Institute of Education Sciences

Fast Response Survey System

Teachers' Use of Technology for School and Homework Assignments: 2018–19

First Look

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Teachers' Use of Technology for School and Homework Assignments: 2018–19

First Look

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Introduction

This report is based on the 2018–19 survey "Teachers' Use of Technology for School and Homework Assignments." This survey was conducted in response to a request from Congress about the educational impact of students' access outside the classroom to digital learning resources, such as computers and the Internet. The survey responds to the congressional request by collecting data such as the location and types of devices and technologies that students use for educational purposes, the impact that students' access to technology outside of school has on teachers' homework assignments, and ways that schools and teachers address challenges that students with limited access to technology face in completing homework assignments. It focuses on information that can best be provided by teachers from their perspective and direct interaction with students. The survey provides nationally representative data of public school teachers who taught at least one regularly scheduled class in grades 3–12 and taught either self-contained classes or departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science.[1] Teachers were asked to respond about the students they were teaching during the 2018–19 school year. Computers were defined to include desktop and laptop computers, as well as tablets with a virtual or physical keyboard. Smartphones were not included in the definition of computers, but separate information was collected for smartphones.

The report presents information about various ways that teachers' students can access school computers and the Internet outside of class time. It also presents data on methods teachers use to find out about their students' access to computers and the Internet at home and how knowledgeable they consider themselves about this access. Teachers' estimates of the extent to which their students access computers and/or the Internet in various locations outside of school to work on school assignments are reported. The report includes information on the access and availability of computers, smartphones, and the Internet to students at home. Data are presented on the extent that teachers' homework assignments are influenced by their students' access to technology and the Internet outside of school. The report includes information on ways that teachers provide assistance to their students who have limited access to technology and the Internet outside of school. It also provides information on the extent to which students have difficulty completing technology-based homework and how prepared students are to use the technology required for online or computerized assessments given by the state, district, or school.

The National Center for Education Statistics (NCES), in the Institute of Education Sciences, conducted this survey during the 2018–19 school year using the Fast Response Survey System (FRSS). FRSS is a survey system designed to collect small amounts of issue-oriented data from a nationally representative sample of districts, schools, or teachers with minimal burden on respondents and within a relatively short period of time. The survey included a sample of 2,000 public schools in the 50 states and the District of Columbia for which sampling lists of eligible teachers were sought. Questionnaires were mailed to about 4,320 teachers selected from the sampling lists. Teachers were offered options of completing the survey on paper or online.

The base-weighted list collection response rate was 86 percent. The base-weighted teacher response rate was 75 percent. This results in an overall response rate of 64 percent.[2] The survey weights were adjusted for list collection and questionnaire nonresponse, and the data were then weighted to yield national estimates that represent all eligible teachers in regular public elementary and secondary schools in the United States. Tables of standard error estimates are provided in appendix A. The results of a nonresponse bias analysis conducted for the survey, along with additional details about the survey methodology, response rates, and data reliability,

[1] Self-contained classes were defined as teaching multiple subjects to the same class of students all or most of the day, and departmentalized classes were defined as teaching the same subject to multiple classes of students. Teachers who taught only special education, bilingual education, or English as a Second Language (ESL) were excluded.

[2] The weighted list collection response rate was calculated using the initial school base weight. The weighted teacher response rate was calculated using a teacher base weight that was the product of the (nonresponse-adjusted) school weight and the reciprocal of the probability of selecting the teacher within the school. The overall weighted response rate was calculated as the product of the weighted list collection and weighted teacher response rates.

are presented in appendix B. Appendix B also includes definitions of the analysis variables (i.e., school characteristics) used in the report. The questionnaire is located in appendix C.

Because the purpose of this report is to introduce new NCES data from the survey through tables containing descriptive information, only selected national findings are presented. These findings have been chosen to demonstrate the range of information available from the FRSS study rather than to discuss all of the data collected; they are not meant to emphasize any particular issue. Readers are cautioned not to make causal inferences about the data presented here. The findings are based on self-reported data from public school teachers. Many of the variables examined are related to one another, and complex interactions and relationships have not been explored. All results have been weighted to reflect the sample design and to account for nonresponse. Comparisons drawn in the selected findings have been tested for statistical significance at the .05 level using Student's *t* statistics to ensure that the differences are larger than those that might be expected due to sampling variation. No adjustments were made for multiple comparisons.

Selected Findings

This section presents selected findings based on public school teachers' survey responses on their use of technology for school and homework assignments in grades 3–12 during the 2018–19 school year.

- Twenty-six percent of teachers reported that their students have district- or school-provided computers for students to take home on a long-term basis during the school year (table 1). However, of these teachers, 40 percent reported that some of their students are not able to take these computers home.
- Thirty-six percent of teachers reported that the school has an additional academic period when their students can use school computers and the Internet for homework or assignments from other classes, and 8 percent reported that the district or school provides mobile hotspots for students to take home (table 1).
- Of the 74 percent of teachers whose students do not have district- or school-provided computers to take home, 81 percent reported that students can access school computers outside of class time, and 8 percent reported that students can borrow computers to take home on a short-term basis (table 1).
- Among the 74 percent of teachers whose students do not have a district- or school-provided computer to take home, 21 percent reported being very knowledgeable and 50 percent reported being somewhat knowledgeable about their students' access to computers at home (table 2). Among all teachers, 23 percent reported being very knowledgeable and 51 percent reported being somewhat knowledgeable about their students' access to the Internet at home.
- Teachers reported that they find out about their students' access to computers and the Internet at home in the following ways: do a survey of all students or parents (51 percent), talk to students or parents individually (84 percent), and develop a sense while working with students (90 percent; table 2).
- Teachers estimated that many of their students access computers or the Internet to work on school assignments in their own homes (60 percent large extent and 27 percent moderate extent), and in the homes of relatives, friends, or neighbors (11 percent large extent and 43 percent moderate extent; table 3). Teachers estimated that various public and commercial locations are used to a large or moderate extent by smaller percentages of their students (from 1 percent to 10 percent).
- Teachers estimated the percentage of their students who have access to a computer at home, including district- or school-provided computers for students who take them home. About two-thirds of teachers estimated that 75 percent or more of their students have access to a computer at home. This is composed of the 30 percent of teachers who estimated that almost all (95–100 percent) of their students have computer access at home, the 12 percent of teachers who estimated 90–94 percent of students, and the 22 percent of teachers who estimated 75–89 percent of students have computer access at home (table 4).
- While computers and Internet service might exist in students' households, computer availability for homework and the reliability of computer connections to the Internet can vary considerably. About a third (35 percent) of teachers estimated that their students' home computers were very available for school assignments (table 4). Twenty-nine percent of teachers thought it very likely that their students' home computers had reliable Internet access.
- Teachers estimated the percentage of their students with access to a smartphone at home. About one-third (34 percent) of teachers estimated that 95–100 percent of their students have access to a smartphone at home and three-quarters of teachers estimated that 80 percent or more of their students have access to a smartphone at home (table 5). Twelve percent of teachers thought smartphones were very useful and 32 percent thought they were somewhat useful for school assignments.
- About half of the teachers reported that their students' access to technology and the Internet outside of school has a moderate (28 percent) or large (20 percent) influence on the homework they assign to them (table 6).

- About a fifth (19 percent) of teachers reported that they often assign technology-based homework and an additional 28 percent reported doing so sometimes (table 6). The 77 percent of teachers who assign technology-based homework, at least rarely, were asked the extent that their students have difficulty completing this type of homework because they are not familiar with how to use technology. Most reported not at all (34 percent) or small extent (52 percent; table 7).
- Among the 98 percent of teachers whose students are given online or computerized assessments by the state, district, or school, 44 percent reported that their students were very prepared and 39 percent reported students to be somewhat prepared to use the technology required for these assessments (table 7).
- Teachers who assigned technology-based homework reported the extent to which they provided various types of assistance for doing technology-based homework to students who have limited access to technology and the Internet outside of school. About three-fourths reported that they do the following to a large or moderate extent: provide hardcopy homework assignments (53 percent large extent and 23 percent moderate extent) and/or give time in class to use school technology for homework (50 percent large extent and 26 percent moderate extent; table 8).

Table 1. Percent of public school teachers reporting on various types of access to computers and/or the Internet provided to their students by the district or school, by school characteristics: School year 2018–19

School characteristic	All teachers			Teachers whose students take home a district- or school-provided computer who have some students not able to take computer home[1]	Teachers whose students do not have a district- or school-provided computer to take home[2]	
	School has additional academic period when students can use computers and Internet for homework	District or school provides mobile hotspots students take home	Students take home a district- or school-provided computer on long-term basis		Students can borrow school computers to take home on short-term basis	Students can access school computers outside of class time (e.g., before or after school, at lunch, in special periods)
All teachers	**36**	**8**	**26**	**40**	**8**	**81**
Instructional level[3]						
Primary school	23	6	9	49	4	69
Middle school	43	9	30	48	7	87
High school	45	11	42	32	15	96
Other school	48	‡	20	48	9!	86
Enrollment size						
Less than 300	49	5!	23	59	13	83
300 to 499	29	6!	20	44	5	76
500 to 999	34	7	22	47	6	76
1,000 or more	40	12	36	28	12	93
Community type						
City	31	7	19	38	7	81
Suburban	34	11	31	33	9	79
Town	46	4!	29	54	7	85
Rural	44	7	26	49	9	83
Percent of students eligible for free or reduced-price lunch						
Less than 35 percent4	42	9	35	32	9	84
35 to 49 percent	41	6	29	45	11	81
50 to 74 percent	28	9	21	44	6	80
75 percent or more	32	7	14	54	6	78
Students take home school computers						
Yes	49	18	100	40	†	†
No	32	5	†	†	8	81

† Not applicable.

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

‡ Reporting standards not met. The coefficient of variation for this estimate is 50 percent or greater.

[1] Based on the 26 percent of teachers who reported that their students have a district- or school-provided computer that the student takes home on a long-term basis during the school year.

[2] Based on the 74 percent of teachers who reported that their students do not have a district- or school-provided computer that the student takes home on a long-term basis during the school year.

[3] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[4] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table 2. Percentage distribution of public school teachers reporting on their level of knowledge about their students' access to computers and the Internet at home, and percent of teachers reporting on the source(s) of that information, by school characteristics: School year 2018–19

School characteristic	Among teachers whose students do not take home school- or district-provided computers, teachers' knowledge of students' access to home computers[1]				All teachers' knowledge of students' access to Internet at home				Sources of information about students' access at home			
	Very knowledgeable	Somewhat knowledgeable	Slightly knowledgeable	Not knowledgeable	Very knowledgeable	Somewhat knowledgeable	Slightly knowledgeable	Not knowledgeable	Survey all students or parents	Talk to students or parents individually	Develop a sense while working with students	Other[2]
All teachers	**21**	**50**	**22**	**8**	**23**	**51**	**19**	**7**	**51**	**84**	**90**	**2**
Instructional level[3]												
Primary school	22	49	22	7	23	51	20	7	54	86	89	2
Middle school	23	52	19	6	25	51	18	6	54	85	89	2
High school	17	49	24	10	21	51	19	8	47	82	90	2
Other school	25	47	21	7!	24	53	19	4!	42	85	92	‡
Enrollment size												
Less than 300	17	53	21	9	18	55	19	8	42	80	91	‡
300 to 499	16	51	26	7	21	50	23	5	54	86	89	2!
500 to 999	25	48	19	8	25	50	18	7	52	86	91	2
1,000 or more	20	51	22	7	23	52	18	7	51	82	88	2
Community type												
City	21	50	22	8	23	51	18	8	51	87	88	2
Suburban	24	52	19	5	26	52	17	5	56	84	91	2
Town	15	44	28	12	18	47	26	9	42	84	88	1!
Rural	18	50	23	9	20	51	21	7	49	82	90	1!
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent[4]	25	50	19	7	26	51	17	7	49	82	91	2
35 to 49 percent	20	50	23	7	21	53	20	6	53	85	90	2
50 to 74 percent	17	47	26	10	20	48	25	7	49	86	88	1!
75 percent or more	21	53	19	6	24	54	15	7	56	86	89	1!
Students take home school computers												
Yes	†	†	†	†	25	53	16	5	52	82	89	2
No	21	50	22	8	22	50	20	7	51	85	90	2

† Not applicable.

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

‡ Reporting standards not met. The coefficient of variation for this estimate is 50 percent or greater.

[1] Based on the 74 percent of teachers who reported that the students they teach do not have a district- or school-provided computer that the student takes home.

[2] Examples of "other" responses include monitoring student use of online resources and receiving information from other school staff.

[3] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[4] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table 3. Percentage distribution of public school teachers reporting on the extent to which their students use various locations for computer and/or Internet access to work on school assignments, by school characteristics: School year 2018–19

School characteristic	Public library				Public locations other than public library[1]				Commercial locations			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**32**	**56**	**10**	**2**	**47**	**46**	**7**	**1**	**50**	**40**	**9**	**1**
Instructional level[2]												
Primary school	40	51	7	2	61	34	4	1!	68	29	3	‡
Middle school	27	59	13	2	44	48	8	1!	51	41	6	1!
High school	28	60	10	2	33	57	10	‡	28	51	19	2
Other school	33	53	12	‡	42	47	9!	‡	45	47	8!	‡
Enrollment size												
Less than 300	32	55	12	‡	52	42	7	#	64	30	6	#
300 to 499	39	50	9	2!	56	38	5	‡	63	32	4	‡
500 to 999	32	56	10	2	48	44	6	1	53	39	6	1
1,000 or more	28	61	9	1!	36	55	10	‡	31	50	18	2
Community type												
City	33	54	11	2	43	47	9	1!	48	40	11	1!
Suburban	30	59	9	2	46	47	6	1!	47	43	9	1!
Town	31	56	11	2!	47	44	8	‡	53	37	9	‡
Rural	35	55	7	2	53	41	5	‡	56	36	7	1!
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent[3]	30	61	7	1	44	50	6	‡	43	45	11	1!
35 to 49 percent	29	59	11	1!	46	47	6	‡	44	44	10	1!
50 to 74 percent	36	52	10	2	51	40	8	1!	54	37	8	2!
75 percent or more	33	53	12	3	45	45	8	1!	59	33	7	‡
Students take home school computers												
Yes	30	57	11	2	32	55	12	#!	31	51	17	2!
No	33	56	9	2	52	42	5	1	56	36	7	1

See notes at end of table.

Table 3. Percentage distribution of public school teachers reporting on the extent to which their students use various locations for computer and/or Internet access to work on school assignments, by school characteristics: School year 2018–19—Continued

School characteristic	Homes of relatives, friends, or neighbors				Student's own home			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**6**	**41**	**43**	**11**	**1**	**12**	**27**	**60**
Instructional level[2]								
Primary school	9	47	36	8	2	17	32	49
Middle school	4	41	43	12	1!	11	24	65
High school	3	34	50	13	1!	7	24	68
Other school	‡	41	41	14	‡	10	29	60
Enrollment size								
Less than 300	5!	41	40	14	1!	17	32	50
300 to 499	8	44	38	10	3	17	33	48
500 to 999	6	41	43	10	1	13	27	59
1,000 or more	3	39	46	13	‡	6	21	73
Community type								
City	5	36	46	13	1!	15	31	53
Suburban	6	45	41	9	1!	8	21	70
Town	7	42	42	9	3!	16	30	51
Rural	6	41	41	12	2	12	29	56
Percent of students eligible for free or reduced-price lunch								
Less than 35 percent[3]	7	47	37	9	1!	4	12	83
35 to 49 percent	6	38	44	12	1!	7	25	67
50 to 74 percent	5	39	45	11	2!	16	34	49
75 percent or more	4	36	47	13	1!	23	43	32
Students take home school computers								
Yes	3	40	44	14	1!	3	14	82
No	6	41	42	10	2	15	31	52

Rounds to zero.

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

‡ Reporting standards not met. The coefficient of variation for this estimate is 50 percent or greater.

[1] Examples of public locations other than public library include parks and community centers.

[2] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[3] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table 4. Percentage distribution of public school teachers reporting the estimated percentage of their students who have access to a computer at home, the availability of those computers for students to use for school assignments, and the likelihood that those computers have reliable Internet access from home, by school characteristics: School year 2018–19

School characteristic	Percentage of teacher's students with access to a computer at home					Availability of computers at home for school assignments[1]					Likelihood computers at home have reliable Internet access[1]				
	0 to 49 percent	50 to 74 percent	75 to 89 percent	90 to 94 percent	95 to 100 percent	Very available	Somewhat available	Slightly available	Not available	Don't know	Very likely	Somewhat likely	Slightly likely	Not likely	Don't know
All teachers	**13**	**22**	**22**	**12**	**30**	**35**	**47**	**10**	**#**	**8**	**29**	**45**	**15**	**3**	**7**
Instructional level[2]															
Primary school	17	26	24	11	22	22	53	15	1!	9	26	43	20	4	8
Middle school	12	21	22	13	32	37	48	9	‡	6	32	45	14	4	6
High school	9	19	20	13	39	48	40	6	‡	7	32	48	11	2	7
Other school	13	27	22	12	25	33	46	11	#	11	23	44	21	6!	6!
Enrollment size															
Less than 300	15	27	22	13	22	31	47	11	‡	10	19	46	18	6	10
300 to 499	19	27	22	9	23	24	51	15	‡	10	22	49	18	3	8
500 to 999	13	23	22	12	29	32	49	11	1!	7	28	44	18	3	7
1,000 or more	7	17	22	15	40	46	42	5	‡	6	40	44	9	2	6
Community type															
City	19	25	24	9	22	28	51	12	‡	8	26	46	17	4	7
Suburban	7	18	20	15	40	43	45	9	‡	4	39	44	11	1	4
Town	17	26	22	10	26	34	42	14	‡	10	22	46	19	4	9
Rural	13	24	23	13	27	30	48	9	1!	12	22	45	17	5	10
Percent of students eligible for free or reduced-price lunch															
Less than 35 percent[3]	2	10	19	19	50	52	39	4	‡	4	51	38	5	#!	5
35 to 49 percent	6	20	28	15	31	34	51	6	‡	8	26	52	13	1!	8
50 to 74 percent	19	31	22	7	21	25	50	14	‡	10	17	47	22	5	9
75 percent or more	29	33	22	6	10	19	53	18	1	9	14	47	24	8	8
Students take home school computers															
Yes	‡	3	10	13	74	75	21	2	#	2	36	51	9	1	4
No	17	29	27	12	15	21	56	13	1	9	27	43	18	4	8

Rounds to zero.

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

‡ Reporting standards not met. The coefficient of variation for this estimate is 50 percent or greater.

[1] Based on the 99.9 percent of teachers who reported that some of their students have access to a computer at home.

[2] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[3] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table 5. Percentage distribution of public school teachers reporting the estimated percentage of their students who have access to a smartphone at home, the usefulness of those smartphones for completing school assignments, availability of those smartphones for school assignments, and the likelihood that those smartphones have reliable Internet access from home, by school characteristics: School year 2018–19

School characteristic	Percentage of teacher's students with access to a smartphone at home					Usefulness of smartphones for school assignments[1]			
	0 to 49 percent	50 to 79 percent	80 to 89 percent	90 to 94 percent	95 to 100 percent	Very useful	Somewhat useful	Slightly useful	Not useful
All teachers	**6**	**20**	**18**	**23**	**34**	**12**	**32**	**35**	**20**
Instructional level[2]									
Primary school	10	26	18	19	26	5	25	39	32
Middle school	5	23	22	22	28	11	32	38	19
High school	1!	9	16	27	47	23	41	28	8
Other school	5!	26	19	20	30	14	34	41	11
Enrollment size									
Less than 300	7	22	23	22	26	10	25	41	23
300 to 499	8	27	20	21	24	7	25	39	28
500 to 999	7	24	17	22	31	9	31	37	23
1,000 or more	2!	9	17	25	47	21	41	28	10
Community type									
City	6	21	17	22	33	14	32	35	19
Suburban	5	17	18	21	38	13	32	34	20
Town	6	28	19	19	28	10	32	36	23
Rural	6	18	20	27	29	10	33	36	21
Percent of students eligible for free or reduced-price lunch									
Less than 35 percent[3]	3	13	16	24	44	13	34	34	19
35 to 49 percent	7	18	18	22	35	13	32	34	20
50 to 74 percent	7	23	23	22	26	11	30	37	22
75 percent or more	7	28	17	22	26	13	32	35	19
Students take home school computers									
Yes	3!	14	19	25	40	10	34	38	18
No	7	22	18	22	32	13	32	34	21

See notes at end of table.

Table 5. Percentage distribution of public school teachers reporting the estimated percentage of their students who have access to a smartphone at home, the usefulness of those smartphones for completing school assignments, availability of those smartphones for school assignments, and the likelihood that those smartphones have reliable Internet access from home, by school characteristics: School year 2018–19—Continued

School characteristic	Availability of smartphones for school assignments[1]					Likelihood smartphones have reliable Internet access from home[1]				
	Very available	Somewhat available	Slightly available	Not available	Don't know	Very likely	Somewhat likely	Slightly likely	Not likely	Don't know
All teachers	**31**	**38**	**19**	**2**	**10**	**35**	**41**	**14**	**3**	**8**
Instructional level[2]										
Primary school	9	39	31	4	17	29	40	17	3	11
Middle school	31	43	16	2	8	36	41	14	2	7
High school	54	33	7	1!	4	42	42	10	2	4
Other school	36	40	18	‡	5!	39	36	18	4!	‡
Enrollment size										
Less than 300	22	39	21	2!	15	24	40	17	6	13
300 to 499	18	38	27	4	13	26	45	17	3	9
500 to 999	23	40	22	2	12	34	40	15	3	8
1,000 or more	52	33	8	1!	5	47	38	9	1!	4
Community type										
City	32	38	20	1	9	35	41	16	3	5
Suburban	35	37	17	3	9	45	37	10	1	7
Town	25	36	24	2!	13	27	45	13	4	10
Rural	24	40	19	3	14	24	45	16	4	11
Percent of students eligible for free or reduced-price lunch										
Less than 35 percent[3]	36	38	13	3	10	52	34	6	‡	7
35 to 49 percent	31	40	18	1!	10	34	45	11	2	7
50 to 74 percent	27	36	24	2	11	27	43	19	4	8
75 percent or more	26	38	24	2!	10	22	44	21	5	8
Students take home school computers										
Yes	38	38	12	3	10	44	41	9	1!	5
No	28	38	21	2	11	32	41	15	3	8

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

‡ Reporting standards not met. The coefficient of variation for this estimate is 50 percent or greater.

[1] Based on the 99.6 percent of teachers who reported that some of their students have access to a smartphone at home.

[2] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[3] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table 6. Percentage distribution of public school teachers reporting on the amount of influence that their students' access to technology and the Internet outside of school has on the homework they assign, the frequency they assign any type of homework, and the frequency they assign technology-based homework, by school characteristics: School year 2018–19

School characteristic	Influence that students' access to technology and Internet outside of school has on homework teachers assign				Frequency that teachers assign any type of homework				Frequency that teachers assign technology-based homework			
	No influence	Small influence	Moderate influence	Large influence	Never	Rarely	Some-times	Often	Never	Rarely	Some-times	Often
All teachers	**16**	**35**	**28**	**20**	**3**	**17**	**27**	**53**	**23**	**31**	**28**	**19**
Instructional level[1]												
Primary school	24	37	22	16	3	13	20	64	37	32	21	11
Middle school	13	33	31	24	3	22	36	39	20	30	29	21
High school	10	35	33	22	2	18	30	50	9	30	35	25
Other school	15	38	25	22	‡	17	30	51	22	41	19	18
Enrollment size												
Less than 300	25	32	25	18	3!	21	28	48	29	35	20	16
300 to 499	21	36	27	17	3	16	25	56	32	33	23	13
500 to 999	17	36	27	20	3	16	28	53	25	30	30	16
1,000 or more	10	35	32	23	2!	19	28	52	11	31	31	28
Community type												
City	15	36	29	20	3	18	27	51	23	31	29	17
Suburban	14	35	29	22	2	15	25	58	17	29	30	23
Town	21	31	28	20	3	19	29	49	30	32	24	13
Rural	21	36	24	18	2	20	30	48	29	34	23	15
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent[2]	13	39	29	19	2	13	27	58	13	28	34	25
35 to 49 percent	16	36	28	20	3	18	30	49	21	32	29	19
50 to 74 percent	20	31	29	20	3	24	26	47	29	33	23	14
75 percent or more	18	34	26	22	4	14	26	55	31	32	23	13
Students take home school computers												
Yes	12	34	32	22	2!	17	28	53	7	26	34	33
No	18	36	27	19	3	17	27	53	28	33	25	13

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

‡ Reporting standards not met. The coefficient of variation for this estimate is 50 percent or greater.

[1] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[2] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table 7. Percentage distribution of public school teachers reporting on the extent to which their students have difficulty completing technology-based homework because the students are not familiar with how to use technology, and how prepared their students are to use the technology required for online or computerized assessments given by the state, district, or school, by school characteristics: School year 2018–19

School characteristic	Extent of difficulty students have with technology-based homework due to unfamiliarity with technology[1]				Level of student preparation to use technology for online or computerized assessments[2]			
	Not at all	Small extent	Moderate extent	Large extent	Very prepared	Somewhat prepared	Slightly prepared	Not prepared
All teachers	**34**	**52**	**11**	**2**	**44**	**39**	**13**	**4**
Instructional level[3]								
Primary school	34	50	12	3	39	38	18	5
Middle school	35	53	9	2	50	37	10	3
High school	33	53	12	2	46	40	11	3
Other school	31	54	13	‡	32	51	12	4!
Enrollment size								
Less than 300	30	55	12	‡	42	34	20	4!
300 to 499	36	50	13	2!	41	43	13	3
500 to 999	34	53	10	3	41	39	15	4
1,000 or more	34	53	12	2	51	38	9	3
Community type								
City	31	50	15	3	38	39	17	6
Suburban	38	51	9	2	50	38	10	2
Town	29	57	13	2!	39	42	15	4!
Rural	33	57	9	‡	45	39	13	2
Percent of students eligible for free or reduced-price lunch								
Less than 35 percent[4]	39	53	7	1!	53	35	10	3
35 to 49 percent	33	56	9	2!	47	40	12	2!
50 to 74 percent	31	50	16	4	38	43	16	3
75 percent or more	30	50	15	4	35	40	18	7
Students take home school computers								
Yes	43	49	8	1!	59	33	7	1!
No	30	54	13	3	39	41	16	4

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

‡ Reporting standards not met. The coefficient of variation for this estimate is 50 percent or greater.

[1] Based on the 77 percent of teachers who reported that they assign technology-based homework to their students.

[2] Based on the 98 percent of teachers who reported that there are online or computerized assessments given by the state, district, or school to the students they teach.

[3] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[4] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table 8. Percentage distribution of public school teachers reporting the extent to which they provide various types of assistance for doing technology-based homework to students who have limited access to technology and the Internet outside of school, by school characteristics: School year 2018–19

School characteristic	Students download homework at school to work on computer without Internet				Provide hardcopy homework assignments and material				Give extended time or later deadline for homework			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**35**	**28**	**21**	**16**	**6**	**18**	**23**	**53**	**14**	**31**	**31**	**25**
Instructional level[1]												
Primary school	50	23	15	13	8	17	19	57	20	28	29	23
Middle school	30	29	24	17	3	16	25	56	8	30	33	29
High school	27	31	24	18	6	21	24	49	12	34	32	23
Other school	36	30	20	14	7!	18	21	54	17	31	34	18
Enrollment size												
Less than 300	32	29	21	18	4!	14	25	58	14	29	35	21
300 to 499	43	23	21	12	5	20	20	56	12	31	31	26
500 to 999	37	26	20	17	6	16	23	55	15	30	29	26
1,000 or more	29	32	22	17	6	22	23	49	12	32	33	23
Community type												
City	38	26	21	15	6	16	21	57	13	28	31	28
Suburban	36	29	20	16	6	20	22	51	14	31	31	23
Town	30	29	25	15	5	20	25	50	11	32	35	23
Rural	32	28	21	20	4	18	26	52	14	33	31	22
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent[2]	33	30	20	17	7	21	22	50	15	34	30	21
35 to 49 percent	32	27	26	15	6	17	27	50	15	31	33	21
50 to 74 percent	40	26	19	15	5	19	22	55	11	32	32	25
75 percent or more	36	27	20	17	5	13	21	61	13	21	33	33
Students take home school computers												
Yes	24	30	24	22	5	25	26	44	11	35	32	22
No	40	27	19	14	6	16	21	57	15	29	31	26

See notes at end of table.

Table 8. Percentage distribution of public school teachers reporting the extent to which they provide various types of assistance for doing technology-based homework to students who have limited access to technology and the Internet outside of school, by school characteristics: School year 2018–19—Continued

School characteristic	Give time in class to use school technology for homework				Give alternate homework not requiring technology			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**6**	**18**	**26**	**50**	**24**	**30**	**23**	**23**
Instructional level[1]								
Primary school	7	18	27	49	20	22	25	33
Middle school	6	16	21	56	20	34	22	25
High school	5	18	28	48	30	34	22	14
Other school	8!	15	24	53	30	34	19	16
Enrollment size								
Less than 300	3!	17	25	55	27	26	28	18
300 to 499	6	16	27	51	24	26	24	25
500 to 999	6	16	25	52	22	29	22	26
1,000 or more	7	19	27	47	26	35	21	18
Community type								
City	5	16	23	55	23	25	24	28
Suburban	9	19	28	44	25	33	21	21
Town	2!	15	26	57	24	32	23	20
Rural	5	17	26	53	26	30	24	20
Percent of students eligible for free or reduced-price lunch								
Less than 35 percent[2]	9	20	26	46	28	33	21	18
35 to 49 percent	4	23	23	50	28	31	23	18
50 to 74 percent	4	12	27	57	21	28	25	26
75 percent or more	5	16	26	53	18	26	23	33
Students take home school computers								
Yes	6	19	28	48	28	39	21	13
No	6	17	25	52	23	26	24	27

! Interpret data with caution; the coefficient of variation is at least 30 percent but less than 50 percent.

[1] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[2] Includes schools with missing values.

NOTE: Based on the 77 percent of teachers who reported that they assign technology-based homework to their students. Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Appendix A

Standard Error Tables

Table A-1. Standard errors for table 1: Percent of public school teachers reporting on various types of access to computers and/or the Internet provided to their students by the district or school, by school characteristics: School year 2018–19

School characteristic	All teachers			Teachers whose students take home a district- or school-provided computer who have some students not able to take computer home	Teachers whose students do not have a district- or school-provided computer to take home	
	School has additional academic period when students can use computers and Internet for homework	District or school provides mobile hotspots students take home	Students take home a district- or school-provided computer on long-term basis		Students can borrow school computers to take home on short-term basis	Students can access school computers outside of class time (e.g., before or after school, at lunch, in special periods)
All teachers	**1.0**	**0.7**	**1.2**	**2.2**	**0.7**	**0.9**
Instructional level						
Primary school	1.7	1.4	1.9	8.2	0.9	1.8
Middle school	1.8	1.2	2.1	3.0	1.2	1.4
High school	2.2	1.1	2.1	3.0	1.9	0.8
Other school	4.5	†	4.4	12.2	3.6	4.1
Enrollment size						
Less than 300	4.2	2.0	3.3	8.8	3.2	2.7
300 to 499	2.2	2.1	3.3	5.2	1.4	2.4
500 to 999	1.3	0.9	1.4	3.4	0.9	1.4
1,000 or more	2.3	1.4	2.4	3.1	2.0	1.2
Community type						
City	1.8	1.3	1.7	4.4	1.1	1.9
Suburban	1.6	1.4	2.7	3.1	1.3	1.8
Town	3.4	1.4	2.7	6.6	1.5	2.5
Rural	2.3	1.3	2.3	3.8	1.4	1.7
Percent of students eligible for free or reduced-price lunch						
Less than 35 percent	1.8	1.1	2.2	3.2	1.5	1.6
35 to 49 percent	2.7	1.2	2.4	4.0	1.8	2.4
50 to 74 percent	2.0	1.8	2.9	5.9	1.1	2.1
75 percent or more	2.0	1.5	1.8	6.1	1.4	2.3
Students take home school computers						
Yes	2.1	1.9	#	2.2	†	†
No	1.2	0.6	†	†	0.7	0.9

† Not applicable.

Rounds to zero.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table A-2. Standard errors for table 2: Percentage distribution of public school teachers reporting on their level of knowledge about their students' access to computers and the Internet at home, and percent of teachers reporting on the source(s) of that information, by school characteristics: School year 2018–19

School characteristic	Among teachers whose students do not take home school- or district-provided computers, teachers' knowledge of students' access to home computers				All teachers' knowledge of students' access to Internet at home				Sources of information about students' access at home			
	Very knowl-edgeable	Some-what knowl-edgeable	Slightly knowl-edgeable	Not knowl-edgeable	Very knowl-edgeable	Some-what knowl-edgeable	Slightly knowl-edgeable	Not knowl-edgeable	Survey all students or parents	Talk to students or parents individ-ually	Develop a sense while working with students	Other
All teachers	**1.1**	**1.3**	**1.1**	**0.6**	**0.9**	**1.0**	**0.9**	**0.5**	**1.0**	**0.8**	**0.7**	**0.2**
Instructional level												
Primary school	1.8	2.0	1.7	1.1	1.7	1.9	1.6	1.0	1.8	1.5	1.3	0.4
Middle school	1.8	2.0	1.7	0.9	1.4	1.7	1.3	0.8	1.7	1.2	1.1	0.5
High school	1.7	2.2	2.0	1.4	1.4	1.6	1.4	1.0	1.9	1.3	1.0	0.4
Other school	4.6	5.0	4.1	2.7	3.9	4.3	3.6	1.7	4.4	3.1	2.4	†
Enrollment size												
Less than 300	2.1	2.7	2.8	1.6	1.7	2.1	2.2	1.5	3.3	2.7	1.8	†
300 to 499	2.0	3.1	2.8	1.6	1.9	2.6	2.5	1.2	2.3	1.7	1.6	0.5
500 to 999	1.7	1.9	1.4	0.9	1.4	1.6	1.1	0.8	1.5	1.2	0.9	0.4
1,000 or more	1.8	2.4	2.2	1.2	1.5	1.8	1.6	1.0	1.8	1.4	1.2	0.5
Community type												
City	2.0	2.1	2.2	1.1	1.7	1.8	1.8	0.9	1.9	1.2	1.3	0.5
Suburban	1.8	2.1	1.7	1.0	1.5	1.7	1.3	0.9	1.5	1.5	1.0	0.4
Town	2.4	3.6	3.2	2.4	2.2	2.8	2.6	1.8	2.7	2.2	1.8	0.4
Rural	1.7	2.5	2.1	1.5	1.5	1.9	1.6	1.0	2.1	1.4	1.4	0.5
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent	2.2	2.4	2.1	1.1	1.6	1.7	1.3	0.9	1.8	1.5	1.1	0.5
35 to 49 percent	2.4	2.8	2.6	1.3	1.8	2.3	2.0	1.1	2.1	1.6	1.6	0.5
50 to 74 percent	1.6	2.3	2.1	1.4	1.6	1.9	1.9	0.9	2.3	1.4	1.4	0.5
75 percent or more	2.2	2.4	1.7	1.2	2.1	2.4	1.5	1.2	2.5	1.9	1.4	0.4
Students take home school computers												
Yes	†	†	†	†	1.5	1.8	1.3	0.9	1.8	1.6	1.4	0.5
No	1.1	1.3	1.1	0.6	1.1	1.3	1.0	0.7	1.2	1.0	0.8	0.3

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table A-3. Standard errors for table 3: Percentage distribution of public school teachers reporting on the extent to which their students use various locations for computer and/or Internet access to work on school assignments, by school characteristics: School year 2018–19

School characteristic	Public library				Public locations other than public library				Commercial locations			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**1.1**	**1.1**	**0.7**	**0.3**	**1.1**	**1.0**	**0.5**	**0.2**	**1.1**	**1.0**	**0.6**	**0.2**
Instructional level												
Primary school	2.2	2.1	1.0	0.5	1.9	1.9	0.7	0.3	1.8	1.8	0.6	†
Middle school	1.8	1.9	1.4	0.4	1.6	1.6	0.9	0.3	1.8	1.6	0.8	0.4
High school	1.5	1.5	1.0	0.5	1.6	1.7	1.1	†	1.5	1.8	1.3	0.4
Other school	4.6	4.4	2.9	†	4.4	4.3	3.0	†	4.4	4.2	2.8	†
Enrollment size												
Less than 300	3.1	3.0	2.0	†	3.3	3.4	1.7	†	3.7	3.7	1.3	†
300 to 499	2.9	2.9	1.4	0.5	2.6	2.4	0.9	†	2.3	2.4	1.0	†
500 to 999	1.6	1.7	1.0	0.5	1.6	1.6	0.7	0.4	1.5	1.5	0.7	0.3
1,000 or more	1.6	1.7	1.1	0.4	1.8	1.7	1.1	†	1.6	1.8	1.4	0.5
Community type												
City	2.0	1.9	1.4	0.6	2.1	2.0	1.1	0.3	1.8	1.7	1.0	0.4
Suburban	1.7	1.7	1.0	0.4	1.7	1.6	0.8	0.3	1.6	1.7	0.9	0.3
Town	2.9	3.1	1.8	0.8	3.0	2.9	1.6	†	2.4	2.6	1.6	†
Rural	1.8	1.8	1.1	0.6	2.2	2.2	1.1	†	2.5	2.3	1.1	0.4
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent	1.5	1.5	1.0	0.4	1.6	1.7	0.9	†	1.7	1.7	1.1	0.3
35 to 49 percent	2.3	2.3	1.3	0.5	2.5	2.5	1.1	†	2.1	2.2	1.5	0.4
50 to 74 percent	2.3	2.2	1.0	0.6	2.3	2.1	1.0	0.4	2.3	2.3	0.8	0.5
75 percent or more	2.2	2.1	1.7	0.8	2.2	2.1	1.3	0.6	2.4	2.0	1.2	†
Students take home school computers												
Yes	2.2	2.2	1.1	0.5	2.5	2.5	1.2	†	2.4	2.3	1.4	0.5
No	1.2	1.2	0.8	0.3	1.3	1.2	0.5	0.2	1.2	1.1	0.6	0.2

See notes at end of table.

Table A-3. Standard errors for table 3: Percentage distribution of public school teachers reporting on the extent to which their students use various locations for computer and/or Internet access to work on school assignments, by school characteristics: School year 2018–19—Continued

School characteristic	Homes of relatives, friends, or neighbors				Student's own home			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**0.6**	**1.1**	**1.1**	**0.7**	**0.3**	**0.7**	**1.0**	**1.1**
Instructional level								
Primary school	1.2	2.0	1.8	1.0	0.6	1.5	1.8	2.2
Middle school	0.7	1.9	1.9	1.1	0.3	1.1	1.4	1.8
High school	0.6	1.5	1.6	1.1	0.2	0.9	1.4	1.6
Other school	†	4.9	5.0	3.0	†	2.7	3.9	4.4
Enrollment size								
Less than 300	1.5	3.2	3.1	2.4	0.7	2.3	2.4	2.7
300 to 499	1.5	2.4	2.4	1.3	0.7	1.8	2.4	2.9
500 to 999	0.9	1.5	1.5	0.9	0.4	1.2	1.6	1.6
1,000 or more	0.6	1.9	1.9	1.4	†	0.9	1.4	1.5
Community type								
City	0.8	2.0	1.7	1.3	0.3	1.5	1.8	2.1
Suburban	0.9	1.9	1.8	1.0	0.3	1.1	1.8	2.0
Town	1.8	3.0	2.9	1.6	1.1	2.0	3.0	2.9
Rural	1.2	2.0	1.9	1.6	0.5	1.6	1.9	2.4
Percent of students eligible for free or reduced-price lunch								
Less than 35 percent	1.0	2.0	1.7	0.9	0.4	0.9	1.2	1.5
35 to 49 percent	1.1	2.2	2.3	1.3	0.5	1.1	2.2	2.5
50 to 74 percent	1.1	1.9	2.2	1.2	0.5	1.5	2.1	2.5
75 percent or more	0.9	1.9	1.8	1.6	0.5	1.8	2.1	2.1
Students take home school computers								
Yes	0.7	1.7	2.0	1.2	0.2	0.6	1.3	1.3
No	0.7	1.2	1.2	0.8	0.3	0.9	1.2	1.2

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table A-4. Standard errors for table 4: Percentage distribution of public school teachers reporting the estimated percentage of their students who have access to a computer at home, the availability of those computers for students to use for school assignments, and the likelihood that those computers have reliable Internet access from home, by school characteristics: School year 2018–19

School characteristic	Percentage of teacher's students with access to a computer at home					Availability of computers at home for school assignments					Likelihood computers at home have reliable Internet access				
	0 to 49 percent	50 to 74 percent	75 to 89 percent	90 to 94 percent	95 to 100 percent	Very available	Some-what available	Slightly available	Not available	Don't know	Very likely	Some-what likely	Slightly likely	Not likely	Don't know
All teachers	**0.7**	**1.0**	**0.9**	**0.6**	**1.2**	**1.1**	**1.3**	**0.6**	†	**0.5**	**1.0**	**1.1**	**0.9**	**0.3**	**0.6**
Instructional level															
Primary school	1.4	1.9	1.6	1.1	2.1	2.2	2.4	1.3	0.3	1.1	1.7	2.1	1.7	0.6	1.2
Middle school	1.1	1.5	1.5	1.2	1.9	1.6	1.6	1.1	†	0.8	1.5	1.8	1.2	0.7	0.8
High school	1.0	1.2	1.5	1.2	1.8	1.8	1.7	0.8	†	0.8	1.6	1.8	1.2	0.5	0.8
Other school	3.0	3.9	3.4	3.1	4.3	4.8	4.6	2.8	†	2.7	4.7	4.9	3.7	2.4	2.5
Enrollment size															
Less than 300	2.4	3.3	3.2	2.1	2.7	3.2	3.5	1.9	†	2.1	2.8	3.8	2.1	1.3	1.7
300 to 499	2.0	2.4	2.0	1.5	3.2	3.1	3.0	1.8	†	1.3	2.3	2.9	2.2	0.7	1.4
500 to 999	1.0	1.6	1.3	1.0	1.6	1.5	1.5	1.0	0.2	0.7	1.4	1.6	1.2	0.5	0.8
1,000 or more	1.0	1.3	1.6	1.3	2.1	2.1	2.2	0.9	†	0.9	1.9	1.9	0.9	0.5	0.8
Community type															
City	1.6	1.8	1.6	1.2	1.8	1.8	1.9	1.1	†	1.1	1.5	1.9	1.6	0.7	1.1
Suburban	0.9	1.5	1.6	1.3	2.5	2.4	2.2	1.3	†	0.7	1.8	2.1	1.3	0.3	0.8
Town	2.0	2.2	2.3	1.7	2.2	3.2	3.0	1.7	†	1.8	2.6	2.9	2.1	1.0	1.8
Rural	1.5	2.1	2.0	1.5	1.9	2.2	2.3	1.3	0.4	1.6	2.0	2.3	1.5	0.9	1.2
Percent of students eligible for free or reduced-price lunch															
Less than 35 percent	0.4	1.1	1.5	1.4	2.2	1.7	1.6	0.7	†	0.9	1.7	1.8	0.8	†	1.0
35 to 49 percent	1.2	2.1	2.0	1.7	2.4	2.5	2.5	1.4	†	1.2	2.1	2.4	1.8	0.6	1.3
50 to 74 percent	1.8	2.0	1.7	1.1	2.7	2.7	2.5	1.5	†	1.1	1.7	2.5	2.0	0.7	1.2
75 percent or more	2.0	2.3	2.0	1.1	1.5	1.6	2.4	1.8	0.4	1.3	1.2	2.3	1.9	1.1	1.2
Students take home school computers															
Yes	†	0.5	1.1	1.3	1.6	1.7	1.5	0.5	†	0.5	2.1	2.1	1.1	0.4	0.6
No	0.9	1.3	1.1	0.8	1.0	1.0	1.4	0.9	0.2	0.7	1.1	1.4	1.1	0.4	0.7

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table A-5. Standard errors for table 5: Percentage distribution of public school teachers reporting the estimated percentage of their students who have access to a smartphone at home, the usefulness of those smartphones for completing school assignments, availability of those smartphones for school assignments, and the likelihood that those smartphones have reliable Internet access from home, by school characteristics: School year 2018–19

School characteristic	Percentage of teacher's students with access to a smartphone at home					Usefulness of smartphones for school assignments			
	0 to 49 percent	50 to 79 percent	80 to 89 percent	90 to 94 percent	95 to 100 percent	Very useful	Somewhat useful	Slightly useful	Not useful
All teachers	**0.6**	**0.8**	**0.8**	**0.7**	**1.0**	**0.6**	**0.9**	**1.1**	**0.8**
Instructional level									
Primary school	1.2	1.8	1.5	1.3	1.6	0.7	1.5	2.1	1.8
Middle school	0.8	1.6	1.4	1.4	1.8	1.1	1.6	1.7	1.5
High school	0.3	1.0	1.1	1.5	1.6	1.2	1.5	1.4	0.8
Other school	1.9	3.6	3.9	3.3	4.2	3.1	4.4	4.2	2.5
Enrollment size									
Less than 300	1.4	2.4	2.7	2.4	2.5	2.0	3.9	3.7	3.1
300 to 499	1.5	2.6	2.3	1.6	2.1	1.2	2.0	2.7	2.3
500 to 999	0.9	1.4	1.1	1.2	1.6	0.9	1.4	1.6	1.3
1,000 or more	0.5	1.0	1.4	1.6	1.8	1.3	1.6	1.8	1.0
Community type									
City	1.1	1.3	1.4	1.5	1.8	1.2	1.7	1.8	1.5
Suburban	1.0	1.5	1.6	1.3	1.5	0.9	1.5	1.8	1.5
Town	1.4	2.6	1.8	1.9	2.7	1.8	3.0	2.6	2.7
Rural	0.9	1.6	1.6	1.7	2.2	1.1	2.1	2.1	1.9
Percent of students eligible for free or reduced-price lunch									
Less than 35 percent	0.6	1.1	1.3	1.4	1.6	1.2	1.5	1.5	1.4
35 to 49 percent	1.2	2.0	1.6	1.8	2.0	1.6	2.1	2.3	1.8
50 to 74 percent	1.2	1.8	1.8	1.7	1.6	1.3	1.7	2.3	1.9
75 percent or more	1.2	1.8	1.6	1.9	2.3	1.7	2.2	2.2	1.9
Students take home school computers									
Yes	0.9	1.4	1.8	1.7	2.3	1.1	1.6	1.8	1.8
No	0.7	0.9	0.9	0.9	1.1	0.7	1.1	1.2	1.0

See notes at end of table.

Table A-5. Standard errors for table 5: Percentage distribution of public school teachers reporting the estimated percentage of their students who have access to a smartphone at home, the usefulness of those smartphones for completing school assignments, availability of those smartphones for school assignments, and the likelihood that those smartphones have reliable Internet access from home, by school characteristics: School year 2018–19—Continued

School characteristic	Availability of smartphones for school assignments					Likelihood smartphones have reliable Internet access from home				
	Very available	Somewhat available	Slightly available	Not available	Don't know	Very likely	Somewhat likely	Slightly likely	Not likely	Don't know
All teachers	**0.8**	**0.9**	**0.8**	**0.3**	**0.7**	**1.1**	**1.0**	**0.8**	**0.3**	**0.6**
Instructional level										
Primary school	1.0	1.9	1.7	0.6	1.6	1.8	1.8	1.7	0.5	1.5
Middle school	1.7	1.8	1.5	0.5	1.0	1.7	1.7	1.2	0.6	0.9
High school	1.6	1.4	0.9	0.3	0.6	1.6	1.5	1.1	0.4	0.6
Other school	3.7	3.7	3.2	†	2.2	4.6	4.3	3.8	2.1	†
Enrollment size										
Less than 300	2.1	3.4	2.8	1.0	3.7	2.7	3.4	2.5	1.2	2.7
300 to 499	1.7	2.2	2.2	0.8	1.7	2.1	2.5	2.3	0.7	1.4
500 to 999	1.3	1.4	1.5	0.5	1.1	1.5	1.4	1.2	0.5	1.0
1,000 or more	1.9	1.8	1.1	0.4	0.8	1.9	1.9	1.0	0.4	0.8
Community type										
City	1.6	1.7	1.5	0.4	1.1	2.0	1.8	1.6	0.6	0.8
Suburban	1.5	1.6	1.2	0.6	1.0	1.7	1.9	1.2	0.3	0.9
Town	2.4	2.5	2.3	0.8	1.9	2.7	2.7	1.9	1.0	2.0
Rural	1.6	1.8	1.8	0.5	2.2	2.0	2.4	1.6	0.8	1.6
Percent of students eligible for free or reduced-price lunch										
Less than 35 percent	1.7	1.7	1.2	0.6	1.4	2.0	1.8	0.9	†	1.3
35 to 49 percent	2.1	2.4	1.9	0.4	1.4	2.1	2.4	1.4	0.5	1.1
50 to 74 percent	2.0	2.1	1.9	0.6	1.3	1.8	2.0	2.1	0.6	1.0
75 percent or more	2.2	2.1	1.8	0.7	1.3	2.2	2.1	1.7	1.0	1.4
Students take home school computers										
Yes	2.1	2.0	1.3	0.6	1.1	2.0	1.9	1.3	0.3	0.8
No	0.9	1.1	1.0	0.3	0.9	1.2	1.1	1.0	0.4	0.7

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table A-6. Standard errors for table 6: Percentage distribution of public school teachers reporting on the amount of influence that their students' access to technology and the Internet outside of school has on the homework they assign, the frequency they assign any type of homework, and the frequency they assign technology-based homework, by school characteristics: School year 2018–19

School characteristic	Influence that students' access to technology and Internet outside of school has on homework teachers assign				Frequency that teachers assign any type of homework				Frequency that teachers assign technology-based homework			
	No influence	Small influence	Moderate influence	Large influence	Never	Rarely	Some-times	Often	Never	Rarely	Some-times	Often
All teachers	**0.7**	**1.0**	**0.8**	**0.9**	**0.4**	**0.7**	**0.9**	**1.1**	**0.9**	**1.0**	**0.9**	**0.9**
Instructional level												
Primary school	1.7	1.9	1.5	1.7	0.9	1.1	1.6	2.0	2.0	1.8	1.5	1.3
Middle school	1.1	1.7	1.7	1.5	0.6	1.6	1.7	1.9	1.6	1.6	1.5	1.5
High school	0.9	1.5	1.5	1.4	0.5	1.3	1.7	1.7	0.9	1.6	1.8	1.6
Other school	3.5	4.3	4.1	3.7	†	3.3	3.9	4.6	3.5	4.2	2.8	3.9
Enrollment size												
Less than 300	2.4	3.0	2.7	2.7	1.1	2.4	3.1	3.3	2.4	2.4	2.3	2.7
300 to 499	1.8	2.7	2.1	2.2	0.8	1.8	2.2	2.8	2.5	2.3	1.9	1.6
500 to 999	1.2	1.3	1.2	1.2	0.7	1.1	1.3	1.5	1.4	1.3	1.4	1.2
1,000 or more	0.9	1.9	1.7	1.7	0.5	1.6	1.8	2.0	1.1	2.0	1.7	1.8
Community type												
City	1.3	1.8	1.6	1.4	0.9	1.5	1.5	2.3	1.6	1.7	1.7	1.4
Suburban	1.0	1.9	1.5	1.4	0.5	1.2	1.5	1.7	1.6	1.8	1.6	1.6
Town	1.9	2.6	2.4	2.3	0.8	1.9	2.4	2.7	2.5	2.3	2.2	1.6
Rural	1.7	1.8	1.6	1.8	0.6	1.6	1.6	1.8	2.0	1.8	1.6	1.5
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent	1.3	1.6	1.6	1.4	0.5	1.3	1.6	1.8	1.3	1.7	1.6	1.7
35 to 49 percent	1.7	2.2	2.0	1.7	0.7	1.9	2.2	2.6	1.9	2.2	2.2	2.0
50 to 74 percent	1.7	2.0	1.8	1.7	0.6	1.5	1.8	2.3	1.9	1.9	1.7	1.4
75 percent or more	1.8	2.0	1.9	1.8	1.2	1.6	1.7	2.4	2.4	2.1	1.8	1.5
Students take home school computers												
Yes	1.3	2.0	1.5	1.8	0.6	1.5	1.6	2.0	1.0	1.8	1.7	1.8
No	0.9	1.1	0.9	1.0	0.5	0.8	1.1	1.4	1.1	1.2	1.1	0.9

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table A-7. Standard errors for table 7: Percentage distribution of public school teachers reporting on the extent to which their students have difficulty completing technology-based homework because the students are not familiar with how to use technology, and how prepared their students are to use the technology required for online or computerized assessments given by the state, district, or school, by school characteristics: School year 2018–19

School characteristic	Extent of difficulty students have with technology-based homework due to unfamiliarity with technology				Level of student preparation to use technology for online or computerized assessments			
	Not at all	Small extent	Moderate extent	Large extent	Very prepared	Somewhat prepared	Slightly prepared	Not prepared
All teachers	**1.1**	**1.2**	**0.7**	**0.4**	**1.1**	**1.1**	**0.7**	**0.4**
Instructional level								
Primary school	2.3	2.5	1.5	0.7	1.9	1.8	1.5	0.8
Middle school	1.9	2.1	1.3	0.5	1.9	1.7	1.0	0.5
High school	1.6	1.8	1.1	0.5	1.8	1.8	0.9	0.6
Other school	5.2	4.4	3.4	†	4.9	4.8	3.0	1.8
Enrollment size								
Less than 300	3.7	3.8	2.6	†	3.3	3.6	1.9	1.3
300 to 499	3.0	3.2	2.3	0.7	2.7	2.9	1.7	0.8
500 to 999	1.9	1.8	1.0	0.6	1.6	1.3	1.0	0.6
1,000 or more	1.9	2.0	1.2	0.5	2.0	1.8	1.0	0.7
Community type								
City	2.2	2.3	1.4	0.7	2.1	2.0	1.5	0.9
Suburban	1.7	1.9	1.0	0.5	1.7	1.7	1.0	0.6
Town	3.0	3.1	2.3	0.7	3.1	3.0	2.4	1.1
Rural	2.7	2.6	1.4	†	2.3	2.4	1.4	0.5
Percent of students eligible for free or reduced-price lunch								
Less than 35 percent	2.0	2.0	1.0	0.3	1.6	1.7	1.0	0.6
35 to 49 percent	2.3	2.3	1.4	0.7	2.2	2.2	1.8	0.6
50 to 74 percent	2.4	2.2	1.7	0.8	2.2	2.0	1.4	0.6
75 percent or more	2.8	2.6	1.9	1.1	2.4	2.2	1.8	1.2
Students take home school computers								
Yes	1.9	2.0	1.0	0.4	1.8	1.7	1.0	0.3
No	1.3	1.5	0.8	0.5	1.2	1.2	0.9	0.5

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Table A-8. Standard errors for table 8: Percentage distribution of public school teachers reporting the extent to which they provide various types of assistance for doing technology-based homework to students who have limited access to technology and the Internet outside of school, by school characteristics: School year 2018–19

School characteristic	Students download homework at school to work on computer without Internet				Provide hardcopy homework assignments and material				Give extended time or later deadline for homework			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**1.1**	**1.0**	**0.8**	**0.9**	**0.5**	**1.0**	**0.9**	**1.2**	**0.8**	**1.1**	**1.1**	**0.9**
Instructional level												
Primary school	2.5	2.1	1.7	1.4	1.2	2.2	1.9	2.5	2.1	2.2	2.1	1.9
Middle school	1.9	1.7	1.7	1.7	0.6	1.2	1.8	1.9	1.0	1.8	1.8	1.8
High school	1.4	1.6	1.5	1.5	0.8	1.5	1.4	1.9	1.1	1.6	1.7	1.6
Other school	5.1	4.7	4.5	3.8	2.6	4.0	3.8	6.1	3.5	5.5	4.7	3.5
Enrollment size												
Less than 300	3.5	3.8	3.1	3.4	1.4	2.9	3.2	3.9	2.9	2.8	3.4	3.3
300 to 499	2.9	2.3	2.2	2.0	1.4	2.9	2.4	2.8	2.4	2.8	3.0	2.7
500 to 999	2.1	1.5	1.4	1.4	0.9	1.5	1.5	2.1	1.3	1.7	1.4	1.5
1,000 or more	1.7	1.7	1.6	1.6	1.0	1.8	1.6	2.1	1.1	2.1	1.9	1.7
Community type												
City	2.1	2.0	1.7	1.6	1.1	1.8	1.7	2.5	1.5	2.1	1.7	1.8
Suburban	1.7	1.8	1.4	1.4	0.9	1.7	1.7	1.9	1.2	1.9	1.9	1.6
Town	3.0	2.7	3.0	2.5	1.4	2.5	3.0	3.4	2.0	3.0	3.2	2.5
Rural	2.4	2.3	1.9	2.0	1.1	2.0	2.3	2.3	1.7	2.0	2.1	1.9
Percent of students eligible for free or reduced-price lunch												
Less than 35 percent	1.5	1.7	1.5	1.6	1.0	1.6	1.5	2.0	1.2	1.8	1.7	1.6
35 to 49 percent	2.5	2.0	2.2	1.8	1.2	1.7	2.2	2.4	2.0	2.6	2.5	2.2
50 to 74 percent	2.2	2.1	1.7	1.4	1.1	2.1	2.0	2.2	1.7	2.0	2.2	2.1
75 percent or more	3.1	2.6	2.1	2.0	1.2	2.0	2.3	3.2	2.2	2.4	2.1	2.4
Students take home school computers												
Yes	1.9	1.9	1.5	1.8	0.9	2.0	1.9	1.8	1.2	1.9	1.9	1.8
No	1.5	1.3	1.1	1.0	0.7	1.2	1.1	1.4	1.1	1.3	1.3	1.2

See notes at end of table.

Table A-8. Standard errors for table 8: Percentage distribution of public school teachers reporting the extent to which they provide various types of assistance for doing technology-based homework to students who have limited access to technology and the Internet outside of school, by school characteristics: School year 2018–19—Continued

School characteristic	Give time in class to use school technology for homework				Give alternate homework not requiring technology			
	Not at all	Small extent	Moderate extent	Large extent	Not at all	Small extent	Moderate extent	Large extent
All teachers	**0.5**	**0.9**	**1.0**	**1.0**	**1.0**	**1.1**	**1.0**	**1.1**
Instructional level								
Primary school	1.1	1.9	2.4	2.4	2.0	1.8	2.3	2.3
Middle school	0.9	1.3	1.5	1.9	1.6	2.0	1.7	1.9
High school	0.7	1.3	1.6	1.7	1.6	1.8	1.4	1.2
Other school	2.7	3.8	5.3	5.5	4.9	5.6	3.9	3.9
Enrollment size								
Less than 300	1.4	2.7	3.8	4.1	4.3	3.7	4.1	3.2
300 to 499	1.3	2.5	3.0	2.8	2.7	2.1	3.0	2.7
500 to 999	0.8	1.2	1.5	1.7	1.6	1.6	1.5	1.5
1,000 or more	0.9	1.4	1.7	1.8	1.8	2.0	1.7	1.7
Community type								
City	0.8	1.8	1.8	2.2	1.7	1.8	1.8	2.0
Suburban	1.0	1.4	1.7	1.8	1.7	1.7	1.6	1.7
Town	0.8	2.4	2.4	3.1	3.2	3.4	2.8	2.6
Rural	0.9	2.1	2.4	2.5	2.5	2.0	1.9	2.1
Percent of students eligible for free or reduced-price lunch								
Less than 35 percent	1.0	1.5	1.5	1.7	1.7	1.8	1.4	1.5
35 to 49 percent	0.9	2.3	2.1	2.6	2.3	2.3	2.2	1.9
50 to 74 percent	1.0	1.3	2.4	2.6	2.1	2.1	2.4	2.1
75 percent or more	1.4	2.1	2.6	2.9	2.4	2.4	2.2	2.7
Students take home school computers								
Yes	0.9	1.4	2.0	2.0	1.8	1.9	1.8	1.4
No	0.7	1.0	1.2	1.2	1.3	1.3	1.1	1.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Appendix B

Technical Notes

Technical Notes

Fast Response Survey System

The Fast Response Survey System (FRSS) was established in 1975 by the National Center for Education Statistics (NCES), U.S. Department of Education. FRSS is designed to collect issue-oriented data within a relatively short time frame. FRSS collects data from state education agencies, local education agencies, public and private elementary and secondary schools, public school teachers, and public libraries. To ensure minimal burden on respondents, the surveys are generally limited to three pages of questions, with a response burden of about 30 minutes per respondent. Sample sizes are relatively small (usually about 1,200 to 1,800 respondents per survey) so that data collection can be completed quickly. Data are weighted to produce national estimates of the sampled education sector. The sample size permits limited breakouts by analysis variables. However, as the number of categories within any single analysis variable increases, the sample size within categories decreases, which results in larger sampling errors for the breakouts by analysis variables.

Sample Design

The sample for the FRSS survey "Teachers' Use of Technology for School and Homework Assignments" consisted of approximately 4,320 teachers from public schools in the 50 states and the District of Columbia. A stratified multistage sample design was used to select teachers for the survey.

At the first stage of sampling, 2,000 regular public schools were selected from a sampling frame constructed from the 2015–16 Common Core of Data (CCD) Public School Universe file, which was the most current file available at the time of selection. The sampling frame for the survey included only regular schools; vocational education, special education, alternative/other nonregular schools, and schools operated by the Department of Defense or Bureau of Indian Education were ineligible for the survey. Schools with a high grade lower than 3, ungraded schools, and schools in the outlying U.S. territories were also ineligible for the survey. The school sample was stratified by instructional level (primary, middle, high, and other) and enrollment size class (less than 300, 300 to 499, 500 to 999, and 1,000 to 1,499, and 1,500 or more) to create 20 primary strata. Within each category of instructional level, the specified number of sample schools was distributed to the five enrollment size classes in proportion to the estimated number of full-time-equivalent (FTE) teachers in the size class. Within each primary sampling stratum, schools in the sampling frame were sorted by community type (city, suburban, town, rural) and categories of poverty level based on the percentage of students eligible for free/reduced-price lunch (missing, under 35 percent, 35 to 49 percent, 50 to 75 percent, 75 percent or more) to induce additional implicit stratification. The sample of schools was selected with probabilities proportionate to the number of FTE teachers in the school.

In the second stage of sampling, a nationally representative sample of approximately 4,320 teachers were selected from the approximately 1,650 schools for which usable teacher lists were obtained. Eligible teachers were those who taught at least one regularly scheduled class in grades 3–12 and taught either self-contained classes or departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Self-contained classes were defined as teaching multiple subjects to the same class of students all or most of the day, and departmentalized classes were defined as teaching the same subject to multiple classes of students. Teachers who taught only special education, bilingual education, or English as a Second Language (ESL) were excluded. Also excluded were student teachers, teachers' aides, itinerant teachers who taught at more than one school, substitute teachers (including short-term and long-term), library media specialists or librarians who taught only library skills or how to use the library, and unpaid volunteers. On average, two to three teachers were randomly selected from each participating school.

Data Collection and Response Rates

Data collection for the study was conducted in two stages. The first stage was the collection of teacher sampling lists. Prior to contacting schools, informational letters were sent to the superintendents of the school districts where the sampled schools were located, and study staff implemented any special procedures required by school districts. Materials for the study were mailed to the principal of each sampled school in September 2018. The materials introduced the study and requested that a list of eligible teachers be provided for the study. The package included instructions for preparing the list and a form to be returned with the list of teachers. Telephone follow-up for nonresponse and clarification of information on the lists was initiated in early October 2018. When a sampling list was not received from the school, two other sources were used to obtain teacher lists. These included teacher lists from district or school websites and teacher lists purchased from a vendor. Lists from all sources were reviewed and edited based on the survey criteria for eligible teachers. Collection of lists and clarification of information on the lists was completed in April 2019.

Of the 2,000 schools in the sample, about 40 were found to be ineligible for the survey because they were closed, merged, or did not meet the eligibility requirements for inclusion (e.g., they were special education, vocational, or alternative schools, or only enrolled students below grade 3). For the eligible schools, the weighted response rate for list collection was 86 percent, where the weight used in the response rate calculations was the initial school base weight. Of the approximately 1,650 teacher lists used for sampling, 32 percent were provided by the school or district, 41 percent came from district or school websites, and 26 percent came from the vendor.

For the second stage of collection, questionnaires and cover letters for the teacher survey were mailed to sampled teachers at their school addresses. Sampling and mailing were conducted in batches, as teacher lists were collected and processed, beginning in November 2018 and ending in April 2019. Teachers were asked to respond about the students they were teaching during the current 2018–19 school year. Respondents were offered options of completing the survey on paper or online. Telephone and e-mail follow-up for survey nonresponse and data clarification was initiated in December 2018 and completed in June 2019.

Of the approximately 4,320 teachers in the sample, about 460 were found to be ineligible for the survey because they did not meet the eligibility requirements for inclusion (e.g., were no longer teaching at the school, were not teaching the eligible grades or subject, or were not teaching at least one regularly scheduled class). For the eligible teachers, a weighted response rate of 75 percent was obtained for the survey. This rate was calculated using an initial teacher base weight that was the product of the (nonresponse-adjusted) school weight and the reciprocal of the probability of selecting the teacher within the school. Of the teachers who completed the survey, 77 percent completed it online, 22 percent completed it on paper (sent by mail, e-mail, or fax), and 1 percent completed it by telephone.

The overall response rate was calculated as the product of the list collection and teacher response rates, which results in an overall response rate of 64 percent. The final weighted count of responding teachers in the survey after nonresponse adjustment represents the estimated universe of eligible teachers in regular public schools in the 50 states and the District of Columbia—approximately 1.3 million teachers (table B-1).[1]

[1] For more details about the development of survey weights, see the section of this report on weighting and sampling errors.

Table B-1. Number and percentage of responding public school teachers in the study sample, and estimated number and percentage of public school teachers the sample represents, by school characteristics: School year 2018–19

School characteristic	Respondent sample (unweighted)		National estimate (weighted)[1]	
	Number	Percent	Number	Percent
All teachers	**2,940**	**100**	**1,272,400**	**100**
Instructional level[2]				
Primary school	860	29	481,800	38
Middle school	930	32	328,000	26
High school	1,010	34	423,700	33
Other school	140	5	38,800	3
Enrollment size				
Less than 300	290	10	121,700	10
300 to 499	560	19	256,900	20
500 to 999	1,260	43	523,600	41
1,000 or more	820	28	370,200	29
Community type				
City	840	28	413,000	32
Suburban	1,040	35	465,300	37
Town	370	13	130,400	10
Rural	690	24	263,700	21
Percent of students eligible for free or reduced-price lunch				
Less than 35 percent[3]	980	33	420,600	33
35 to 49 percent	570	19	234,000	18
50 to 74 percent	810	28	351,600	28
75 percent or more	570	20	266,100	21
Students take home school computers				
Yes	820	28	327,400	26
No	2,110	72	945,000	74

[1] Weighted count of responding teachers using the final nonresponse-adjusted weights. The weighted count is an estimate of the number of eligible teachers in the study universe (see note below for definition of the types of teachers included in the study).

[2] Primary school has low grade 3, high grade 3–8; middle school has low grade 4–7, high grade 4–9; high school has low grade 7–12, high grade 11–12, or grade 9 only; other school is all other schools.

[3] Includes schools with missing values.

NOTE: Includes public school teachers who teach at least one regularly scheduled class in grades 3–12 and teach either (1) self-contained classes; or (2) departmentalized classes in one or more of the core subjects of English/language arts, social studies/social science, math, or science. Excludes those who teach only special education, bilingual education, or English as a Second Language (ESL). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Teachers' Use of Technology for School and Homework Assignments," FRSS 109, 2019.

Imputation for Item Nonresponse

Teachers with missing survey data were contacted by e-mail and telephone to collect the missing information. However, for cases in which this data retrieval was unsuccessful, missing data were imputed. Although item nonresponse was very low (1 percent or less for any item), missing data were imputed for the 32 items with a response rate of less than 100 percent. The missing items included both numerical data such as the estimated percentage of students with access to a computer at home, as well as categorical data such as whether the school allows students to borrow computers on a short-term basis. The missing data were imputed using a "hot-deck" approach to obtain a "donor" teacher from which the imputed values were derived. Under the hot-

deck approach, a donor teacher that matched selected characteristics of the teacher with missing data (the recipient teacher) was identified (Kalton 1983, pp. 65–104). The matching characteristics included whether the teacher's students take home district- or school-provided computers, and characteristics of the teacher's school, including instructional level, community type, and percent of students in the school eligible for free/reduced-price lunch. In addition, other relevant questionnaire items were used to form appropriate imputation groupings. Once a donor was found, the imputed value was simply the corresponding value from the donor teacher.

Data Reliability

Although the survey was designed to account for sampling error and to minimize nonsampling error, estimates produced from the data collected are subject to both types of error. Sampling error occurs because the data are collected from a sample rather than a census of the population, and nonsampling errors are errors made during the collection and processing of the data.

Weighting and Sampling Errors

The responses were weighted to produce national estimates (table B-1). The weights were designed to reflect the probabilities of selection of the sampled schools and teachers, and were adjusted for differential unit (teacher sampling list and questionnaire) nonresponse. List collection nonresponse weighting adjustments were made within classes defined by school-level variables correlated with response propensity: instructional level, categories of school enrollment size, community type, and categories for percent of students eligible for free or reduced-price lunch. Teacher base weights were the product of the (nonresponse-adjusted) school weight and the reciprocal of the probability of selecting the teacher within the school. Questionnaire nonresponse weighting adjustments were made within classes defined by the same school-level variables used for list collection nonresponse plus survey release group. Within the final weighting classes, the teacher base weights were inflated by the inverse of the weighted response rate for the class. Such weights are appropriate for analysis of the types of data collected in the survey.

The findings in this report are estimates based on the sample selected and, consequently, are subject to sampling variability. Because the survey data were collected using a complex sampling design, the variances of the estimates from the survey (e.g., estimates of proportions) are typically different from what would be expected from data collected with a simple random sample. Not taking the complex sample design into account can lead to an under- or overestimation of the standard errors associated with such estimates. To generate accurate standard errors for the estimates in this report, standard errors were computed using a technique known as jackknife replication (Levy and Lemeshow 1991). As with any replication method, jackknife replication involves constructing a number of subsamples (replicates) from the full sample and computing the statistic of interest for each replicate. A form of jackknife replication referred to as the JK2 method was used to construct the replicates. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic. To construct the replications, 100 variance strata, each consisting of teachers in two subsets of schools referred to as variance units, were created. Subsamples of the full sample were created by dropping one variance unit at a time from each variance stratum to define 100 jackknife replicates. Estimates of standard errors can be computed using statistical packages such as SAS or WesVar.

The standard error is a measure of the variability of an estimate due to sampling. It indicates the variability of a sample estimate that would be obtained from all possible samples of a given design and size. Standard errors are used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the true population parameter being estimated in about 95 percent of the samples. This is a 95 percent confidence interval. For example, the estimated percent of teachers whose students take home a

district- or school-provided computer is 26 percent, and the standard error is 1.2 percent (tables 1 and A-1). The 95 percent confidence interval for the statistic extends from 26 – (1.2 x 1.96) to 26 + (1.2 x 1.96), or from 24 to 28 percent. The 1.96 is the appropriate percentile from a standard normal distribution corresponding to a two-sided statistical test at the $p < .05$ significance level (where .05 indicates the 5 percent of all possible samples that would be outside the range of the confidence interval).

Comparisons can be tested for statistical significance at the $p < .05$ level using Student's t statistic to ensure that the differences are larger than those that might be expected due to sampling variation. Student's t values are computed to test the difference between estimates with the following formula:

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

where E_1 and E_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors.

Nonsampling Errors

Nonsampling error is the term used to describe variations in the estimates that may be caused by population coverage limitations and data collection, processing, and reporting procedures. The sources of nonsampling errors are typically problems such as unit and item nonresponse, differences in respondents' interpretations of the meaning of questions, response differences related to the particular time the survey was conducted, and mistakes made during data preparation. It is difficult to identify and estimate either the amount of nonsampling error or the bias caused by this error. To minimize the potential for nonsampling error, this study used a variety of procedures, including a pretest of the questionnaire with teachers who were part of the eligible population. The pretest provided the opportunity to check for consistency of interpretation of questions and definitions and to eliminate ambiguous items. The questionnaire and instructions were also extensively reviewed by NCES. In addition, extensive editing of the teacher sampling lists and questionnaire responses was conducted to check the data for accuracy and consistency. Respondents with questionnaires that had missing, inconsistent, or out-of-range items were contacted by e-mail or telephone to resolve problems. Survey responses received by mail, fax, or telephone were entered into the web survey application. Responses were entered a second time to ensure accuracy of entry.

One potential source of nonsampling error is nonresponse bias. NCES statistical standards and guidelines require a nonresponse bias analysis if the weighted unit response rate at any stage of data collection is less than 85 percent (Seastrom 2014). For this survey, unit nonresponse occurred at the school level when no teacher sampling list was obtained for a school and at the teacher level when an eligible sampled teacher did not complete the questionnaire. The weighted list collection response rate was 86 percent. The weighted teacher response rate was 75 percent. Though not required at the school level, nonresponse bias analyses were produced for the school-level component of the collection as well as the teacher-level component.

Bias due to survey nonresponse was estimated for characteristics known for most respondents and nonrespondents. These characteristics include school-level variables available from CCD. Five variables with a total of 20 categories were used to analyze at the school level. The same set of variables was used to analyze at the teacher level. Bias was estimated before and after nonresponse weight adjustment in order to examine the impact of the nonresponse adjustment. The bias was estimated for each category of each characteristic as the difference between the unadjusted weighted means (proportions) reported by the respondents and the corresponding nonresponse-adjusted weighted means reported by the respondents.

Several categories of the instructional level, community type, enrollment size class, and percent of students eligible for free or reduced-price lunch variables were significantly correlated with response rates at the school level. Several categories of the school community type taught in and the region taught in were significantly

correlated with response rates at the teacher level. For the selected questionnaire items, statistically significant differences between the unadjusted respondent mean and the corresponding nonresponse-adjusted respondent mean were eliminated by the nonresponse adjustment at both levels. For more information on the bias analyses, refer to the FRSS:109 Data File Documentation (Gray and Lewis forthcoming).

NCES statistical standards and guidelines also require a nonresponse bias analysis if item-level response rates are below 85 percent. No items in the study had response rates below this threshold.

Definitions of Analysis Variables

Many of the school characteristics described below may be related to each other. For example, school instructional level and enrollment size are related, with high schools typically being larger than primary schools. Other relationships between these analysis variables may exist. However, this First Look report focuses on national estimates and bivariate relationships between the analysis variables and questionnaire variables rather than more complex analyses.

School instructional level—Schools were classified according to their grade span in the 2015–16 CCD Public School Universe file, revised based on any updated grade span information obtained during survey collection.

Primary school—low grade of PK through 3 and high grade of 3 through 8
Middle school—low grade of 4 through 7 and high grade of 4 through 9
High school—low grade of 7 through 12 and high grade of 11 through 12, or grade 9 only
Other school—all other schools with at least one grade 3 or higher and not falling in the above three categories

School enrollment size—This variable indicates the total number of students enrolled in the school based on data from the 2015–16 CCD Public School Universe file. The variable was collapsed into the following categories:

Less than 300
300 to 499
500 to 999
1,000 or more

School community type—This variable indicates the type of community in which the school is located, as defined in the 2015–16 CCD Public School Universe file. These codes are based on the location of school buildings. This classification system has four major locale categories—city, suburban, town, and rural—each of which is subdivided into three subcategories. This variable was based on the 12-category urban-centric locale variable from CCD and collapsed into the four categories below.

City—Territory inside an urbanized area and inside a principal city
Suburban—Territory outside a principal city and inside an urbanized area
Town—Territory inside an urban cluster
Rural—Territory outside an urbanized area and outside an urban cluster

Percent of students in school eligible for free or reduced-price lunch— Based on the 2015–16 CCD Public School Universe file data on the students in the school who are eligible to participate in the Free Lunch and Reduced Price Lunch Programs under the National School Lunch Act of 1946. The category for "Less than 35 percent" includes schools with missing data.

Less than 35 percent
35 to 49 percent
50 to 74 percent
75 percent or more

Students take home school computers—Based on the responses to survey question 1, this indicates whether the teacher's students have a district- or school-provided computer that the students take home. These are computers provided to students on a long-term basis during the school year.

Yes
No

Definitions and Instructions Provided in This Survey

The following definitions and instructions were provided to respondents in the questionnaire.

- Please respond about the students you are teaching during the current 2018–19 school year.
- For purposes of this survey, computers include desktop and laptop computers, as well as tablets with a virtual or physical keyboard. Smartphones are not included in the definition of computers.
- Information is collected separately for computers and smartphones.
- For questions 17 through 21, technology includes devices such as computers and smartphones, software such as computer programs and digital apps, and the Internet. Technology-based homework is homework designed to be completed using technology.

Contact Information

For more information about the survey, contact Christopher Chapman, National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Potomac Center Plaza, 550 12th Street SW, Washington, DC 20202; e-mail: chris.chapman@ed.gov; telephone: (202) 245-7103.

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Appendix C

Questionnaire

U.S. DEPARTMENT OF EDUCATION NATIONAL CENTER FOR EDUCATION STATISTICS WASHINGTON, D.C. 20006–5651 **TEACHERS' USE OF TECHNOLOGY FOR SCHOOL AND HOMEWORK ASSIGNMENTS** FAST RESPONSE SURVEY SYSTEM	O.M.B. No.: 1850–0857 EXPIRATION DATE: 03/2021

NCES is authorized to conduct this survey by the Education Science Reform Act of 2002 (ESRA 2002, 20 U.S.C. §9543). While participation in this survey is voluntary, your cooperation is critical to make the results of this survey comprehensive, accurate, and timely. All of the information you provide may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose except as required by law (20 U.S.C. §9573 and 6 U.S.C. §151).

This survey is being conducted in response to a request from Congress about the educational impact of students' access outside the classroom to digital learning resources such as computers and the Internet. The survey focuses on information that can best be provided by teachers from their perspective and direct interaction with students.

- **Please respond about the students you are teaching during the current 2018–19 school year.**
- **For purposes of this survey, computers include desktop and laptop computers, as well as tablets with a virtual or physical keyboard. Smartphones are <u>not</u> included in the definition of computers.**
- **Information is collected separately for computers and smartphones.**

Name of person completing this form: _____

Name of school: _____

Telephone number: _____ E-mail: _____

Best days and times to reach you (in case of questions): _____

THANK YOU. PLEASE KEEP A COPY OF THIS SURVEY FOR YOUR RECORDS.

PLEASE RETURN COMPLETED FORM TO:	**IF YOU HAVE ANY QUESTIONS OR COMMENTS, CONTACT:**
Mail: Cindy Gray (6197.04.01.03) Westat, RB3103 1600 Research Boulevard Rockville, Maryland 20850-3129	The Westat FRSS Study Team 855-813-4337 (toll-free) FRSSTeacherSurvey@westat.com
Fax: 800-254-0984 (toll-free)	
Email: FRSSTeacherSurvey@westat.com	

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 1850–0857. The time required to complete this information collection is estimated to average 15 minutes per response, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments concerning the accuracy of the time estimate, suggestions for improving this form, or any comments or concerns regarding the status of your individual submission of this form, please write directly to: Quick Response Information System (QRIS), National Center for Education Statistics (NCES), PCP, 550 12th Street, SW, 4th floor, Washington, DC 20202.

FRSS Form No. 109, 11/2018

For purposes of this survey, computers include desktop and laptop computers, as well as tablets with a virtual or physical keyboard. Smartphones are not included in the definition of computers.

1. Do the students that you teach have a district- or school-provided computer that the student takes home? *(These are computers provided to students on a long-term basis during the school year.)*

   Yes ... ☐ *(Continue with question 2.)* No .... ☐ *(Skip to question 3.)*

2. Are there some students who are not able to take their district- or school-provided computer home?

   Yes ... ☐ *(Skip to question 5.)* No .... ☐ *(Skip to question 5.)*

3. Does your school allow students to borrow computers to take home on a short-term basis?

   Yes ... ☐ No ..... ☐

4. Can students access school computers outside of class time (for example, before or after school, at lunch, or during special periods during the school day)? *(School computers may be located in computer labs, library media centers, or classrooms.)*

   Yes ... ☐ No ..... ☐

5. Does your school have an additional academic period for all students during the school day (for example, a study or academic support period) when students can use computers and the Internet to work on homework or assignments from other classes?

   Yes ... ☐ No ..... ☐

6. Does your district or school provide mobile hotspots for students to take home for Internet access?

   Yes ... ☐ No ..... ☐

7. How knowledgeable are you about your students' access to (a) computers and (b) the Internet for doing school assignments **at home**? *(Select one in each row.)*

Technology	Knowledge of students' access at home			
	Very knowledgeable	Somewhat knowledgeable	Slightly knowledgeable	Not knowledgeable
a. Computers *(leave row blank if students take district- or school-provided computers home)*..	☐	☐	☐	☐
b. The Internet.....	☐	☐	☐	☐

8. How do you find out information about your students' access at home to computers and/or the Internet? *(Indicate yes or no for each item.)*

	Yes	No
a. Do a survey (verbal, written, or online) of all your students and/or their parents about access at home (Include surveys conducted by you or by your district or school.).....	☐	☐
b. Talk to students and/or parents individually about access at home	☐	☐
c. Develop a sense of what students have as you work with them	☐	☐
d. Other (*Specify*): _____	☐	☐

9. In your estimation, to what extent do your students use the following locations for computer and/or Internet access to work on school assignments? *(Select one box on each line.)*

Locations	Extent location is used for school assignments			
	Not at all	Small extent	Moderate extent	Large extent
a. Public library.....	☐	☐	☐	☐
b. Other public locations (e.g., parks, community centers).....	☐	☐	☐	☐
c. Commercial locations (e.g., bookstores, cafes).....	☐	☐	☐	☐
d. Homes of relatives, friends, or neighbors	☐	☐	☐	☐
e. Student's own home	☐	☐	☐	☐
f. Other *(Specify)* _____	☐	☐	☐	☐

10. In your estimation, about what percentage of the students you teach have access to a computer at home? *(Include district- or school-provided computers for those students who take them home.)* _____%

If none of your students have access to a computer at home (that is, if question 10 equals zero), skip to question 13.

11. For your students who have access to a computer at home (including a district- or school-provided computer if students take it home), in your estimation how **available** are those computers for the students to use for school assignments? *(Availability may be affected by things such as having to share the computer with parents or siblings.) (Select one box.)*

    Very available: students can almost always use it when needed .... ☐
    Somewhat available: students can usually use it when needed ..... ☐
    Slightly available: students can rarely use it when needed..... ☐
    Not available: students are not allowed to use it..... ☐
    Don't know..... ☐

12. For your students who have access to a computer at home (including a district- or school-provided computer if students take it home), in your estimation how likely is it that the computer has reliable Internet access from home? *(Select one box.)*

    Very likely .... ☐ Somewhat likely ... ☐ Slightly likely .... ☐ Not likely .... ☐ Don't know.... ☐

13. In your estimation, about what percentage of the students you teach have access to a smartphone at home? _____%

If none of your students have access to a smartphone at home (that is, if question 13 equals zero), skip to question 17.

14. For your students who have access to a smartphone at home, in your estimation how **useful** are those smartphones for completing the assignments you give your students? *(Select one box.)*

    Very useful... ☐ Somewhat useful ... ☐ Slightly useful .. ☐ Note useful .. ☐

15. For your students who have access to a smartphone at home, in your estimation how **available** are those smartphones for the students to use for school assignments? *(Availability may be affected by things such as having to share the device with parents or siblings.) (Select one box.)*

    Very available: students can almost always use it when needed .... ☐
    Somewhat available: students can usually use it when needed ..... ☐
    Slightly available: students can rarely use it when needed..... ☐
    Not available: students are not allowed to use it..... ☐
    Don't know..... ☐

16. For your students who have access to a smartphone at home, in your estimation how likely is it that the smartphone has reliable Internet access from home? *(Select one box.)*

    Very likely .... ☐ Somewhat likely ... ☐ Slightly likely .... ☐ Not likely .... ☐ Don't know.... ☐

For questions 17 through 21, technology includes devices such as computers and smartphones, software such as computer programs and digital apps, and the Internet. Technology-based homework is homework designed to be completed using technology.

17. How much influence does your students' access to technology and the Internet **outside of school** have on the homework assignments that you give them? *(Select one box.)*

    No influence... ☐ Small influence .. ☐ Moderate influence ... ☐ Large influence . ☐

18. How often do you assign technology-based homework to your students? *(Select one box.)*

    Never .... ☐ Rarely .... ☐ Sometimes ... ☐ Often .. ☐

19. How often do you assign any type of homework to your students? *(Include both technology-based and non-technology-based homework.) (Select one box.)*

    Never .... ☐ Rarely .... ☐ Sometimes ... ☐ Often .. ☐

If you never give technology-based homework to your students (that is, if question 18 is "never"), skip to question 22.

20. To what extent do your students have difficulty completing technology-based homework because they are not familiar with how to use technology? *(Select one box.)*

Not at all ... ☐ Small extent..... ☐ Moderate extent .... ☐ Large extent .. ☐

21. For your students who have limited access to technology and the Internet **outside of school**, to what extent do you provide the following types of assistance for doing technology-based homework? *(Select one box on each line.)*

Assistance for students with limited technology outside of school	Extent you provide assistance			
	Not at all	**Small extent**	**Moderate extent**	**Large extent**
a. Have students download homework assignments and materials while they are at school so they can work on the homework assignments on a computer without access to the Internet.....	☐	☐	☐	☐
b. Provide hardcopy homework assignments and materials for students to use at home.....	☐	☐	☐	☐
c. Give students extended time or a later deadline to turn in homework assignments	☐	☐	☐	☐
d. Give time during class for students to use school technology to work on homework assignments.....	☐	☐	☐	☐
e. Give alternate homework assignments that don't require technology to complete (e.g., make a poster by hand rather than a computer presentation).....	☐	☐	☐	☐

22. How prepared are your students to use the technology required for online or computerized assessments given by your state, district, or school? *(Select one box.)*

Very prepared..... ☐
Somewhat prepared ..... ☐
Slightly prepared ..... ☐
Not prepared..... ☐
Not applicable (no online or computerized assessments are given by the state, district, or school) ..... ☐

23. Which statement best describes the way your classes at this school are organized? *(Select one box.)*

Self-contained classroom: you instruct the same group of students all or most of the day in multiple subjects ..... ☐ *(Skip to question 25.)*

Departmentalized instruction: you instruct several classes of different students all or most of the day in one or more subjects ..... ☐ *(Continue with question 24.)*

24. Which of the following subjects do you teach at this school? *(Select all that apply.)*

English/language arts..... ☐
Social studies/social science..... ☐
Math..... ☐
Science..... ☐

25. What grades do you currently teach at this school? *(Circle all that apply.)*

PK K 1 2 3 4 5 6 7 8 9 10 11 12 Ungraded

THANK YOU. PLEASE KEEP A COPY OF THIS SURVEY FOR YOUR RECORDS.