly from 94 percent in 1999 to 97 percent in 2000 (Kleiner and Farris 2002).

II. Access to Computer Resources

Previous research found that by 1999, nearly all public schools in the United States had at least one computer (Smerdon et al. 2000). Internet access increased rapidly in public schools from 1994–99. For instance, in 1999, 94 percent of public elementary schools had Internet access, compared with only 30 percent in 1994 (Snyder and Hoffman 2002).[14] In 2000, 98 percent of all public schools were connected to the Internet, as were 76 percent of elementary school classrooms (Cattagni and Farris 2001).

Differences have been found between the percent of children who have a computer in their home and the percent who actually use home computers. According to the U.S. Census Bureau's 1997 Current Population Survey, 45 percent of prekindergarten and kindergarten children lived in a home with at least one computer, while 30 percent used a computer at home. In the same year, 51 percent of first to eighth grade children had home computer access, and 43 percent used home computers. Of prekindergarten and kindergarten children, 57 percent of White children had a computer in their home, while 38 percent used home computers. Eighteen percent of Black children and 21 percent of Hispanic children had computers in their homes, while 10 percent of Black children and 11 percent of Hispanic children used home computers (Snyder and Hoffman 2002).

What computer resources are available in the schools, classrooms, and homes of kindergartners?

In general, kindergartners in the spring of 1999 had access to a variety of computer resources in their schools, classrooms, and homes (table 3). Consistent with other findings (Becker 2000), all public school kindergartners and 96 percent of private school kindergartners attended schools that had at least one computer. Almost all kindergartners (97 percent) had access to a computer either in their home or in their kindergarten program. Ninety-four percent of children used computers in kindergarten, and over three-quarters had computer areas in their classrooms and attended schools with student access to computer labs and CD-ROM drives. More than half attended

[14]Information on children's access to the Internet in 2001 has recently been published (Kleiner and Farris 2002). However, 1999 and 2000 estimates from other studies are presented in this report because they reflect the same timeframe as the ECLS-K estimates.

schools that provided student access to local area networks (LANs) and the Internet, had kindergarten teachers who attended a computer/ technology workshop in the past year, and had home computers that they used.

Table 3. Percent of kindergartners who had access to various computer resources in their schools, classrooms, and homes, by school control: Spring 1999

Computer resources	All kindergartners	Public school kindergartners	Private school kindergartners
Access to computers at school or home	97	98	96
School has at least one computer	99	100	96
School computer resources for student use			
Computer lab in school	79	80	75
Local area networks (LAN)	63	67	39
CD-ROM drives	90	92	80
Wide area networks (WAN, Internet)	71	75	51
Teacher/classroom resources			
Computers used in kindergarten	94	96	83
Computer area in classroom	84	86	72
Teacher attended computer/technology workshop in past year	59	62	42
Home computer resources			
Child has access to and uses a home computer	53	49	73
Child has access to and uses the Internet at home	6	6	8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Kindergartners' access to school, classroom, and home computer resources tended to vary by the type of school they attended. Although the apparent difference between the percentage of public and private school kindergartners with computer labs in their schools was not statistically significant, kindergartners in public schools had greater access to resources such as LANs, CD-ROM drives, and the Internet than private school kindergartners. In addition, public school kindergartners had greater access to computers in their classrooms, and a higher percentage of their teachers had attended computer/ technology workshops during the school year than private school

kindergartners. However, only about half of public school kindergartners had access to computers in their home, compared with almost three-quarters of private school kindergartners.

When the data were analyzed at the school and teacher level, the findings were consistent with child-level data (tables B-1 and B-2). At the school level, a smaller proportion of private schools with kindergartens had computer labs or student access to LANs, CD-ROM drives, and the Internet than did public schools with kindergartens (table B-1). Also, private school kindergarten teachers were less likely to use computers with their classes, to have a computer area in the classroom, and were less likely to have attended a computer or technology workshop in the past year than were public school kindergarten teachers (table B-2).

In sum, significant differences were found between public and private school kindergartners' access to computer resources at home and school. As a result, the remainder of this report focuses on public school children's access to and use of computers so that differences found by child, family, and school characteristics are not confounded by school control differences. Approximately 85 percent of kindergartners attended public schools in the 1998–99 academic year (table 1).

Public school kindergartners' access to computer resources at school was also examined in terms of the school's child/computer ratio — that is, the number of children enrolled in the school divided by the total number of computers in the school — and the percent of classrooms in the school that had various computer resources available for student use (table B-4). On average, the public schools that kindergartners attended had one computer for every nine children in the school. Approximately half of the classrooms in children's schools had LAN and Internet access, while 71 percent had computers with CD-ROM hardware.

Are these resources equally available to girls and boys, disadvantaged and advantaged students, and minority and nonminority children?

In this section, children's access to computer resources in their homes and schools was examined in relation to the children's sex, race/ethnicity, disability status, family SES,

and poverty status. Children's SES level is strongly related to their racial/ethnic background (table B-5). For example, 11 percent of White kindergartners fall into the lowest SES level, compared with 20 percent of Asian/Pacific Islander, 36 percent of Black, and 45 percent of Hispanic kindergartners. In addition, the majority (71 percent) of children in the lowest SES level are also living below the poverty level (not shown in tables). Since the findings on computer access and use were consistent for the most part across the SES and poverty level variables, only SES-level differences are reported in the text.

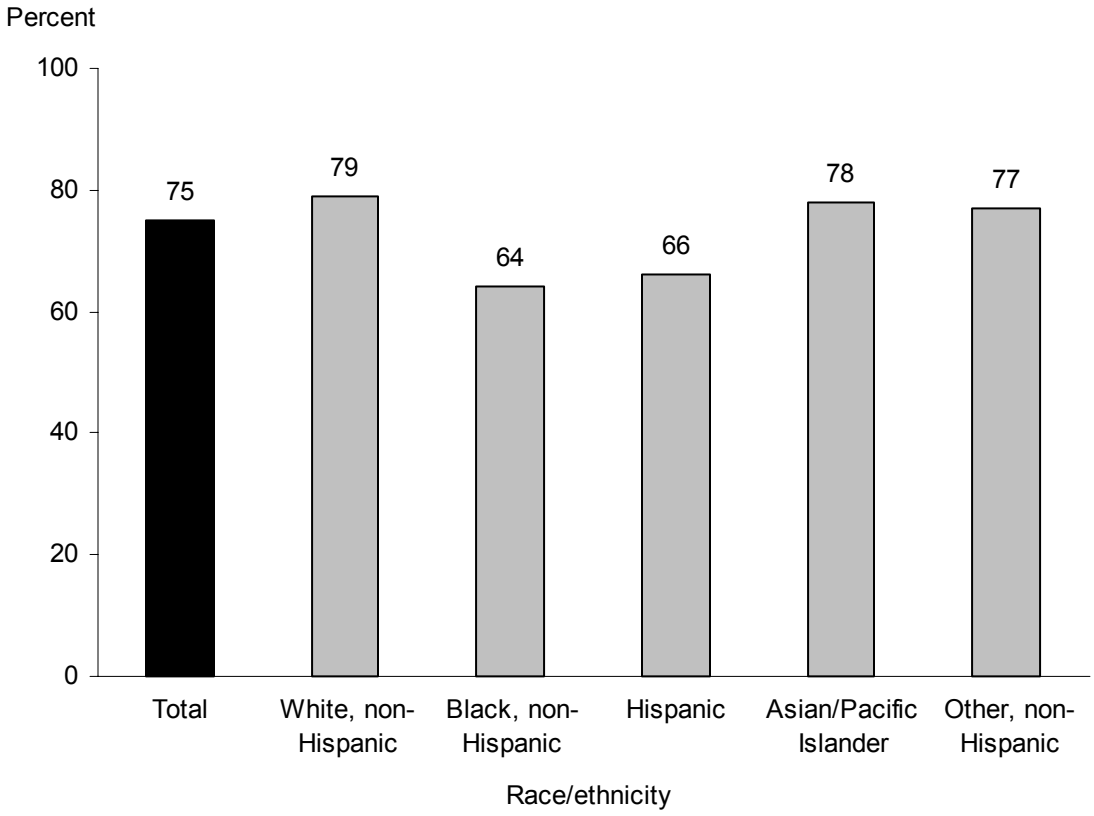
School computer resources. In an effort to identify whether school computer resources were equally distributed for all kindergartners, the percent of public school kindergartners with access to various resources was examined in relation to child and family characteristics (table B-6). In the spring of 1999, no difference was detected in student access to school computer labs, LANs, and CD-ROM equipment for all public school kindergartners with respect to children's sex, race/ethnicity, SES, and disability status. However, student access to the Internet and wide area networks (WAN) in schools varied by children's race/ethnicity and SES. A higher percentage of White children attended schools that provided student access to the Internet than did Black and Hispanic children (79 percent vs. 64 and 66 percent, respectively) (figure 1, table B-6). [15] Also, children from the highest SES group were more likely to attend schools that provide student access to the Internet than those in the lowest SES group (80 percent vs. 69 percent).

When kindergartners' access to computer resources in public schools was examined in terms of their schools' child/computer ratio, no significant differences were detected across child and family characteristics (table B-4). However, Hispanic kindergartners' schools had a lower percent of classrooms with Internet access when compared to White, Asian/Pacific Islander, and other, non-Hispanic kindergartners' schools (41 percent vs. 55, 58, and 60 percent, respectively). Kindergartners from the lowest SES group also had a lower percentage of classrooms in their schools with Internet access compared to children from the highest SES group. In addition, the average percentage

[15]Logistic regression was used to examine whether children's race/ethnicity was related to the likelihood that their school offered Internet access to students after controlling for children's family SES. The regression results indicated that Black children were still less likely to be in schools that provide Internet access for students than White children, after controlling for family SES (not in tables).

of classrooms in children's schools with LAN access was lower for Hispanic kindergartners than for Asian/Pacific Islander children (46 percent vs. 62 percent).

Figure 1. Percent of public school kindergartners attending schools with Internet access for students, by child's race/ethnicity: Spring 1999



SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Teacher/classroom computer resources. The percent of public school kindergartners with access to various classroom computer resources was examined in relation to child and family characteristics (table B-7). Almost all public school kindergartners (96 percent) used computers during the school year. Kindergartners' access to teachers who participated in computer/technology workshops during the school year did not show variation by children's sex, race/ethnicity, SES, or disability status. However, a lower percentage of kindergartners in the lowest SES group had computer areas in their classrooms than kindergartners from the highest SES group (83 percent vs. 90 percent).

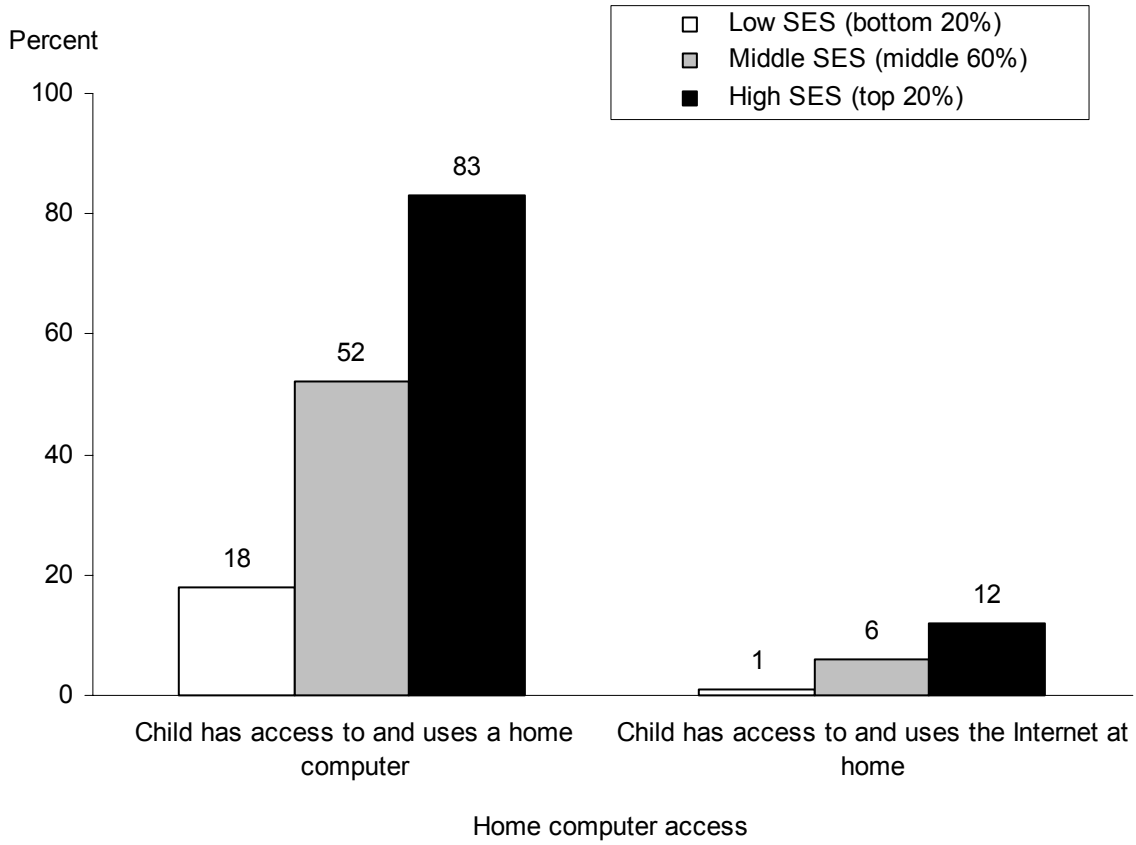
Home computer resources. Children's access to and use of home computer resources were also compared by various child and family characteristics (table 4). Home access and use of computers and the Internet differed by children's race/ethnicity and SES. For instance, Black and Hispanic kindergartners were less likely than White and Asian/Pacific Islander kindergartners to have a home computer that they used or home access to the Internet. Also, family SES level was positively associated with kindergartners' home access and use of computers and the Internet (figure 2).

Table 4. Percent of public school kindergartners who had access to and used computers and the Internet in their homes, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Child has access to and uses a home computer	Child has access to and uses the Internet at home
All kindergartners	49	6
Child's sex		
Male	49	7
Female	49	5
Child's race/ethnicity		
White, non-Hispanic	62	8
Black, non-Hispanic	30	3
Hispanic	30	3
Asian/Pacific Islander	53	6
Other, non-Hispanic	43	7
Family socioeconomic status (SES) level		
Low SES (bottom 20%)	18	1
Middle SES (middle 60%)	52	6
High SES (top 20%)	83	12
Family poverty status[1]		
Below poverty level	21	2
At or above poverty level	59	7
Child's disability status[2]		
Not disabled	50	6
Disabled	51	5

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Figure 2. Percent of public school kindergartners who had access to and used computers and the Internet in their homes, by family socioeconomic status (SES): Spring 1999

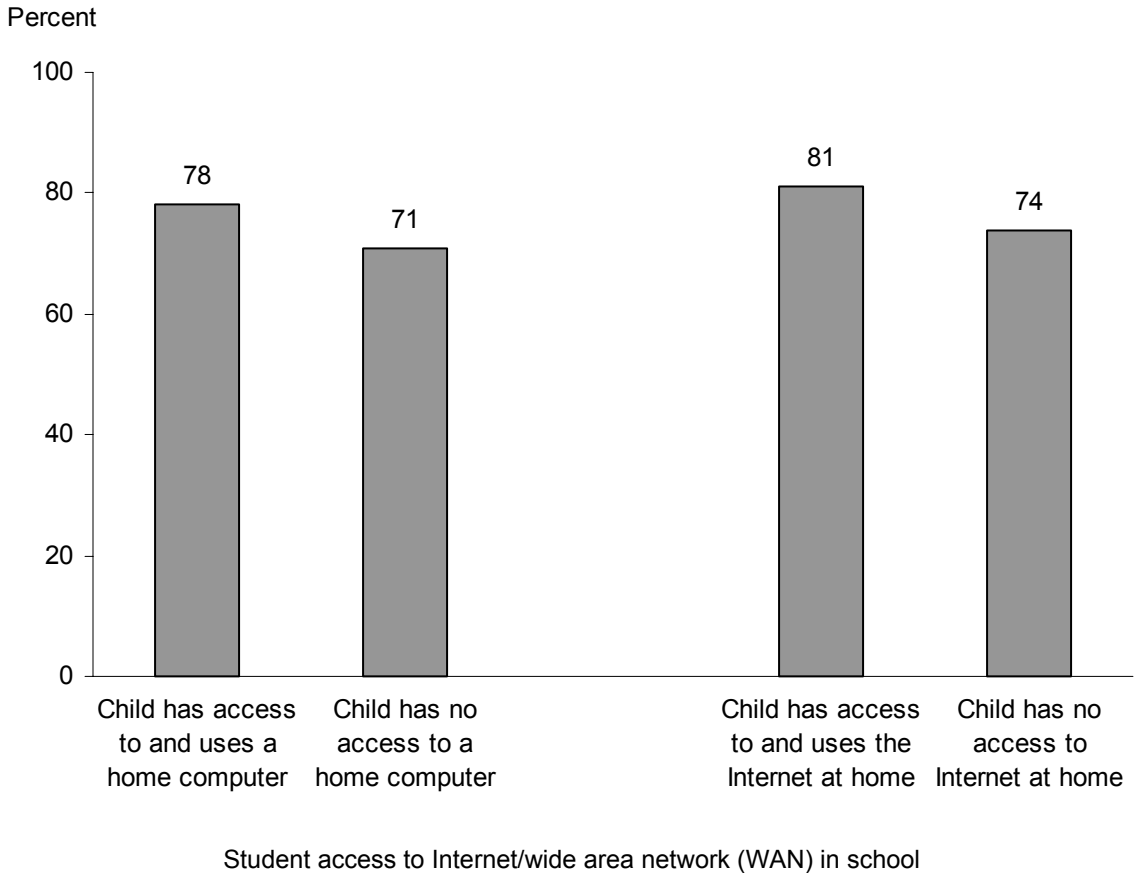


SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

What school and classroom computer resources are available to children from homes with various computer resources?

Public school kindergartners' access to school and classroom computer resources was also examined in relation to whether children had home computers that they used and whether they accessed the Internet from home (table B-8). For the most part, kindergartners' access to school and classroom computer resources did not differ by their level of home computer resources. However, a higher percentage of kindergartners who had home access to computers and the Internet attended schools with student Internet access than did children without home computer resources (figure 3, table B-8).

Figure 3. Percent of public school kindergartners who had student access to Internet/wide area networks (WAN) in their schools, by level of access to home computer resources: Spring 1999



SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Does the level of computer resources that are available in the schools, classrooms, and homes of young children change from kindergarten to first grade?

Young children's access to most of the computer resources examined in this report increased as they moved from kindergarten to first grade (table 5). From spring of 1999 to spring of 2000, a greater percentage of public school children attended schools that provided student access to computers with LANs, CD-ROM drives, and Internet access. In addition, more children had computer areas in their classrooms in first grade. Public school children's access to computers in their homes also improved as they moved from

kindergarten to first grade. These differences between kindergarten and first grade access may be due to the change in grade level or the year in which data were collected.

Table 5. Percent of public school kindergarten and first-grade children who had access to various computer resources in their schools, classrooms, and homes: Spring 1999 and spring 2000

Computer resources	Spring 1999 public school kindergartners	Spring 2000 public school first-graders
School computer resources for student use		
Computer lab in school	80	82
Local area networks (LAN)	67	77
CD-ROM drives	92	96
Wide area networks (WAN, Internet)	75	87
Teacher/classroom resources		
Computers used in kindergarten	96	98
Computer area in classroom	86	92
Teacher attended computer/technology workshop in past year	62	62
Home computer resources		
Child has access to and uses a home computer	49	60
Child has access to and uses the Internet at home	6	—

— Data were not collected.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999 and Spring 2000.

Based on these findings, further analyses were done to determine whether the increase in first-graders' access to certain computer resources in their schools and homes also led to more equitable distribution of computer resources for children. In the kindergarten year, children from economically disadvantaged homes and those from some minority groups were less likely to have access to the Internet in their schools, computer areas in their classrooms, and computer resources in their homes. Also, a lower percentage of kindergartners without home computer access attended schools with student Internet access, compared with kindergartners who had home computer access. Thus, this report examines whether the overall increases in computer resources helped to equalize access to these resources for all first-graders or if disparities in computer access still existed for some groups of young children.

School computer resources. Consistent with kindergarten findings, no differences were detected with first-graders' access to school computer labs, CD-ROM drives, and LANs in their schools when compared by child and family characteristics. In first grade, children from the lowest SES group continued to be less likely to attend schools with student access to the Internet than first-graders in the highest SES group (tables B-9). However, no significant difference was detected in the percentage of first-graders who had school access to the Internet relative to their level of home computer access (table B-10). This finding differed from the kindergarten data, which showed that children without home computer access were less likely than kindergartners with home computer access to attend schools that provided student access to the Internet (table B-8). As noted earlier, this difference may be due, in part, to the increase in elementary school Internet access from 1999 to 2000 (Kleiner and Farris 2002).

Teacher/classroom computer resources. Although the percentage of classrooms with computer areas increased from kindergarten to first grade (table 5), not all children had equal access to these resources (table B-11). First-graders in the lowest SES group continued to be less likely to have computer areas in their classrooms, compared with children from the highest SES group (88 percent vs. 94 percent).

In kindergarten (table B-7), children's access to computer areas in their classes and to teachers who attended computer/technology workshops in the past year did not differ by children's race/ethnicity. However, in first grade racial/ethnic group differences were found in these two classroom-level resources (table B-11). A lower percentage of Hispanic first-graders had computer areas in their classrooms, compared with White first-graders (87 percent vs. 94 percent). Also, Hispanic first-graders were less likely than White or Black first-graders to have teachers who had attended a computer/technology workshop in the past year (54 percent vs. 64 percent).

Home computer resources. The percent of children who had access to home computers increased from Spring 1999 to Spring 2000 (table 5), although home computer access was not equal for all first-graders (table 6). Black and Hispanic first-graders were still less likely than their White and Asian/Pacific Islander peers to have home computers available to them. In addition, first-graders' access to home computers continued to be positively associated with family SES. Access to home computers also

differed significantly by children's disability status, a finding that differed from kindergarten (table 4). In first grade, children with disabilities were less likely to have access to home computers than children without disabilities.

Table 6. Percent of public school first-graders who had access to and used a home computer, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Child has access to and uses a home computer
All first-graders	60
Child's sex	
Male	60
Female	61
Child's race/ethnicity	
White, non-Hispanic	74
Black, non-Hispanic	43
Hispanic	39
Asian/Pacific Islander	67
Other, non-Hispanic	52
Family socioeconomic status (SES) level	
Low SES (bottom 20%)	24
Middle SES (middle 60%)	64
High SES (top 20%)	91
Family poverty status[1]	
Below poverty level	29
At or above poverty level	70
Child's disability status[2]	
Not disabled	61
Disabled	56

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Summary

Almost all young children had access to computers, either at home or in their classrooms and schools. However, access to computer resources differed by the type of school children attended. Public school kindergartners tended to have greater access to school

and classroom resources, whereas private school kindergartners had greater access to home computer resources.

Focusing on public school children, children's access to computer resources at school and home increased as they moved from kindergarten to first grade, and for the most part young children's access to school computer resources did not differ greatly by child and family characteristics. However, in kindergarten some minority children, those from lower SES families, and those without home computer resources also were less likely to attend schools that provided student access to the Internet. These differences were not detected in first grade. In terms of classroom computer resources, kindergartners and first-graders from the lowest SES group were less likely to have a computer area in their classroom than children in the highest SES group. In first grade, public school Hispanic children were less likely to have access to computers in their classrooms than White children, and Hispanic first-graders were less likely to have teachers who had attended a computer/technology workshop than White and Black children—findings that did not occur in kindergarten. Changes in children's access to computer resources may be due not only to the change in grade level but also to the general growth in computer resources from the spring of 1999 to the spring of 2000.

In kindergarten and first grade, public school children's access to home computer resources varied by race/ethnicity and SES, with minority children and children from lower SES families being less likely to have home access to computers and the Internet than White children and those from higher SES families. Also, in first grade, children with disabilities were less likely to have access to home computers than children without disabilities.

III. Use of Computer Resources

The ECLS-K collected information on kindergartners' classroom and home computer use from children's teachers and parents. Children's use of computers in their classrooms and homes was examined overall and in relation to teacher, classroom, child, and family characteristics.

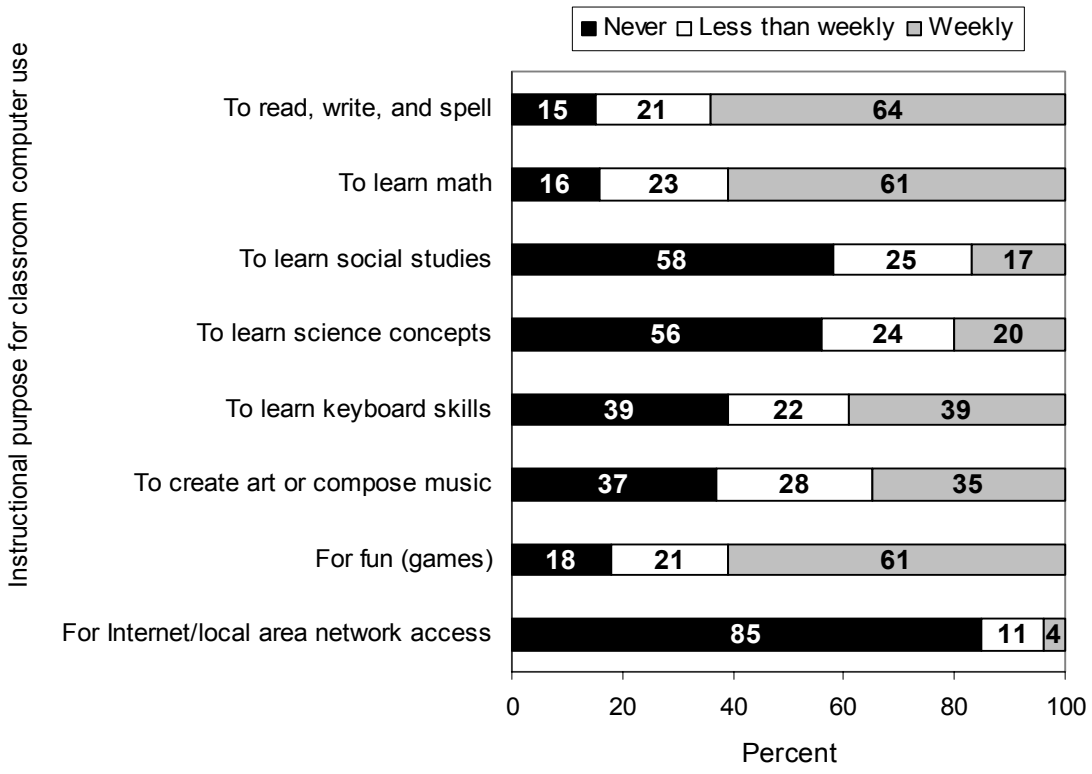
Previous research has shown that young children use computers at school and at home to varying degrees. Results from the U.S. Census Bureau's 1997 Current Population Survey (CPS) indicated that about 37 percent of prekindergarten and kindergarten children in 1997 used computers at school, 30 percent used computers at home, and less than 2 percent used computers at home to do school work. Within different settings, children's computer use differed by race/ethnicity and family income. At the prekindergarten and kindergarten levels, a higher percent of White children used computers in their schools than Hispanic children (39 percent vs. 31 percent, respectively). As noted in *Section II* of this report, the CPS results showed 38 percent of White students used home computers, compared with 10 percent of Black students and 11 percent of Hispanic students. Also, students from lower income families, in general, were less likely to use computers at home than students from higher income families (Snyder and Hoffman 2002). Children's use of the Internet at home and in school also differed in 1997 by socioeconomic characteristics (Newburger 1999).

Teacher preparation and training in technology and the presence of computer resources in the classroom are associated with children's classroom computer use. The 1999 NCES Fast Response Survey on Public Teacher's Use of Computers and the Internet found that the presence of adequate computer resources and teachers' expertise in using computers were related to their use of computers in their classroom instruction (Smerdon et al. 2000). The study found that teachers who had more computers or Internet access in the classroom were more likely to use such technologies with their students than those with fewer resources. Also, teachers who spent more time in professional development in technology reported feeling better prepared to use computers and the Internet in their classrooms, and were more likely to use computers with their students.

How frequently do kindergartners use computers in their classrooms and homes, and for what purposes?

Classroom computer use. Public school kindergarten teachers reported the frequency that they used computers in their classes for different instructional purposes on a six-point scale, ranging from "no use" to "daily use" for a given purpose. For this report, the frequency of computer use categories were collapsed to three groups: no use, less than weekly use, and weekly use (figure 4). The most frequent uses for computers in kindergarten were to learn reading, writing, and spelling; to learn math; and for fun; at least 60 percent of public school kindergartners' teachers reported that all of these activities were done on at least a weekly basis. The least frequent use for computers in kindergarten was for Internet/LAN access, with only 4 percent of public school kindergartners' classes using them on a weekly basis for this purpose.

Figure 4. Percentage distribution of the frequency that public school kindergartners used computers in their classrooms for different instructional purposes: Spring 1999



SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

As noted in *Section I*, public school kindergarten teachers provided information on the frequency that their class used computers for different instructional purposes over the course of a week, rather than the frequency that each child used computers for different purposes. Thus, it is not possible to determine the frequency of sampled kindergartners' computer use for various instructional purposes. However, data collected from sampled children's teachers can be used to describe the general frequency of computer use in the children's classes.

Home computer use. Parents were asked questions about the frequency that public school kindergartners used computers in their homes and the types of activities children were involved in when they used home computers. On average, public school kindergartners used home computers 1.7 days a week (not in tables). For children who used home computers, computer use averaged 3.5 days a week (table 9). Of kindergartners who used home computers, over three-quarters used them for art or educational programs, while 12 percent used them to access the Internet (table 7).

Table 7. Percent of public school kindergartners who used home computers for various purposes, overall and for those children with access to a home computer: Spring 1999

Computer-use purpose	All kindergartners	Kindergartners who have access to and use a home computer
Access the Internet	6	12
Play with educational programs	43	88
Play with art or drawing programs	39	79

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Do certain groups of children use computers more often than others in each of these learning environments?

Classroom computer use. Public school kindergartners' opportunities to use computers for different instructional purposes tended to vary by certain classroom characteristics (table 8). For example, the percentage of public school kindergartners whose classes used computers on a weekly basis for reading, writing, and spelling;

mathematics; social studies; science; keyboarding instruction; art creation or music composition; and for fun differed significantly by teachers' computer/technology workshop attendance, the presence of a computer area in the classroom, the proportion of time teachers spent in teacher-directed, whole-class instruction, and the kindergarten program type (part day vs. full day). Kindergartners whose teachers participated in computer/technology workshops and those with a computer area in their classroom were more likely to be in classes that used the computer on a weekly basis for these instructional purposes than kindergartners whose teachers had not attended computer training during the school year or those without computer areas in their classrooms. Also, kindergartners whose teachers spent half of the instructional day or less in teacher-directed, whole-class activities and those participating in full-day kindergarten programs were more likely to be in classes that used the computer on a weekly basis in these areas than those whose teachers spent more than half of the instructional day in teacher-directed, whole-class activities or were enrolled in part-day kindergarten programs. Since only 4 percent of kindergartners were in classes that used computers on a weekly basis to access the Internet or local area networks, few significant differences in use were detected by classroom characteristics.

Public school kindergarten teachers' certification areas were also related to the frequency that computers were used for some instructional purposes[16] (table 8). Kindergartners whose teachers held early childhood certification were more likely to be in classes that used computers on a weekly basis for math instruction compared with children whose teachers who held neither an early childhood nor elementary education certification. Also, more children whose teachers held either an early childhood and/or an elementary education certificate were in classes that used computers to learn keyboarding skills, compared with those whose teachers held neither teaching certificate.

[16]Teachers' area of certification was related to the level of certification teachers held (i.e., less than regular certificate, regular certificate) and their years of kindergarten teaching experience (table B-12). Over 90 percent of public school kindergartners' teachers who were certified in early childhood education or elementary education held a regular certificate, compared with 68 percent of kindergartners' teachers who were not certified in either area. Also, 39 percent of public school kindergartners' teachers with neither certification had been teaching for less than 3 years, compared with 21 percent of kindergartners' teachers who held early childhood education certificates.

Table 8. Percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999

Selected teacher and classroom characteristics	Instructional purpose			
	To read, write, and spell	To learn math	To learn social studies	To learn science concepts
Teacher attended computer/technology workshop in past year				
Yes	71	67	19	23
No	54	52	13	17
Computer area in classroom				
Yes	68	65	18	22
No	38	36	9	13
Type of certificate				
Elementary	64	62	17	20
Early childhood	69	66	20	24
Neither	67	47	19	19
Teacher-directed, whole-class instruction				
Half the day or less	68	65	18	22
More than half the day	55	51	13	14
Class size				
Less than 18 children	66	65	20	23
18 to 24	67	62	17	20
25 or more	58	55	15	20
Kindergarten program type				
Part day	57	54	11	14
Full day	70	67	22	26

Table 8. Percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999–Continued

Selected teacher and classroom characteristics	Instructional purpose			
	To learn keyboard skills	To create art or compose music	For fun (games)	To access the Internet/local area networks
Teacher attended computer/technology workshop in past year				
Yes	43	41	65	5
No	32	26	53	3
Computer area in classroom				
Yes	41	39	66	4
No	26	14	30	3
Type of certificate				
Elementary	39	36	61	4
Early childhood	44	40	65	4
Neither	24	25	48	4
Teacher-directed, whole-class instruction				
Half the day or less	41	39	64	4
More than half the day	32	27	51	3
Class size				
Less than 18 children	40	38	65	7
18 to 24	40	38	63	3
25 or more	34	34	52	4
Kindergarten program type				
Part day	31	28	54	2
Full day	46	42	67	5

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

For the most part, no differences were detected in the frequency of public school kindergartners' classroom computer use by class size (table 8), teachers' years of kindergarten teaching experience, the percent of minority children in the classroom, or school low-income level (table B-13). However, children in the largest classrooms (25 or more students) were least likely to use computers on a weekly basis for fun and games, compared to classrooms with fewer students.

Home computer use. For those public school kindergartners with access to home computers, all children used their computers an average of about 3 ½ days a week. However, the way in which these children used computers varied by the children's sex, race/ethnicity, and SES (table 9). Girls who had access to home computers more often used them for playing with art or drawing programs than boys. White kindergartners with home computer access were more likely than Hispanic and Asian/Pacific Islander children to use them to play with educational programs, and were more likely than Black or Hispanic children to play with art or drawing programs. For kindergartners who used computers at home, family SES was positively associated with children's use of home computers for educational programs and Internet access. Also, kindergartners in the lowest SES group who had access to home computers were least likely to use their computers to play with art or drawing programs.

Table 9. Among public school kindergartners with access to and who used a home computer, mean number of days per week they used home computers, and percent that used home computers for various purposes, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Days	Percent		
	Mean number of days/week use computer	Access the Internet	Play with educational programs	Play with art or drawing programs
All kindergartners	3.5	12	88	79
Child's sex				
Male	3.6	13	88	76
Female	3.4	11	88	81
Race/ethnicity				
White, non-Hispanic	3.5	13	89	81
Black, non-Hispanic	3.6	10	88	69
Hispanic	3.5	9	84	74
Asian/Pacific Islander	3.5	11	81	76
Other, non-Hispanic	3.6	16	86	79
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	3.7	8	79	71
Middle SES (middle 60%)	3.5	12	87	80
High SES (top 20%)	3.4	15	91	79
Family poverty status[1]				
Below poverty level	3.6	9	81	70
At or above poverty level	3.5	13	89	80
Child's disability status[2]				
Not disabled	3.5	13	89	79
Disabled	3.6	10	88	78

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Does the frequency of children's computer use in their homes, classrooms, and schools change from kindergarten to first grade?

Classroom/teacher computer use. The ECLS-K collected information on young children's computer use in their classrooms in kindergarten and first grade (table 10). Sixty-four percent of public school kindergartners and 65 percent of public school first-graders used computers in school on a weekly basis for reading, writing, and spelling. The most common classroom computer uses in both grades were to read, write, and spell, to learn math, and for fun.

A smaller percentage of public school first-graders than kindergartners used the computer on a weekly basis to learn math, social studies or science concepts, to create art or compose music, or for fun. In contrast, weekly use of computers to access the Internet in public school doubled from kindergarten to first grade. Kindergarten to first grade increases in Internet use may be due to the change in grade level or to growth of computer resources from 1999 to 2000.

Table 10. Percent of public school kindergarten and first-grade children that used computers on a weekly basis in their classrooms for various instructional purposes: Spring 1999 and spring 2000

Instructional purpose	Spring 1999 public school kindergartners	Spring 2000 public school first-graders
To read, write, and spell	64	65
To learn math	61	56
To learn social studies	17	13
To learn science concepts	20	14
To learn keyboard skills	39	37
To create art or compose music	35	26
For fun (games)	61	52
For Internet/local area network (LAN) access	4	9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999 and Spring 2000.

Consistent with the kindergarten findings, the percent of public school first-graders who used computers for different instructional purposes varied by teachers' attendance at computer/technology workshops during the year, the presence of a computer area in the

classroom, and the proportion of time children spent in teacher-directed, whole-class instruction (table B-14). A higher proportion of first-graders with a computer area in their classroom and those with teachers who attended a computer/technology workshop during the school year used computers on a weekly basis across all measured classroom computer activities than first-graders without a computer area in the classroom or whose teachers did not attend computer/technology workshops. Also, those children who spent no more than half of the instructional day in teacher-directed, whole-class instruction were more likely to use computers to learn math, social studies, keyboarding skills, to create art or compose music, and to access the Internet than first-graders whose teachers spent more than half of the instructional day in teacher-directed, whole-class activities.

For the most part, public school teachers' areas of certification, years of first-grade teaching experience, percent of minority enrollment in the classroom, class size, and school low-income level were not linked to differences in children's classroom use of computers (table B-14). However, first-graders whose teachers were certified in early childhood education more often used computers for science and social studies than teachers with elementary education certificates. First-graders whose teachers held early childhood education certificates also used the computer more often to access the Internet on a weekly basis than children whose teachers held neither an early childhood nor an elementary education certificate.

Home computer use. Public school kindergartners and first-graders with home computers both tended to use computers about 3 to 4 days per week (tables 9 and 11). However, Black first-graders used their home computers more often than White first-graders (3.6 days/week vs. 3.3 days/week).

Questions on the ECLS-K parent interviews related to home computer use differed from kindergarten to first grade. For instance, during the kindergarten year parents were asked whether their children used the computer to play with educational programs, to access the Internet, and to play with art or drawing programs. In first grade, parents were asked to report on the frequency with which their children used the computer for educational purposes. For this report, the first-grade item on frequency of computer use for educational purposes was recoded to serve as a dichotomous variable with a value

of “yes” or “no” so that it could be compared with the similar kindergarten item on whether the child used the computer to play educational games. At least 85 percent of young children in both kindergarten and first grade who used home computers played educational programs with them or used them for educational purposes (tables 9 and 11). In addition, family SES continued to be positively related to first-grader’s use of home computers for educational purposes, consistent with the kindergarten findings.

Table 11. Among public school first-graders with access to and who used a computer in their home, mean number of days per week that they used computers in their homes, and the percent who used them for educational purposes, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Mean number of days/week use computer	Percent using a home computer for educational purposes
All first-graders	3.3	86
Child’s sex		
Male	3.4	85
Female	3.3	87
Child’s race/ethnicity		
White, non-Hispanic	3.3	86
Black, non-Hispanic	3.6	87
Hispanic	3.3	85
Asian/Pacific Islander	3.3	80
Other, non-Hispanic	3.6	84
Family socioeconomic status (SES) level		
Low SES (bottom 20%)	3.5	78
Middle SES (middle 60%)	3.4	86
High SES (top 20%)	3.3	89
Family poverty status[1]		
Below poverty level	3.4	80
At or above poverty level	3.3	86
Child’s disability status[2]		
Not disabled	3.3	85
Disabled	3.5	87

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children’s disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

How frequently do young children use computers over summer vacation?

In addition to capturing data on children's computer use during the school year, the ECLS-K collected information from parents at the start of first grade on children's use of computers during the summer following kindergarten, including the use of computers in summer school and summer camp programs.[17] Attendance in summer school or summer camps outside of regular child care between kindergarten and first grade was not common. Eleven percent of children attended summer school after kindergarten and 20 percent participated in a summer camp (table 12). About half of children who attended summer school used computers in the program and 22 percent of those who attended summer camp used computers as part of their programs. In general, few young children attend structured summer programs and used computers while attending such programs.

Table 12. Percent of public school children who attended summer school or summer camp programs in the summer prior to first grade and who used computers in the summer programs: Fall 1999

Summer program	Attended summer program	Used computers in summer program
Summer school	11	51
Summer camp	20	22

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Fall 1999.

Parents also reported on children's use of computers in the home during the summer prior to first grade. The fall first-grade items on computer use were asked of all parents, regardless of whether the family had a home computer that their child used.[18] Data were

[17]The ECLS-K fall first-grade data collection involved a 30 percent subsample of children from the larger ECLS-K sample. For this report, only the sample of children who were attending first grade in the fall of 1999 was included in analyses of summer activities.

[18]In the spring of 1999 and spring of 2000, questions on children's home computer use were only asked if children had access to and used computers in the home. Thus, data on summer computer use are not directly comparable with computer use in spring of 1999 and 2000.

collected on the frequency that children used computers in the summer to play games[19] and for educational purposes (table 13). About half of first-graders used home computers in the summer on at least a weekly basis prior to first grade for each of these two purposes, and almost three-quarters of children used computers at home for at least one of these purposes (table 14).

Table 13. Percentage distribution of the frequency that public school first-graders used computers in their homes for different purposes in the summer prior to first grade: Fall 1999

	Frequency of home computer use			
Summer home computer use	Never	One to two times a week	Three to six times a week	Daily
To play games	49	20	18	14
For educational purposes	46	25	20	10

NOTE: Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Fall 1999.

Children's use of computers in their homes during the summer between kindergarten and first grade was also examined by children's sex, race/ethnicity, family SES, and family poverty status (table 14). Overall, more boys used home computers on a weekly basis in the summer than girls, and more White children used computers than Hispanic children for either games or educational purposes. A greater percentage of boys than girls, and Black than White children used home computers to play games. Also, White and Black children more often used computers on a weekly basis in their homes for educational purposes when compared to Hispanic children.

Family SES was positively associated with children's general use of home computers in the summer prior to first grade. As with computer use during the school year, children's summer computer use for educational purposes was positively related to SES. However, children from the highest SES group were less likely to use home computers in the summer to play games compared with children from the middle SES group.

[19]Parents were asked how often their child used the computer for games like Nintendo or Sega over a 1-week time period. No definition of "computer" was provided to respondents, thus it is possible that some parents may have included other noncomputer game devices (e.g., handheld or TV game systems) when responding to the item.

Table 14. Percent of public school first-graders who used a home computer in the past summer on a weekly basis for various purposes, by selected child and family characteristics: Fall 1999

Selected child and family characteristics	Computer-use purpose		
	To play games	For educational purposes	Any summer home computer use
All first-graders	51	54	72
Child's sex			
Male	63	53	77
Female	39	55	68
Child's race/ethnicity			
White, non-Hispanic	49	60	75
Black, non-Hispanic	58	53	72
Hispanic	51	38	64
Asian/Pacific Islander	52	54	72
Other, non-Hispanic	56	46	73
Family socioeconomic status (SES) level			
Low SES (bottom 20%)	50	32	60
Middle SES (middle 60%)	54	57	75
High SES (top 20%)	44	72	80
Family poverty status*			
Below poverty level	51	36	62
At or above poverty level	52	60	76

*Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Fall 1999.

What opportunities do children with and without home computer resources have to use computers in their classrooms?

Little research has been done on the relationship between computer resources and use at home versus computer resources and use at school. Much has been written about access to and use of computers at school (Cattagni and Farris 2001; Becker 2000; Smerdon et al. 2000) and at home (Subrahmanyam et al. 2000), but there is very little information about whether students who use computers at home are more likely to use them at school or vice versa. Findings in the earlier sections of this report indicated that children's access to home access to computers and the Internet varied by race/ethnicity and SES. In contrast, children's access to most school computer resources did not differ

by these characteristics, with the exception of student access to the Internet. It is important to examine whether children's home computer access and use are related to the access they have to computers in their classrooms. No differences were detected in the percentages of public school kindergartners and first-graders using computers in the classroom on a weekly basis for different instructional purposes, in terms of their access to home computer resources (tables 15 and B-15).

Table 15. Percent of public school kindergartners that used computers in their classrooms on a weekly basis for various instructional purposes, by level of home computer and Internet access: Spring 1999

	Child has access to and uses a home computer		Child has access to and uses the Internet at home	
Instructional purpose	Yes	No	Yes	No
To read, write, and spell	64	64	65	64
To learn math	61	61	60	61
To learn social studies	17	17	17	17
To learn science concepts	21	20	21	20
To learn keyboard skills	38	39	35	39
To create art or compose music	37	34	37	35
For fun (games)	61	60	62	61
For Internet/local area network (LAN) access	4	4	5	4

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Do children who use computers more often at home also use them more often in their classrooms?

In the ECLS-K, parents and teachers provided information on the frequency with which kindergartners used computers in their homes and classrooms. Correlations were calculated between the frequency of young children's home computer use and the frequency with which computers were used in their classrooms for different instructional purposes (tables B-16 and B-17). There were virtually no correlations between the frequency of home and classroom computer use in either kindergarten or first grade.

Summary

The majority of young children in public schools were in classrooms where computers were used for instructional purposes on a weekly basis. The most frequent classroom uses for computers were to learn reading, writing, and spelling; to learn math; and for fun. Classroom Internet use for young children was not prevalent; 4 percent of public school kindergartners and 9 percent of public school first-graders accessed the Internet on a weekly basis in their classes. Young children's use of computers in the classroom for different instructional purposes tended to vary by kindergarten program type (part day vs. full day), teacher's attendance at computer/technology workshops during the school year, presence of a computer area in the classroom, and the proportion of time classes spent in teacher-directed, whole-class instruction.

For the 49 percent of public school kindergartners and the 60 percent of public school first-graders who had access to and used home computers, computer use at home averaged about 3 to 4 days a week. Over 85 percent of young children in these grades with home computer access used them for educational purposes. The frequency that children used home computers generally did not differ by child or family characteristics, but the purposes for which they used computers at home varied by children's sex, race/ethnicity, and SES. In the summer prior to first grade, few public school children used computers in structured summer programs. However, almost three-quarters of children used home computers in the summer on a weekly basis to play games, or for educational purposes. The percentage of public school children using computers for different purposes in the summer also varied by children's sex, race/ethnicity, and socioeconomic status.

Young children's classroom computer use in public schools did not differ based on whether children had home access to computers or the Internet. In addition, there were no significant relationships between the frequency of home computer use and the frequency of classroom computer use for different instructional purposes.

IV. Conclusion

Although almost all young children had access to computers, either at home or in their classrooms and schools, differences in the amount of access varied according to children's school type, race/ethnicity, and family SES. Public school kindergartners tended to have greater access to school and classroom computer resources, whereas private school kindergartners had greater access to home computer resources. Young children's access to most computer resources in public schools did not differ greatly by child and family characteristics; however, in kindergarten some minority children, those from lower SES families, and those without home computer resources were less likely to attend schools that provided student access to the Internet. In terms of classroom computer resources, kindergartners and first-graders from the lowest SES group were less likely to have a computer area in their classroom than children in the highest SES group. In first grade, public school Hispanic children were less likely to have access to computers in their classrooms than White children, and Hispanic first-graders were less likely to have teachers who had attended a computer/technology workshop than White and Black children—findings that did not occur in kindergarten. In terms of home computer resources, public school children's access varied by race/ethnicity and family SES, with minority and disadvantaged children being less likely to have home access to computer resources in kindergarten and first grade. Public school children's access to computer resources at school and home tended to increase as they moved from kindergarten to first grade.

Over half of young children in public schools attended classrooms where computers were used to learn reading, writing, spelling; math; and for fun on a weekly basis. Classroom Internet use for young children in public schools was not prevalent; 4 percent of kindergartners and 9 percent of first-graders accessed the Internet on a weekly basis. Young children's use of computers in the classroom for different instructional purposes tended to vary by kindergarten program type (part day vs. full day), teachers' attendance at computer/technology workshops during the school year, presence of a computer area in the classroom, and the proportion of time classes spent in teacher-directed, whole-class instruction.

The frequency of home computer use for public school young children with access to home computers did not differ by child and family characteristics; however, the percent of children using home computers for different purposes (i.e., Internet access, educational programs, art/drawing programs) varied by the children's sex, race/ethnicity, and SES. On average, public school young children with access to home computers used them about 3 to 4 days a week during the school year. In addition, almost three-quarters of all children used home computers in the summer on a weekly basis to play games or for educational purposes.

This report provides a detailed description of young children's access and use of computers at their schools and homes. However, as mentioned in the Introduction section of this report, there are limitations of the ECLS-K data collected on children's access to and use of computers. Information on young children's access to school computer resources and on the use of classroom computers for various purposes provides indicators of the presence and use of computers in the sampled children's environment, but the data do not indicate whether a particular child actually had access to or used such resources. In addition, the ECLS-K collects data from multiple sources on computer access and use but the survey instruments do not capture specific information on the quality of young children's computer use or the specific software children are using at school and in their homes. There may also be response bias concerns due to social desirability, in that some respondents may indicate that young children use computers more often than they actually do if the respondents believe that frequent computer use is a desirable behavior.

The ECLS-K is designed to provide a wealth of information on children's cognitive, socioemotional, and physical development from kindergarten through fifth grade across multiple contexts, including the home, classroom, school, and community. Since this report shows differences in computer access and use between public and private school children, additional analyses could explore child and family characteristic differences within private school settings. Based on the findings from this report, future research could also examine the relationships between children's access to and use of computers in different settings with their development and achievement over time. Also, information

on computer resources and use could be further explored at the school and classroom level to identify differences based on characteristics of the schools that young children attend. For example, children's access to school computer resources could be examined in terms of school size, grade range, federal program participation, urbanicity, and region.

V. Methodology and Technical Notes

Survey Methodology

The Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), is being conducted by Westat for the U.S. Department of Education, National Center for Education Statistics (NCES). It is designed to provide detailed information on children's early school experiences. The study began in the fall of the 1998–99 school year. The children participating in the ECLS-K are being followed longitudinally from kindergarten through the fifth grade. Estimates in this report are based on data collected from and about children who attended kindergarten in the 1998–99 school year and those who attended first grade in the 1999–2000 school year.

Sample Design

A nationally representative sample of 22,782 children enrolled in 1,277 kindergarten programs during the 1998–99 school year was selected to participate in the ECLS-K. The children attended both public and private kindergartens that offered full-day and part-day programs. The sample includes children from different racial/ethnic and socioeconomic backgrounds, and includes oversamples of Asian/Pacific Islander children, private kindergartens, and private kindergartners.

Sampling for the ECLS-K involved a dual-frame, multistage sampling design. The first stage of sampling involved the selection of 100 primary sampling units (PSU) from a national sample of PSUs. The PSUs were counties and county groups. Public and private schools were then selected within the PSUs, and children were sampled from the selected schools. Public schools were selected from the Common Core of Data (NCES), a public school frame, and private schools were selected from a private school frame developed from the Private School Survey (another NCES survey).[20] Approximately 23 kindergartners were selected in each of the sampled schools. In the spring of first grade, the sample was freshened to reflect children who did not attend kindergarten during the 1998–99 school year. While all students still enrolled in their

[20]During the spring of 1998, Westat identified new schools that were not found on either frame. A sample of these schools was included in the ECLS-K school sample.

base-year schools were recontacted, a 50 percent subsample of base-year students who had transferred from their kindergarten school was followed. For information on freshening procedures and subsampling of transfer children (i.e., movers), refer to the *ECLS-K First-grade Public-Use Data Files User's Manual.* Fall kindergarten data were obtained from September to December 1998 and spring kindergarten data were obtained from March to June 1999. Fall first-grade data were obtained from September to November 1999 and spring first-grade data were obtained from March to July 2000.

Response Rates

A total of 944 of the 1,277 originally sampled schools participated during the base year of the study. This translates into a weighted response rate of 74 percent for the base year of the study. The school response rate during the spring of the base year (74.2 percent) was higher than during the fall (69.4 percent), due to some of the schools that originally declined to participate deciding to participate in the spring. Nearly all (99.4 percent) of the schools that participated in the fall of the base year also participated in the spring. The Base Year and First-grade Year public-use data files contain spring teacher data for 90 percent and 86 percent of the sampled children, respectively.[21] The Base Year and First-grade Year public-use files contain school administrator data for 85 percent and 82 percent of the sampled children, respectively.[22]

The child base-year survey completion rate was 92 percent (i.e., 92 percent of the children were assessed at least once during kindergarten). The parent base-year completion rate was 89 percent (i.e., a parent interview was completed at least once during kindergarten). Thus, the overall base-year response rate for children was 68.1 percent (74 percent x 92 percent) and the base-year response rate for the parent interview was 65.9 percent (74 percent x 89 percent). About 95 percent of the children and 94 percent of the parents who participated in the fall of kindergarten also participated in the spring. About 88 percent of the children and 85 percent of the parents who were eligible for the spring first-grade collection participated.

[21]Based on variable A2TQUEX from the ECLS-K Base Year Public-Use Electronic Codebook and variable A4TQUEX from the ECLS-K First-grade Public-Use Electronic Codebook.
[22]Based on variable S2INSAQ from the ECLS-K Base Year Public-Use Electronic Codebook and variable S4INSAQ from the ECLS-K First-grade Public-Use Electronic Codebook.

A nonresponse bias analysis was conducted to determine if substantial bias was introduced as a result of the base year school nonresponse. For information on the nonresponse bias analysis, refer to the *ECLS-K Base Year Public-Use Data Files User's Manual* and the *ECLS-K First-grade Public-Use Data Files User's Manual*. Findings from this analysis suggest that there is not a bias due to nonresponse.

Data Reliability

Estimates produced using data from the ECLS–K are subject to two types of error, sampling and nonsampling errors. Nonsampling errors are errors made in the collection and processing of data. Sampling errors occur because the data are collected from a sample rather than a census of the population. A detailed discussion of these types of errors can be found in *America's Kindergartners* (West et al. 2000).

Standard Errors and Weights

In order to produce national estimates from the ECLS-K data collected during the kindergarten and first-grade year, the sample data were weighted. Weighting the data adjusts for unequal selection probabilities at the school and child levels and adjusts for school, child, teacher, and parent nonresponse.[23] The cross sectional parent weights for spring of 1999, fall of 1999, and spring of 2000 (C2PW0, C3PW0, and C4PW0, respectively) were used to produce the estimates found in this report. These weights sum to the population of all children who attended kindergarten in the spring of 1999 and first-grade in the fall of 1999 and spring of 2000.

In addition to properly weighting the responses, special procedures for estimating the statistical significance of the estimates were employed, because the data were collected using a complex sample design. Complex sample designs, like that used in the ECLS-K, result in data that violate the assumptions that are normally required to assess the statistical significance of the results. Frequently, the standard errors of the estimates are

[23]The approach used to develop weights for the ECLS-K is described in the *ECLS-K Base Year Public-use Data Files User's Manual (*NCES 2001-029*)* and the *ECLS-K First-grade Public-use Data Files User's Manual (*NCES 2002-134*)*.

larger than would be expected, if the sample was a simple random sample and the observations were independent and identically distributed random variables.

Replication methods of variance estimation were used to reflect the actual sample design used in the ECLS-K. A form of the jackknife replication method (JK2) using 90 replicates was used to compute approximately unbiased estimates of the standard errors of the estimates in the report, using WesVarPC. The jackknife methods were used to estimate the precision of the estimates of the reported national percentages and means.

Statistical Procedures

Comparisons made in the text were tested for statistical significance to ensure that the differences are larger than might be expected due to sampling variation. When comparing estimates between categorical groups (e.g., sex, race/ethnicity), *t* statistics were calculated. The formula used to compute the *t* statistic was:

$t = Est_1 - Est_2 / (SQRT[(se_1)^2 + (se_2)^2])$

Where Est_1 and Est_2 are the estimates being compared and se_1 and se_2 are their corresponding standard errors. For example, information from Tables 4 and 4a are used to compare children's home access to computers by children's race/ethnicity. The formula used to compute the *t* statistic for the comparison of White and Hispanic kindergartners' access to home computers would be:

$t = \text{White estimate} - \text{Hispanic estimate} / (SQRT[(\text{White se})^2 + (\text{Hispanic se})^2])$
$t = 62 - 30 / SQRT[(1.0)^2 + (1.1)^2]$
$t = 21.53$

To guard against errors of inference based on multiple comparisons, the Bonferroni procedure was used to correct significance tests for multiple contrasts. The Bonferroni procedure divides the alpha level for a single *t* test (e.g., .05) by the number of critical pairwise comparisons, in order to provide a new alpha that adjusts for the number of comparisons being made. In the above example comparing White and Hispanic

kindergartners' access to home computers, the critical *t*-value for the comparison would be 2.81, based on 10 comparisons of all racial/ethnic groups.

When comparisons with ordinal independent variables were made (i.e., family SES) with dichotomous dependent variables (e.g., home computer available for child's use), logistic regression analyses were used in addition to t-test comparisons to detect significant relationships.

Derived Variables

A number of variables used in this report were derived by combining information from one or more questions in the ECLS-K study instruments. The derivation of key variables is described in this section. Unless otherwise noted, steps for deriving variables were identical for kindergarten and first-grade data. Variable names from the ECLS-K database are included in the descriptions using the kindergarten names and are indicated by all capital letters.

Student access to local area networks (LANs), CD-ROMs, and wide area networks (WANs)/Internet. School administrators answered a series of questions regarding whether they had LAN access, CD-ROM drives, and WAN/Internet access in their schools. To calculate whether a child's school had a certain resource available for its students, values were recoded to match the skip pattern on the School Administrator Questionnaire (SAQ). First, the school administrator indicated whether a given resource was present in his or her school, such as LAN access (e.g., variable S2LANSCH from the kindergarten SAQ question #28). If the resource was present, the respondent next indicated whether the given resource was available for student use (e.g., S2LANSTU). If the resource was not available at the school, the respondent skipped to the next computer resource. In such cases, responses to the second item on availability for student use were recoded from 'Not applicable' to 'No' based on the skip pattern. If a respondent did not answer the question on whether a given resource was available in his or her school, the second item on student availability was recoded to a system missing value. This procedure was used for all three school computer resources measured in kindergarten and first grade.

Percent of classrooms in a child's school with LAN, CD-ROM, and WAN/Internet access for student use. This derived variable is a follow-up to the previous derived variable *Student access to local area networks (LANs), CD-ROMs, and wide area networks (WANs)/Internet.* The third part of SAQ question #28 asked respondents to identify the number of classrooms in their schools that had a given resource, such as LAN access (e.g., S2LANRMS). If school administrators had indicated in the first part of question #28 (e.g., S2LANSCH) that they did not have a given resource, the value for the third question on the number of instructional rooms that had the resource was recoded from 'Not applicable' to 'zero'. Then the percent of classrooms in a child's school with a given resource available for student use was calculated by dividing the number of classrooms in the school with the given resource by the total number of instructional rooms in the school (e.g., S2LANRMS/S2RMNUM).

School child/computer ratio. The ratio of children to school computers was calculated by dividing the total school enrollment by the total number of computers in the school (i.e., S2ANUMCH / S2TOTCM).

Presence of a computer lab in the school. This derived variable was based on data collected on the adequacy of school computer labs (e.g., S2COMPOK). For this report, schools were identified as having a school computer lab if their response to S2COMPOK was greater than 1 (Do not have a computer lab).

Use of computer equipment in kindergarten and first grade. This derived variable was based on data collected on the adequacy of computer equipment in kindergarten and first grade (e.g., A2COMPEQ). For this report, teachers were identified as using computer equipment in kindergarten or first grade if their response to A2COMPEQ was greater than 1 (I do not use at this grade level).

Frequency of home computer use. This derived variable was created by combining information from parent items on whether the child had a home computer that they used and if so, the frequency that they used the home computer on a weekly basis. The parent interview used a four-point scale to collect information on children's weekly computer use (e.g., P2COMPWK). The four point scale was recoded into a new variable as follows: 'never' was recoded to equal '0'; 'once or twice a week' was recoded to equal

'1.5'; '3 to six times a week' was recoded to '4.5'; and 'daily' was recoded to '7'. If the child did not have a home computer that they used (e.g., P2HOMECM = 'no'), the new variable received a value of '0' for the frequency of home computer use.

Emphasis on teacher-directed, whole class instruction. Teachers were asked to indicate the amount of time the class spent in teacher-directed whole-class, small group, and individual instruction and in child-selected activities in a typical day using a five-point scale for each grouping practice (e.g., A2WHLCLS, A2SMLGRP, A2INDVDL, A2CHCLDS). For this report, teachers' responses to the five categories for each practice were recoded into new grouping variables as follows: 'no time' was recoded to '0'; 'half hour or less' was recoded to '0.25'; 'about one hour' was recoded to '1'; 'about two hours' was recoded to '2'; and 'three or more hours' was recoded to '3'. The proportion of time spent in teacher-directed, whole-class instruction was then calculated by dividing the amount of time spent on whole class instruction by the sum total of the time reported spent across the four types of grouping practices. Using the sum of the time across the four teaching practices does not take into account the fact that teachers may use more than one grouping practice simultaneously, and thus may not always provide times that are mutually exclusive when reporting. However, the average total amount of time reported by teachers was consistent with the amount of daily instructional time reported by teachers in another part of the survey.

***Children's race/ethnicity*.** The race/ethnicity composite (RACE) was constructed from two parent-reported variables: ethnicity and race. Following new Office of Management and Budget guidelines, a respondent could select more than one race. Thus, each respondent had to identify whether the child was Hispanic, and then select one or more races. The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian/Pacific Islander and other (which includes American Indians, Alaska Natives, and multiracial children). When race/ethnicity differences are presented in this report, White refers to White, non-Hispanic and Black refers to Black, non-Hispanic.

Family socioeconomic status (SES). The family SES variables used in this report are composite variables (e.g., WKSESQ5) from the ECLS-K-Base Year and First Grade Public-Use Data Files. For this report, the middle three SES quintiles were collapsed, so

that comparisons could be made among children from low-SES, middle-SES, and high-SES households. The WKSESQ5 composite was derived from the following variables: mother/female guardian's education level, father/male guardian's education level, mother/female guardian's occupation, father/male guardian's occupation, and household income. The mean income for kindergartners from the lowest SES group was $14,289, and their parents' mean education level was less than a high school education. For the middle SES group, the mean income was $45,514 and the parents' mean education level was attendance in a vocational/technical program beyond a high school diploma, but no college degree. In the highest SES group, the mean income was $50,107, mothers' mean education level was a bachelor's degree, and father's mean education level was some graduate level coursework beyond a bachelor's degree, but no graduate degree. For more information on the composite, please see Chapter 7 of the NCES User's Manual for the ECLS-K Base Year Public-Use Data file and Electronic Codebook (NCES 2001–029, revised).

Child's disability status. The composites variables for children's disability status (e.g., P1DISABL) were based on seven parent interview questions in the Child Health section of the fall kindergarten and spring first-grade interviews related to whether the child had been diagnosed with a disability. The composite is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision, or has participated in therapy or programs for children with disabilities. For more information on the composite, please see Chapter 7 of the NCES User's Manual for the ECLS-K Base Year Public-Use Data file and Electronic Codebook (NCES 2001–029, revised).

Class size. This variable was derived from multiple responses to the teacher questionnaire, in efforts to reduce missing data. Class size was based on teacher's responses to the total enrollment item following the enrollment counts for students of different racial/ethnic backgrounds (e.g., A1TOTRA). If this information was missing, total enrollment following the enrollment counts for students of different ages was used (A1TOTAG). A third measure, the sum of boys and girls in the class (e.g., A1BOYS + A1GIRLS), was used to supplement any remaining missing data.

School low-income level. This derived variable comes from variables on the school administrator questionnaire. It was only calculated for public schools. The ECLS-K Electronic Code Book (ECB) includes two composite variables for the percent of children in the school who are eligible for free lunch (i.e., S2KFLNCH) and the percent who are eligible for reduced lunch (i.e., S2KRLNCH), based on school administrator information on the total school enrollment and the number of children eligible for free or reduced lunch. The values for the two composite variables were added together, with topcoding used if the sum was greater than 100 percent. However, these items on the school administrator questionnaire had a high level of item non-response (these data were missing for approximately 38 percent of public schools).

Schools qualify for schoolwide Title I funding when 50 percent or more of the students are eligible for free or reduced-priced lunch. Thus, for schools where the free and reduced-priced lunch information was missing, participation in a "schoolwide" Title I program (i.e., S2TT1 and S2TT1SW) was used as an indicator of whether the free or reduced-priced lunch eligibility was below or above 50 percent.

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Appendix A

Standard Error Tables for Main Text

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Selected school, classroom, and child characteristics	All kindergartners	Public school kindergartners	Private school kindergartners
School control			
Public	0.6	†	†
Private	0.6	†	†
School low-income level[1]			
Less than 50% low-income students	2.0	2.0	†
50% or more low-income students	2.0	2.0	†
Class size			
Less than 18 children	1.4	1.6	3.5
18 to 24	1.7	1.8	3.4
25 or more	1.6	1.8	3.1
Child's sex			
Male	0.4	0.4	0.9
Female	0.4	0.4	0.9
Child's race/ethnicity			
White, non-Hispanic	1.5	1.6	2.1
Black, non-Hispanic	0.8	0.9	1.6
Hispanic	1.0	1.2	1.2
Asian/Pacific Islander	0.3	0.3	0.5
Other, non-Hispanic	0.9	0.9	1.1
Child's disability status[2]			
Not disabled	0.4	0.4	0.9
Disabled	0.4	0.4	0.9

† Not applicable.
[1]School low-income level is only available for public schools and is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
NOTE: Detail may not sum to totals due to nonresponse and rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table A-2. Standard errors of the percent of first-grade children by school control and by selected school, classroom, and child characteristics: Spring 2000

Selected school, classroom, and child characteristics	All first-graders	Public school first-graders	Private school first-graders
School control			
Public	0.6	†	†
Private	0.6	†	†
School low-income level[1]			
Less than 50% low-income students	2.0	2.0	†
50% or more low-income students	2.0	2.0	†
Class size			
Less than 18 children	1.3	1.4	2.7
18 to 24	1.3	1.4	3.5
25 or more	1.2	1.3	3.0
Child's sex			
Male	0.5	0.5	1.2
Female	0.5	0.5	1.2
Child's race/ethnicity			
White, non-Hispanic	1.4	1.6	2.2
Black, non-Hispanic	0.9	1.0	1.6
Hispanic	1.1	1.2	1.4
Asian/Pacific Islander	0.3	0.4	0.6
Other, non-Hispanic	0.8	0.9	0.4
Child's disability status[2]			
Not disabled	0.5	0.6	0.9
Disabled	0.5	0.5	0.9

† Not applicable.
[1]School low-income level is only available for public schools and is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
NOTE: Detail may not sum to totals due to nonresponse and rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table A-3. Standard errors of the percent of kindergartners who had access to various computer resources in their schools, classrooms, and homes, by school control: Spring 1999

Computer resources	All kindergartners	Public school kindergartners	Private school kindergartners
Access to computer at school or home	0.3	0.3	0.8
School has at least one computer	0.2	0.0	1.3
School computer resources for student use			
Computer lab in school	1.8	2.0	3.6
Local area networks (LAN)	2.1	2.2	4.1
CD-ROM drives	1.2	1.3	3.2
Wide area networks (WAN, Internet)	1.7	1.9	4.3
Teacher/classroom resources			
Computers used in kindergarten	0.5	0.5	2.7
Computer area in classroom	0.9	1.1	2.8
Teacher attended computer/technology workshop in past year	1.5	1.6	3.5
Home computer resources			
Child has access to and uses a home computer	0.8	0.9	1.4
Child has access to and uses the Internet at home	0.2	0.3	0.5

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table A-4. Standard errors of the percent of public school kindergartners who had access to and used computers and the Internet in their homes, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Child has access to and uses a home computer	Child has access to and uses the Internet at home
All kindergartners	0.9	0.3
Child's sex		
Male	1.0	0.4
Female	0.9	0.3
Child's race/ethnicity		
White, non-Hispanic	1.0	0.4
Black, non-Hispanic	1.0	0.3
Hispanic	1.1	0.4
Asian/Pacific Islander	3.6	0.8
Other, non-Hispanic	4.9	1.1
Family socioeconomic status (SES) level		
Low SES (bottom 20%)	0.7	0.2
Middle SES (middle 60%)	0.8	0.3
High SES (top 20%)	1.0	0.7
Family poverty status[1]		
Below poverty level	0.8	0.2
At or above poverty level	0.9	0.3
Child's disability status[2]		
Not disabled	1.0	0.3
Disabled	1.5	0.5

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table A-5. Standard errors of the percent of public school kindergarten and first-grade children who had access to various computer resources in their schools, classrooms, and homes: Spring 1999 and spring 2000

Computer resources	Spring 1999 public school kindergartners	Spring 2000 public school first-graders
School computer resources for student use		
Computer lab in school	2.0	1.5
Local area networks (LAN)	2.2	2.0
CD-ROM drives	1.3	0.9
Wide area networks (WAN, Internet)	1.9	1.9
Teacher/classroom resources		
Computers used in kindergarten	0.5	0.4
Computer area in classroom	1.1	0.7
Teacher attended computer/technology workshop in past year	1.6	1.5
Home computer resources		
Child has access to and uses a home computer	0.9	1.0
Child has access to and uses the Internet at home	0.3	—

— Data were not collected.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999 and Spring 2000.

Table A-6. Standard errors of the percent of public school first-graders who had access to and used a home computer, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Child has access to and uses a home computer
All first-graders	1.0
Child's sex	
Male	1.1
Female	1.2
Child's race/ethnicity	
White, non-Hispanic	1.0
Black, non-Hispanic	1.6
Hispanic	1.6
Asian/Pacific Islander	4.0
Other, non-Hispanic	6.9
Family socioeconomic status (SES) level	
Low SES (bottom 20%)	1.3
Middle SES (middle 60%)	0.9
High SES (top 20%)	0.7
Family poverty status[1]	
Below poverty level	1.2
At or above poverty level	0.9
Child's disability status[2]	
Not disabled	1.0
Disabled	2.3

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table A-7. Standard errors of the percent of public school kindergartners who used home computers for various purposes, overall and for those children with access to a home computer: Spring 1999

Computer-use purpose	All kindergartners	Kindergartners who have access to and use a home computer
Mean number of days a week child uses computer in home	0.03	0.03
Types of home computer use		
Access the Internet	0.3	0.5
Play with educational programs	0.8	0.5
Play with art or drawing programs	0.8	0.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table A-8. Standard errors of the percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999

Selected teacher and classroom characteristics	Instructional purpose			
	To read, write, and spell	To learn math	To learn social studies	To learn science concepts
Teacher attended computer/technology workshop in past year				
Yes	1.9	1.9	1.5	1.7
No	2.5	2.2	1.4	1.8
Computer area in classroom				
Yes	1.6	1.6	1.5	1.4
No	4.0	3.8	2.2	3.3
Type of certificate				
Elementary	1.8	1.7	1.3	1.5
Early childhood	1.8	1.8	1.6	1.9
Neither	5.6	6.1	5.8	5.8
Teacher-directed, whole-class instruction				
Half the day or less	1.6	1.6	1.3	1.5
More than half the day	3.0	2.9	1.6	1.8
Class size				
Less than 18 children	3.3	3.0	2.4	3.0
18 to 24	2.1	2.2	1.7	1.9
25 or more	3.8	3.9	2.4	2.6
Kindergarten program type				
Part day	2.5	2.4	1.3	1.7
Full day	2.1	2.0	1.5	1.7

Table A-8. Standard errors of the percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999—Continued

Selected teacher and classroom characteristics	Instructional purpose			
	To learn keyboard skills	To create art or compose music	For fun (games)	To access the Internet/local area networks
Teacher attended computer/technology workshop in past year				
Yes	1.9	2.3	2.0	0.6
No	2.2	2.3	2.4	0.7
Computer area in classroom				
Yes	1.9	1.9	1.7	0.6
No	3.4	2.3	3.5	1.3
Type of certificate				
Elementary	1.6	2.1	1.7	0.6
Early childhood	2.2	2.3	1.7	0.6
Neither	5.4	6.2	7.4	1.7
Teacher-directed, whole-class instruction				
Half the day or less	1.8	2.0	1.6	0.7
More than half the day	2.5	2.6	3.1	0.7
Class size				
Less than 18 children	3.2	4.0	3.4	1.6
18 to 24	2.2	2.3	2.1	0.6
25 or more	2.5	3.2	3.5	1.2
Kindergarten program type				
Part day	2.6	2.2	2.3	0.7
Full day	1.8	2.5	2.2	0.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table A-9. Standard errors: Among public school kindergartners with access to and who used a home computer, mean number of days per week they used home computers, and percent that used home computers for various purposes, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Mean number of days/week use computer	Access the Internet	Play with educational programs	Play with art or drawing programs
All kindergartners	0.03	0.5	0.5	0.7
Child's sex				
Male	0.04	0.7	0.6	0.8
Female	0.04	0.5	0.6	0.9
Child's race/ethnicity				
White, non-Hispanic	0.03	0.6	0.5	0.7
Black, non-Hispanic	0.10	1.0	1.3	1.7
Hispanic	0.08	1.2	1.4	1.9
Asian/Pacific Islander	0.12	1.4	2.6	2.2
Other, non-Hispanic	0.14	2.1	2.3	2.5
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	0.12	1.2	2.0	2.2
Middle SES (middle 60%)	0.04	0.5	0.6	0.7
High SES (top 20%)	0.05	0.9	0.7	1.1
Family poverty status[1]				
Below poverty level	0.11	1.2	1.6	1.8
At or above poverty level	0.03	0.5	0.5	0.7
Child's disability status[2]				
Not disabled	0.03	0.5	1.3	0.7
Disabled	0.08	1.0	0.5	1.5

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table A-10. Standard errors of the percent of public school kindergarten and first-grade children that used computers on a weekly basis in their classrooms for various instructional purposes: Spring 1999 and spring 2000

Instructional purpose	Spring 1999 public school kindergartners	Spring 2000 public school first-graders
To read, write, and spell	1.6	1.2
To learn math	1.6	1.3
To learn social studies	1.1	0.9
To learn science concepts	1.3	0.9
To learn keyboard skills	1.6	1.2
To create art or compose music	1.9	1.3
For fun (games)	1.6	1.4
For Internet/local area network (LAN) access	0.5	0.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999 and Spring 2000.

Table A-11. Standard errors among public school first-graders with access to and who used a home computer, mean number of days per week that they used computers in their homes, and the percent who used them for educational purposes, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Mean number of days/week use computer	Percent using a home computer for educational purposes
All first-graders	0.03	0.5
Child's sex		
Male	0.04	0.6
Female	0.04	0.7
Child's race/ethnicity		
White, non-Hispanic	0.03	0.6
Black, non-Hispanic	0.10	1.4
Hispanic	0.09	1.9
Asian/Pacific Islander	0.14	2.5
Other, non-Hispanic	0.15	3.2
Family socioeconomic status (SES) level		
Low SES (bottom 20%)	0.12	2.2
Middle SES (middle 60%)	0.04	0.6
High SES (top 20%)	0.05	0.7
Family poverty status[1]		
Below poverty level	0.10	1.9
At or above poverty level	0.03	0.5
Child's disability status[2]		
Not disabled	0.03	0.6
Disabled	0.07	1.3

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table A-12. Standard errors of the percent of public school children who attended summer school or summer camp programs in the summer prior to first grade and who used computers in the summer programs: Fall 1999

Summer program	Attended summer program	Used computers in summer program
Summer school	1.2	4.5
Summer camp	1.5	3.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Fall 1999.

Table A-13. Standard errors of the percentage distribution of the frequency that public school first-graders used computers in their homes for different purposes in the summer prior to first grade: Fall 1999

	Frequency of home computer use			
Summer home computer use	Never	One to two times a week	Three to six times a week	Daily
To play games (e.g., Nintendo, Sega)	1.2	0.8	0.7	0.9
For educational purposes	1.2	0.8	0.8	0.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Fall 1999.

Table A-14. Standard errors of the percent of first-graders who used a home computer in the past summer on a weekly basis for various purposes, by selected child and family characteristics: Fall 1999

Selected child and family characteristics	Computer-use purpose		
	To play games	For educational purposes	Any summer home computer use
All first-graders	1.2	1.2	1.4
Child's sex			
Male	1.7	1.4	1.5
Female	1.5	1.5	1.7
Child's race/ethnicity			
White, non-Hispanic	1.6	1.7	1.7
Black, non-Hispanic	2.1	2.4	2.2
Hispanic	1.9	2.8	2.5
Asian/Pacific Islander	4.3	6.6	7.2
Other, non-Hispanic	7.6	6.4	3.3
Family socioeconomic status (SES) level			
Low SES (bottom 20%)	2.3	2.1	2.8
Middle SES (middle 60%)	1.2	1.4	1.4
High SES (top 20%)	2.3	1.6	1.3
Family poverty status*			
Below poverty level	1.9	1.5	2.0
At or above poverty level	1.3	1.3	1.3

* Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Fall 1999.

Table A-15. Standard errors of the percent of public school kindergartners that used computers in their classrooms on a weekly basis for various instructional purposes, by level of home computer and Internet access: Spring 1999

Instructional purpose	Child has access to and uses a home computer		Child has access to and uses the Internet at home	
	Yes	No	Yes	No
To read, write, and spell	1.8	1.8	2.6	1.7
To learn math	1.8	1.6	2.5	1.6
To learn social studies	1.2	1.2	1.9	1.1
To learn science concepts	1.5	1.4	2.2	1.3
To learn keyboard skills	1.9	1.6	2.3	1.6
To create art or compose music	2.0	2.0	2.7	1.9
For fun (games)	1.7	1.9	2.6	1.6
For Internet/local area network (LAN) access	0.6	0.5	0.5	1.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table A-16. Standard errors for Figure 4: Percentage distribution of the frequency that public school kindergartners used computers in their classrooms for different instructional purposes: Spring 1999

Instructional purpose for classroom computer use	Frequency of classroom computer use		
	Never	Less than weekly	Weekly
To read, write, and spell	1.2	1.1	1.7
To learn math	1.2	1.2	1.6
To learn social studies	1.9	1.1	1.2
To learn science concepts	1.9	1.1	1.4
To learn keyboard skills	1.6	1.1	1.6
To create art or compose music	2.0	1.0	1.9
For fun (games)	1.3	1.1	1.6
For Internet/local area network (LAN) access	1.3	1.1	0.5

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

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Table B-1. Percent of schools with kindergartens that had various computer resources available to students, overall and by school control: Spring 1999

Computer resources	All schools with kindergartens	Public schools with kindergartens	Private schools with kindergartens
Computer lab in school	73	78	63
Local area networks (LAN)	53	67	28
CD-ROM drives	85	91	74
Wide area networks (WAN, Internet)	62	74	41

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-1a. Standard errors of the percent of schools with kindergartens that had various computer resources available to students, overall and by school control: Spring 1999

Computer resources	All schools with kindergartens	Public schools with kindergartens	Private schools with kindergartens
Computer lab in school	2.1	2.2	4.0
Local area networks (LAN)	1.9	2.3	3.2
CD-ROM drives	1.6	1.5	3.8
Wide area networks (WAN, Internet)	2.0	2.7	3.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-2. Percent of kindergarten teachers with various computer resources in their classrooms, overall and by school control: Spring 1999

Computer resources	All kindergarten teachers	Public school kindergarten teachers	Private school kindergarten teachers
Access to and use of computers in kindergarten	92	96	76
Computer area in classroom	83	87	68
Teacher attended computer/technology workshop in past year	57	62	37

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-2a. Standard errors of the percent of kindergarten teachers with various computer resources in their classrooms, overall and by school control: Spring 1999

Computer resources	All kindergarten teachers	Public school kindergarten teachers	Private school kindergarten teachers
Access to and use of computers in kindergarten	0.7	0.6	3.2
Computer area in classroom	1.0	1.2	2.8
Teacher attended computer/technology workshop in past year	1.6	1.7	3.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-3. Percent of first-graders who had access to various computer resources in their schools and classrooms, by school control: Spring 2000

Computer resources	All first-graders	Public school first-graders	Private school first-graders
School computer resources for student use			
Computer lab in school	83	82	90
Local area networks (LAN)	74	77	56
CD-ROM drives	96	96	98
Wide area networks (WAN, Internet)	85	87	76
Teacher/classroom resources			
Computers used in first grade	97	98	92
Computer area in classroom	90	92	77
Teacher attended computer/technology workshop in past year	60	62	47

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-3a. Standard errors of the percent of first-graders who had access to various computer resources in their schools and classrooms, by school control: Spring 2000

Computer resources	All first-graders	Public school first-graders	Private school first-graders
School computer resources for student use			
Computer lab in school	1.4	1.5	2.6
Local area networks (LAN)	1.8	2.0	4.4
CD-ROM drives	0.8	0.9	1.0
Wide area networks (WAN, Internet)	1.8	1.9	3.5
Teacher/classroom resources			
Computers used in first grade	0.4	0.4	2.2
Computer area in classroom	0.7	0.7	2.6
Teacher attended computer/technology workshop in past year	1.5	1.5	3.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-4. Average child-per-computer ratio in public schools with kindergartens and average percent of instructional rooms in kindergartners' schools with different computer resources, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Average child/computer ratio	Average percent of classrooms in children's schools with		
		Local area network (LAN) access	CD-ROM access	Wide area network (WAN)/Internet access
All kindergartners	8.9	51.5	71.2	51.0
Child's sex				
Male	8.8	52.0	70.9	51.1
Female	9.0	51.0	71.5	50.8
Child's race/ethnicity				
White, non-Hispanic	8.7	52.9	72.6	55.2
Black, non-Hispanic	8.6	47.6	68.8	43.6
Hispanic	10.1	46.3	67.0	40.7
Asian/Pacific Islander	8.3	62.2	76.3	57.8
Other, non-Hispanic	7.4	61.1	73.8	59.9
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	9.4	49.2	69.3	45.9
Middle SES (middle 60%)	8.8	50.8	71.6	51.3
High SES (top 20%)	8.5	56.7	72.2	55.9
Family poverty status[1]				
Below poverty level	9.2	49.4	70.1	45.9
At or above poverty level	8.8	52.1	71.6	52.6
Child's disability status[2]				
Not disabled	8.9	51.7	71.0	51.3
Disabled	8.5	51.5	71.2	53.1

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-4a. Standard errors of the average child-per-computer ratio in public schools with kindergartens and average percent of instructional rooms in kindergartners' schools with different computer resources, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Average child/computer ratio	Average percent of classrooms in children's schools with		
		Local area network (LAN) access	CD-ROM access	Wide area network (WAN)/Internet access
All kindergartners	0.45	2.30	1.97	2.45
Child's sex				
Male	0.46	2.35	1.98	2.57
Female	0.44	2.32	2.04	2.39
Child's race/ethnicity				
White, non-Hispanic	0.49	2.72	2.33	2.73
Black, non-Hispanic	0.72	3.58	3.88	4.83
Hispanic	0.56	3.32	2.83	3.31
Asian/Pacific Islander	0.31	4.20	3.22	4.45
Other, non-Hispanic	0.96	5.03	4.02	5.59
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	0.55	2.69	2.61	2.78
Middle SES (middle 60%)	0.49	2.49	2.09	2.71
High SES (top 20%)	0.43	2.98	2.41	3.03
Family poverty status[1]				
Below poverty level	0.56	2.66	2.59	2.86
At or above poverty level	0.47	2.47	2.05	2.57
Child's disability status[2]				
Not disabled	0.46	2.39	2.63	2.59
Disabled	0.45	3.10	1.97	3.43

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-5. Percentage distribution of public school kindergartners' family socioeconomic status (SES) level, by child's race/ethnicity: Academic year 1998–99

Family socioeconomic status (SES) level	Child's race/ethnicity				
	White, non-Hispanic	Black, non-Hispanic	Hispanic	Asian/Pacific Islander	Other, non-Hispanic
Low SES (bottom 20%)	11	36	45	20	23
Middle SES (middle 60%)	66	58	50	57	64
High SES (top 20%)	23	6	5	23	13

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Academic Year 1998–99.

Table B-5a. Standard errors of the percentage distribution of public school kindergartners' family socioeconomic status (SES) level, by child's race/ethnicity: Academic year 1998–99

Family socioeconomic status (SES) level	Child's race/ethnicity				
	White, non-Hispanic	Black, non-Hispanic	Hispanic	Asian/Pacific Islander	Other, non-Hispanic
Low SES (bottom 20%)	1.0	2.1	1.5	2.2	2.7
Middle SES (middle 60%)	1.0	2.1	1.5	2.4	1.9
High SES (top 20%)	1.0	0.6	0.5	2.0	1.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Academic Year 1998–99.

Table B-6. Percent of public school kindergartners who had access to various computer resources in their schools, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Student access to			
	School computer lab	Local area network (LAN)	CD-ROM drives	Wide area network (WAN)/Internet
All kindergartners	80	67	92	75
Child's sex				
Male	80	67	92	74
Female	79	67	92	75
Child's race/ethnicity				
White, non-Hispanic	79	70	94	79
Black, non-Hispanic	81	61	86	64
Hispanic	78	61	91	66
Asian/Pacific Islander	81	69	92	78
Other, non-Hispanic	86	70	92	77
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	79	65	89	69
Middle SES (middle 60%)	80	67	92	75
High SES (top 20%)	79	71	94	80
Family poverty status[1]				
Below poverty level	80	64	89	68
At or above poverty level	79	68	93	77
Child's disability status[2]				
Not disabled	79	67	92	76
Disabled	80	68	92	76

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-6a. Standard errors of the percent of public school kindergartners who had access to various computer resources in their schools, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Student access to			
	School computer lab	Local area network (LAN)	CD-ROM drives	Wide area network (WAN)/Internet
All kindergartners	2.0	2.2	1.3	1.9
Child's sex				
Male	2.0	2.2	1.3	1.8
Female	2.1	2.2	1.3	2.1
Child's race/ethnicity				
White, non-Hispanic	2.2	2.3	1.3	2.3
Black, non-Hispanic	2.9	4.9	4.2	3.4
Hispanic	4.1	3.6	2.3	3.4
Asian/Pacific Islander	3.7	4.2	2.3	3.9
Other, non-Hispanic	1.9	4.2	2.0	3.9
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	2.8	3.0	2.2	2.7
Middle SES (middle 60%)	2.0	2.3	1.3	2.1
High SES (top 20%)	3.0	2.7	1.5	2.2
Family poverty status[1]				
Below poverty level	2.5	3.0	2.3	2.5
At or above poverty level	2.1	2.2	1.2	2.0
Child's disability status[2]				
Not disabled	2.1	2.2	1.3	2.0
Disabled	2.0	2.5	1.4	2.8

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-7. Percent of public school kindergartners with various classroom-level computer resources, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Classroom-level computer resources		
	Access to and use of computers in kindergarten	Computer area in classroom	Teacher attended computer/technology workshop
All kindergartners	96	86	62
Child's sex			
Male	96	86	62
Female	96	87	62
Child's race/ethnicity			
White, non-Hispanic	98	88	64
Black, non-Hispanic	93	85	62
Hispanic	94	83	58
Asian/Pacific Islander	97	85	59
Other, non-Hispanic	97	86	65
Family socioeconomic status (SES) level			
Low SES (bottom 20%)	94	83	60
Middle SES (middle 60%)	97	87	64
High SES (top 20%)	98	90	61
Family poverty status[1]			
Below poverty level	94	85	61
At or above poverty level	97	87	63
Child's disability status[2]			
Not disabled	96	87	63
Disabled	97	88	63

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-7a. Standard errors of the percent of public school kindergartners with various classroom-level computer resources, by selected child and family characteristics: Spring 1999

Selected child and family characteristics	Classroom-level computer resources		
	Access to and use of computers in kindergarten	Computer area in classroom	Teacher attended computer/technology workshop
All kindergartners	0.5	1.1	1.6
Child's sex			
Male	0.6	1.2	1.6
Female	0.5	1.1	1.6
Child's race/ethnicity			
White, non-Hispanic	0.5	1.3	1.9
Black, non-Hispanic	1.4	2.8	2.6
Hispanic	1.1	1.9	2.4
Asian/Pacific Islander	1.5	2.5	2.9
Other, non-Hispanic	1.3	2.7	3
Family socioeconomic status (SES) level			
Low SES (bottom 20%)	1.0	1.7	2.0
Middle SES (middle 60%)	0.6	1.1	1.7
High SES (top 20%)	0.5	1.4	2.3
Family poverty status[1]			
Below poverty level	0.9	1.6	1.8
At or above poverty level	0.5	1.1	1.7
Child's disability status[2]			
Not disabled	0.6	1.1	1.6
Disabled	0.6	1.5	2.3

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-8. Percent of public school kindergartners who had access to various computer resources in their schools and classrooms, by home level of access to computers and the Internet: Spring 1999

Computer resources	Child has access to and uses a home computer		Child has access to and uses the Internet at home	
	Yes	No	Yes	No
School computer resources for student use				
Computer lab in school	80	79	79	80
Local area networks (LAN)	69	65	71	67
CD-ROM drives	93	91	93	92
Wide area networks (WAN, Internet)	78	71	81	74
Teacher/classroom resources				
Access to and use of computers in kindergarten	97	95	98	96
Computer area in classroom	88	85	87	86
Teacher attended computer/technology workshop in past year	63	62	63	62

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-8a. Standard errors of the percent of public school kindergartners who had access to various computer resources in their schools and classrooms, by home level of access to computers and the Internet: Spring 1999

Computer resources	Child has access to and uses a home computer		Child has access to and uses the Internet at home	
	Yes	No	Yes	No
School computer resources for student use				
Computer lab in school	2.1	2.3	2.5	2.0
Local area networks (LAN)	2.1	2.5	2.5	2.2
CD-ROM drives	1.2	1.6	1.5	1.3
Wide area networks (WAN, Internet)	2.0	2.1	2.5	1.9
Teacher/classroom resources				
Access to and use of computers in kindergarten	0.5	0.7	0.7	0.6
Computer area in classroom	1.2	1.2	1.6	1.1
Teacher attended computer/technology workshop in past year	1.8	1.6	2.3	1.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-9. Percent of public school first-graders who had access to various computer resources in their schools, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Student access to			
	School computer lab	Local area networks (LAN)	CD-ROM drives	Wide area networks (WAN)/Internet
All first-graders	82	77	98	87
Child's sex				
Male	83	77	98	87
Female	81	76	98	87
Child's race/ethnicity				
White, non-Hispanic	82	78	98	88
Black, non-Hispanic	82	70	96	80
Hispanic	79	79	98	87
Asian/Pacific Islander	82	74	99	89
Other, non-Hispanic	86	78	99	84
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	80	75	97	83
Middle SES (middle 60%)	82	77	98	87
High SES (top 20%)	84	77	99	91
Family poverty status[1]				
Below poverty level	81	75	97	83
At or above poverty level	82	77	98	88
Child's disability status[2]				
Not disabled	82	77	98	87
Disabled	82	75	98	88

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-9a. Standard errors of the percent of public school first-graders who had access to various computer resources in their schools, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Student access to			
	School computer lab	Local area networks (LAN)	CD-ROM drives	Wide area networks (WAN)/Internet
All first-graders	1.5	2.0	0.6	1.9
Child's sex				
Male	1.6	2.0	0.5	1.9
Female	1.6	2.1	0.7	2.0
Child's race/ethnicity				
White, non-Hispanic	2.1	2.0	0.8	2.1
Black, non-Hispanic	2.4	3.6	1.4	4.5
Hispanic	2.6	3.2	0.7	2.3
Asian/Pacific Islander	3.4	5.4	0.3	3.5
Other, non-Hispanic	2.4	3.8	0.4	3.7
Family socioeconomic status (SES) level				
Low SES (bottom 20%)	2.0	2.8	1.0	2.9
Middle SES (middle 60%)	1.6	2.1	0.6	2.0
High SES (top 20%)	2.5	2.6	0.7	1.6
Family poverty status[1]				
Below poverty level	2.0	2.7	1.0	2.9
At or above poverty level	1.6	2.0	0.6	1.8
Child's disability status[2]				
Not disabled	1.6	2.0	0.6	2.0
Disabled	1.8	2.5	0.7	2.0

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-10. Percent of public school first-graders who had access to various computer resources in their schools and classrooms, by level of access to a home computer: Spring 2000

Computer resources	Child has access to and uses a home computer	
	Yes	No
School computer resources for student use		
Computer lab in school	83	81
Local area networks (LAN)	76	77
CD-ROM drives	98	97
Wide area networks (WAN, Internet)	88	85
Teacher/classroom resources		
Access to and use of computers in first grade	99	96
Computer area in classroom	93	90
Teacher attended computer/technology workshop in past year	62	62

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-10a. Standard errors of the percent of public school first-graders who had access to various computer resources in their schools and classrooms, by level of access to a home computer: Spring 2000

Computer resources	Child has access to and uses a home computer	
	Yes	No
School computer resources for student use		
Computer lab in school	1.8	1.7
Local area networks (LAN)	2.0	2.2
CD-ROM drives	0.5	0.9
Wide area networks (WAN, Internet)	1.9	2.3
Teacher/classroom resources		
Access to and use of computers in first grade	0.2	0.6
Computer area in classroom	0.8	1.1
Teacher attended computer/technology workshop in past year	1.6	1.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-11. Percent of public school first-graders with various classroom-level computer resources, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Classroom-level computer resources		
	Access to and use of computers in first grade	Computer area in the classroom	Teacher attended computer/technology workshop
All first-graders	98	92	62
Child's sex			
Male	98	92	61
Female	98	92	63
Child's race/ethnicity			
White, non-Hispanic	99	94	64
Black, non-Hispanic	97	91	64
Hispanic	94	87	54
Asian/Pacific Islander	97	92	56
Other, non-Hispanic	99	93	63
Family socioeconomic status (SES) level			
Low SES (bottom 20%)	95	88	60
Middle SES (middle 60%)	98	92	63
High SES (top 20%)	99	94	62
Family poverty status[1]			
Below poverty level	96	90	61
At or above poverty level	98	92	62
Child's disability status[2]			
Not disabled	98	92	62
Disabled	98	92	62

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-11a. Standard errors of the percent of public school first-graders with various classroom-level computer resources, by selected child and family characteristics: Spring 2000

Selected child and family characteristics	Classroom-level computer resources		
	Access to and use of computers in first grade	Computer area in the classroom	Teacher attended computer/technology workshop
All first-graders	0.4	0.7	1.5
Child's sex			
Male	0.4	0.8	1.5
Female	0.4	0.8	1.7
Child's race/ethnicity			
White, non-Hispanic	0.3	0.8	2.0
Black, non-Hispanic	1.0	1.9	1.8
Hispanic	1.1	2.0	2.2
Asian/Pacific Islander	1.4	1.8	3.5
Other, non-Hispanic	0.5	2.2	3.4
Family socioeconomic status (SES) level			
Low SES (bottom 20%)	1.0	1.5	1.8
Middle SES (middle 60%)	0.3	0.7	1.7
High SES (top 20%)	0.2	1.2	2.3
Family poverty status[1]			
Below poverty level	0.7	1.3	1.8
At or above poverty level	0.3	0.8	1.6
Child's disability status[2]			
Not disabled	0.4	0.7	1.5
Disabled	0.5	1.0	2.2

[1]Poverty is a function of household size and household income. Based on 1998 Census information, where a household of four with a total income below $16,655 was considered to be below poverty level.
[2]Children's disability status is derived from parent information on whether the child has been diagnosed by a professional as having problems with attention, activity level, coordination, speech, hearing, or vision or has participated in therapy or programs for children with disabilities.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-12. Percentage distribution of kindergartners whose teachers held teaching certificates in various areas, by level of certification and years of kindergarten teaching experience: Spring 1999

Teacher characteristics	Area of certification		
	Early childhood certificate	Elementary education certificate	Neither certificate
Level of certification			
Less than regular	7	9	32
Regular	93	91	68
Years of kindergarten teaching experience			
Less than 3	21	26	39
3 to 9	38	36	30
10 to 19	28	26	19
20 or more	14	13	11

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-12a. Standard errors of the percentage distribution of kindergartners whose teachers held teaching certificates in various areas, by level of certification and years of kindergarten teaching experience: Spring 1999

Teacher characteristics	Area of certification		
	Early childhood certificate	Elementary education certificate	Neither certificate
Level of certification			
Less than regular	0.9	0.8	6.7
Regular	0.9	0.8	6.7
Years of kindergarten teaching experience			
Less than 3	1.6	1.2	6.4
3 to 9	1.6	1.3	6.4
10 to 19	1.6	1.1	6.4
20 or more	1.4	1.0	4.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-13. Percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999

Selected teacher and classroom characteristics	Instructional purpose			
	To read, write, and spell	To learn math	To learn social studies	To learn science concepts
Years of kindergarten teaching experience				
Less than 3	60	57	16	19
3 to 9	65	63	15	21
10 to 19	69	64	20	23
20 or more	63	61	17	18
Percent minority enrollment in class				
0-24	63	61	15	19
25-49	68	66	22	26
50-74	71	66	16	24
75 or more	64	57	18	19
School low-income level*				
Less than 50% low-income students	63	60	18	22
50% or more low-income students	67	62	17	19

Table B-13. Percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999—Continued

Selected teacher and classroom characteristics	Instructional purpose			
	To learn keyboard skills	To create art or compose music	For fun (games)	To access the Internet/local area networks
Years of kindergarten teaching experience				
Less than 3	42	36	59	3
3 to 9	38	37	62	5
10 to 19	40	35	62	4
20 or more	36	33	61	4
Percent minority enrollment in class				
0-24	35	35	63	4
25-49	46	46	66	6
50-74	44	39	61	2
75 or more	40	36	56	4
School low-income level*				
Less than 50% low-income students	36	36	61	3
50% or more low-income students	42	34	60	4

*School low-income level is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-13a. Standard errors of the percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999

Selected teacher and classroom characteristics	Instructional purpose			
	To read, write, and spell	To learn math	To learn social studies	To learn science concepts
Years of kindergarten teaching experience				
Less than 3	2.3	2.1	1.3	1.7
3 to 9	2.4	2.4	1.9	2.1
10 to 19	2.4	2.7	2.0	2.2
20 or more	4.4	4.0	2.9	3.4
Percent minority enrollment in class				
0-24	3.0	3.0	1.7	2.1
25-49	2.6	2.7	3.0	3.4
50-74	3.8	3.8	2.9	3.5
75 or more	3.2	2.7	2.3	2.4
School low-income level*				
Less than 50% low-income students	2.7	2.6	1.6	2.0
50% or more low-income students	2.2	2.1	1.8	2.0

Table B-13a. Standard errors of the percent of public school kindergartners in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 1999—Continued

Selected teacher and classroom characteristics	Instructional purpose			
	To learn keyboard skills	To create art or compose music	For fun (games)	To access the Internet/local area networks
Years of kindergarten teaching experience				
Less than 3	2.5	2.6	2.3	0.8
3 to 9	2.1	2.8	2.9	1.1
10 to 19	2.8	2.9	2.4	0.8
20 or more	4.4	4.0	4.0	1.2
Percent minority enrollment in class				
0-24	2.7	2.7	2.6	0.7
25-49	3.8	3.3	2.8	1.8
50-74	3.1	4.0	4.6	1.0
75 or more	3.0	3.2	2.7	1.0
School low-income level*				
Less than 50% low-income students	2.2	2.4	2.3	0.7
50% or more low-income students	2.5	2.7	2.3	0.9

*School low-income level is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-14. Percent of public school first-graders in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 2000

Selected teacher and classroom characteristics	Instructional purpose			
	To read, write, and spell	To learn math	To learn social studies	To learn science concepts
All first-graders	65	56	13	14
Teacher attended computer/technology workshop in past year				
Yes	70	60	15	17
No	57	50	11	11
Computer area in classroom				
Yes	68	59	14	15
No	35	30	5	6
Years of first-grade teaching experience				
Less than 3	62	55	13	14
3 to 9	67	58	13	14
10 to 19	67	55	14	16
20 or more	67	58	15	15
Type of certificate				
Elementary	65	56	13	14
Early childhood	68	59	18	19
Neither	56	53	19	17
Teacher-directed, whole-class instruction				
Half the day or less	67	58	15	15
More than half the day	63	52	10	12
Percent minority enrollment in class				
0-24	63	53	11	13
25-49	72	62	11	14
50-74	68	57	14	14
75 or more	63	58	18	18
Class size				
Less than 18 children	65	60	14	16
18 to 24	66	56	13	14
25 or more	64	53	15	16
School low-income level*				
Less than 50% low-income students	63	55	13	13
50% or more low-income students	67	57	13	14

Table B-14. Percent of public school first-graders in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 2000—Continued

Selected teacher and classroom characteristics	Instructional purpose			
	To learn keyboard skills	To create art or compose music	For fun (games)	To access the Internet/local area networks
All first-graders	37	26	52	9
Teacher attended computer/technology workshop in past year				
Yes	40	28	55	11
No	32	23	46	5
Computer area in classroom				
Yes	38	27	55	9
No	26	10	20	2
Years of first-grade teaching experience				
Less than 3	35	26	49	9
3 to 9	38	28	54	9
10 to 19	36	24	51	8
20 or more	38	23	52	6
Type of certificate				
Elementary	36	26	52	9
Early childhood	40	27	56	12
Neither	36	37	46	5
Teacher-directed, whole-class instruction				
Half the day or less	39	29	53	10
More than half the day	33	20	50	6
Percent minority enrollment in class				
0-24	34	23	53	8
25-49	40	29	57	10
50-74	37	27	49	9
75 or more	40	30	46	7
Class size				
Less than 18 children	37	29	59	9
18 to 24	37	25	51	8
25 or more	39	25	43	9
School low-income level*				
Less than 50% low-income students	36	26	53	9
50% or more low-income students	38	25	50	8

*School low-income level is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-14a. Standard errors of the percent of public school first-graders in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 2000

Selected teacher and classroom characteristics	Instructional purpose			
	To read, write, and spell	To learn math	To learn social studies	To learn science concepts
All first-graders	1.2	1.3	0.9	0.9
Teacher attended computer/technology workshop in past year				
Yes	1.4	1.8	1.3	1.2
No	2.0	2.1	1.0	1.1
Computer area in classroom				
Yes	1.2	1.4	0.9	1.0
No	5.0	4.8	1.7	1.8
Years of first-grade teaching experience				
Less than 3	2.4	2.4	1.4	1.6
3 to 9	1.8	1.9	1.2	1.2
10 to 19	2.5	3.2	1.8	2.1
20 or more	2.7	3.2	2.4	2.4
Type of certificate				
Elementary	1.3	1.4	0.9	0.9
Early childhood	2.1	2.7	1.7	1.8
Neither	6.7	6.9	4.7	4.7
Teacher-directed, whole-class instruction				
Half the day or less	1.7	1.7	1.1	1.2
More than half the day	2.0	2.3	1.3	1.4
Percent minority enrollment in class				
0-24	2.0	2.1	1.1	1.2
25-49	2.4	2.7	1.7	1.8
50-74	3.3	4.1	2.4	2.4
75 or more	2.9	2.7	2.5	2.2
Class size				
Less than 18 children	2.8	3.2	2.0	2.3
18 to 24	1.3	1.5	1.0	1.0
25 or more	3.8	3.9	2.6	2.8
School low-income level*				
Less than 50% low-income students	1.9	1.7	1.1	1.2
50% or more low-income students	2.3	2.3	1.6	1.6

Table B-14a. Standard errors of the percent of public school first-graders in classrooms that used computers on a weekly basis for various instructional purposes, by selected teacher and classroom characteristics: Spring 2000–Continued

Selected teacher and classroom characteristics	Instructional purpose			
	To learn keyboard skills	To create art or compose music	For fun (games)	To access the Internet/local area networks
All first-graders	1.2	1.3	1.4	0.7
Teacher attended computer/technology workshop in past year				
Yes	1.5	1.8	1.7	1.1
No	2.3	1.3	2.1	0.8
Computer area in classroom				
Yes	1.3	1.3	1.5	0.8
No	3.8	2.7	3.7	0.9
Years of first-grade teaching experience				
Less than 3	2.0	2.3	2.2	1.1
3 to 9	1.8	1.7	1.8	1.1
10 to 19	2.8	2.4	2.4	1.3
20 or more	3.2	3.0	3.8	1.7
Type of certificate				
Elementary	1.3	1.4	1.5	1.8
Early childhood	1.9	1.9	2.3	1.6
Neither	6.1	6.3	7.2	2.1
Teacher-directed, whole-class instruction				
Half the day or less	1.6	1.5	1.6	1.0
More than half the day	2.2	2.0	2.6	1.0
Percent minority enrollment in class				
0-24	2.0	1.6	2.1	1.0
25-49	2.4	2.2	2.9	1.9
50-74	3.7	3.5	3.1	2.1
75 or more	2.4	2.7	3.3	1.2
Class size				
Less than 18 children	3.4	2.8	2.9	1.7
18 to 24	1.3	1.4	1.7	0.9
25 or more	3.2	3.1	3.7	1.9
School low-income level*				
Less than 50% low-income students	1.8	1.5	2.0	1.1
50% or more low-income students	2.0	2.1	2.3	1.3

* School low-income level is defined by the percent of free or reduced lunch-eligible enrollment or by receipt of schoolwide Title I assistance (if free/reduced lunch-eligible data were missing).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-15. Percent of public school first-graders that used computers in their classrooms on a weekly basis for various instructional purposes, by level of access to a home computer: Spring 2000

Instructional purpose	Child has access to and uses a home computer	
	Yes	No
To read, write, and spell	64	67
To learn math	55	58
To learn social studies	13	14
To learn science concepts	14	15
To learn keyboard skills	36	39
To create art or compose music	27	25
For fun (games)	52	51
For Internet/local area network (LAN) access	9	8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-15a. Standard errors of the percent of public school first-graders that used computers in their classrooms on a weekly basis for various instructional purposes, by level of access to a home computer: Spring 2000

Instructional purpose	Child has access to and uses a home computer	
	Yes	No
To read, write, and spell	1.4	1.4
To learn math	1.3	1.8
To learn social studies	0.8	1.4
To learn science concepts	0.9	1.4
To learn keyboard skills	1.3	1.6
To create art or compose music	1.4	1.6
For fun (games)	1.5	2.0
For Internet/local area network (LAN) access	0.8	0.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.

Table B-16. Correlations between the frequency of public school kindergartners' home and classroom computer use, by classroom instructional purpose: Spring 1999

Classroom instructional purpose	Correlation with home computer use	Significance
To read, write, and spell	.023	.1139
To learn math	.024	.1091
To learn social studies	.019	.1184
To learn science concepts	.022	.0713
To learn keyboard skills	-.008	.5417
To create art or compose music	.047	.0036
For fun (games)	.022	.1346
For Internet/local area network (LAN) access	.025	.0395

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 1999.

Table B-17. Correlations between the frequency of public school first-graders' home and classroom computer use, by classroom instructional purpose: Spring 2000

Classroom instructional purpose	Correlation with home computer use	Significance
To read, write, and spell	.007	.6229
To learn math	.017	.2037
To learn social studies	.020	.2923
To learn science concepts	.030	.0956
To learn keyboard skills	.002	.8902
To create art or compose music	.048	.0022
For fun (games)	.042	.0190
For Internet/local area network (LAN) access	.059	.0000

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Spring 2000.