Technical Notes
Educational Technology in U.S. Public Schools, Fall 2008

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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 1,000 to 1,500 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 classification variables. However, as the number of categories within the classification variables increases, the sample size within categories decreases, which results in larger sampling errors for the breakouts by classification variables.

Sample and Response Rates

The sample for the FRSS 2008 school survey on educational technology consisted of 2,005 public elementary and secondary/combined schools in the 50 states and the District of Columbia. This survey was one of three related FRSS surveys conducted under a nested design involving a sample of schools, districts that administer the sampled schools, and teachers within the sampled schools.

A nationally representative sample of regular U.S. public schools was selected from the 2005–06 NCES Common Core of Data (CCD) Public School Universe file, which was the most current file available at the time of selection. The sampling frame included 85,719 regular schools. Excluded from the sampling frame were schools with a high grade of prekindergarten or kindergarten and ungraded schools, along with special education, vocational, and alternative/other schools; schools outside the 50 states and the District of Columbia; and schools with zero or missing enrollment.

To select the sample, the public school sampling frame was stratified by level (elementary or secondary/combined), categories of enrollment size, and categories for percent of students eligible for free/reduced-price lunch. To improve the representativeness of the sample, an implicit stratification was induced by sorting the schools within each stratum by type of locale[1] and region prior to sampling. Within each stratum, schools were sampled systematically and with equal probabilities at predetermined rates that varied from stratum to stratum.

Questionnaires and cover letters for the study were mailed to the principal of each sampled school in September 2008. The letter introduced the study and requested that the questionnaire be completed by the person most knowledgeable about educational technology within the school. Respondents were offered the option of completing the survey via the web or by mail. Telephone follow-up for survey nonresponse and data clarification was initiated in early October 2008 and completed in July 2009.

Of the 2,005 schools in the sample, 56 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). For the eligible schools, the response rate was 78 percent (1,519 responding schools divided by the 1,949 eligible schools in the sample). The weighted response rate was 79 percent. NCES statistical standards and guidelines require a nonresponse bias analysis if the unit response rate at any stage of data collection is less than 85 percent. Therefore, a nonresponse bias analysis was conducted for the survey to inform the nonresponse weight adjustments. The nonresponse bias analysis report is attached and the results are summarized in the Nonsampling Errors, Coding, and Editing section. Of the schools that completed the survey, 61 percent completed it by web, 33 percent completed it by mail, 6 percent completed it by fax, and less than 1 percent completed it by telephone.

Although item nonresponse for key items was very low, missing data were imputed for the items with a response rate of less than 100 percent. The missing items included both numerical data such as the number of instructional computers that have Internet access, as well as categorical data such as whether the school used its district network or Internet access to provide access for students to online distance learning. The missing data were imputed using a "hot-deck" approach to obtain a "donor" school from which the imputed values were derived. Under the hot-deck approach, a donor school that matched selected characteristics of the school with missing data (the recipient school) was identified. The

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[1] The metro-centric locale variable from 2005–06 CCD was used in sampling, weighting, and nonresponse bias analysis. The variable for community type (URBAN) in this data file is based on the urban-centric school locale variable discussed further in the Definitions of Selected Analysis Variables section. This urban-centric locale variable was used as a classification variable in the *First Look* report titled *Educational Technology in U.S. Public Schools: Fall 2008* (NCES 2010–034).

matching characteristics included instructional level, categories of enrollment size, region, categories for percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/Alaska Native students, categories for percent of students eligible for free or reduced-price lunch, district size, and district poverty level. In addition, relevant questionnaire items were used to form appropriate imputation groupings. Once a donor was found, it was used to obtain the imputed values for the school with missing data. For categorical items, the imputed value was simply the corresponding value from the donor school. For numerical items, an appropriate ratio (e.g., proportion of instructional computers that have Internet access) was calculated for the donor school, and this ratio was applied to available data (e.g., reported number of instructional computers) for the recipient school to obtain the corresponding imputed value. Imputation flags are included in the data.

Weighting Procedures and Sampling Errors

The response data were weighted to produce national estimates (see table 1). The weights were designed to adjust for the variable probabilities of selection and differential nonresponse. FRSS survey data are based on complex sample designs that require the use of weights to compensate for variable probabilities of selection, differential response rates, and possible deficiencies in the sampling frame. The reciprocal of the probability of selection, referred to as the "base weight," will produce unbiased (or consistent) estimates of population totals and ratios if there is no nonresponse in the survey. Since a stratified sample design was employed for the survey, the base weight for the i-th school in stratum h was computed as $w_{hi}=1/f_h$ where f_h is the overall sampling rate used to select schools in stratum h.

Adjustment of the base weights was necessary to compensate for the survey nonrespondents (i.e., whole questionnaire or unit nonresponse). To compensate for unit nonresponse, an adjustment factor was computed as the inverse of the base-weighted response rate within selected weighting classes. This factor was then used to inflate the base weights of the schools in the weighting class to obtain the final nonresponse-adjusted weight.

The survey findings are presented in a forthcoming *First Look* report titled *Educational Technology in U.S. Public Schools: Fall 2008* (NCES 2010–034). The reported findings are estimates based on the sample selected and, consequently, are subject to sampling variability. 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 public elementary and secondary schools that have laptop computers on carts for instructional use is 57.5 percent, and the standard error is 1.3 percent. The 95 percent confidence interval for the statistic extends from 57.5 – (1.3 x 1.96) to 57.5 + (1.3 x 1.96), or from 55.0 to 60.0 percent. The coefficient of variation ("c.v.," also referred to as the "relative standard error") of an estimate (y) is defined as c.v. = (s.e. / y) x 100, where s.e. is the standard error of the estimate y.

Because the data from the FRSS educational technology survey were collected using a complex sampling design, the variances of the estimates from this 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 underestimation of the standard errors associated with such estimates. Estimates of standard errors were computed using a technique known as jackknife replication. 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. 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, 50 stratified subsamples of the full sample were created and then dropped one at a time to define 50 jackknife replicates. A computer program (WesVar) was used to calculate the estimates of standard errors using the JK1 option.

Table 1. Number and percent of responding public schools in the study sample, and estimated number and percent of public schools the sample represents, by school characteristics: Fall 2008

School characteristic	Respondent sample (unweighted)		National estimate (weighted)	
	Number	Percent	Number	Percent
All public schools	1,519	100	81,700	100
Instructional level[1]				
Elementary..	808	53	61,800	76
Secondary	660	43	18,000	22
Enrollment size				
Less than 300	252	17	20,000	24
300 to 999	916	60	53,100	65
1,000 or more	351	23	8,700	11
Community type				
City	325	21	17,600	22
Suburban	477	31	26,200	32
Town	215	14	10,900	13
Rural	502	33	27,100	33
Region				
Northeast	297	20	15,400	19
Southeast	366	24	18,100	22
Central	402	26	22,900	28
West	454	30	25,300	31
Percent combined enrollment of Black, Hispanic, Asian/ Pacific Islander, or American Indian/Alaska Native students[2]				
Less than 6 percent	320	21	17,900	22
6 to 20 percent	360	24	18,000	22
21 to 49 percent	362	24	18,800	23
50 percent or more	477	31	27,100	33
Percent of students eligible for free or reduced-price lunch				
Less than 35 percent	599	39	29,700	36
35 to 49 percent	260	17	13,000	16
50 to 74 percent...	378	25	21,000	26
75 percent or more...	282	19	18,100	22

[1] Data for combined schools (those with both elementary and secondary grades) are included in the totals and in analyses by other school characteristics but are not shown separately.
[2] Black includes African American and Hispanic includes Latino.
NOTE: 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), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Nonsampling Errors, Coding, and Editing

The survey estimates are also subject to nonsampling errors that can arise because of nonobservation (nonresponse or noncoverage) errors, errors of reporting, and errors made in data collection. These errors can sometimes bias the data. Nonsampling errors may include such problems as misrecording of responses; incorrect editing, coding, and data entry; differences related to the particular time the survey was conducted; or errors in data preparation. While general sampling theory can be used to determine how to estimate the sampling variability of a statistic, nonsampling errors are not easy to measure and, for measurement purposes, usually require that an experiment be conducted as part of the data collection procedures or that data external to the study be used.

To minimize the potential for nonsampling error, the questionnaire was pretested with school respondents. During the design of the survey and the survey pretest, an effort was made to check for consistency of interpretation of questions and definitions and to eliminate ambiguous items. The questionnaire and instructions were extensively reviewed by NCES and the data requester at the Office of Educational Technology.

Editing of the questionnaire responses was conducted to check the data for accuracy and consistency. Cases with missing or inconsistent items were recontacted by telephone. A coding source file and editing specifications were used to produce the codebook. The codebook served as the main tool for coding, editing, and processing completed questionnaires. Coders used the codebook to identify cases requiring data retrieval or clarification and prepare cases for entry into the web application. The source file served as a data dictionary and included the data file layout, a description of each data item, a list of valid response codes or range formats with codes for nonresponse and inapplicable, and defined skip patterns.

Logics, ranges, and validation checks were prepared prior to data collection and included online edit checks, manual logic checks, and automated checks using SAS. Online checks were incorporated into the web application and manual edits were conducted to process cases received by mail, fax, or telephone. Steps were taken to ensure that the method of entering data from web and hardcopy questionnaires was the same, regardless of mode. For example, to enter survey data received by mail, fax, or telephone, the data processing staff accessed the survey website as "respondents" and "completed" the survey using the responses on the hardcopy survey. Subjecting all survey responses to the same set of built-in logics, ranges, and validation checks helps to ensure that data entry does not produce systematic differences in the survey data. In addition, all hardcopy data were subject to 100 percent verification using "doublekeying."

One potential source of nonsampling error is nonresponse bias. For this survey, nonresponse occurred when an eligible sampled school did not complete the school questionnaire. An analysis was conducted for the survey to look for potential nonresponse biases and examine whether any additional weighting adjustments for nonresponse beyond the usual FRSS procedures should be considered. The nonresponse bias analysis report is attached and the results are summarized below.

The analysis included an examination of response rates by the classification variables (school characteristics) and a comparison of the base-weighted distributions of school characteristics for the total sample versus the respondents. School characteristics used in the analysis were based on data available on the frame at the time of sampling and may differ from data included in the survey data files. During the analysis, school characteristics where the response rates varied significantly for subgroups were identified. Next, comparisons were made of data before and after the standard FRSS nonresponse adjustments were made to the weights. These comparisons involved distributions of respondents by school characteristics, estimates of CCD data items, and selected survey results.

The analysis found that response rates varied significantly by locale, region, race/ethnicity status (defined by percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/Alaska Native), and enrollment size. To compensate for the differential survey response rates, weight adjustments were developed and applied to the base weights. In general, such weight adjustments will reduce nonresponse bias if the variables used in forming the weight adjustment classes are correlated with response propensity (the probability that a sampled school will respond to the survey) and with the characteristics obtained from the survey.

There are reasons to believe that the nonresponse-adjusted weights developed for the survey will be reasonably effective in reducing potential biases. First, the weight adjustments removed most of the disparities between the weighted distributions of the respondents and the distributions of the total sample. Although some differences were not eliminated completely (i.e., by locale), the differences do not seem to be large enough to have a material impact on the weighted estimates derived from the survey. For example, for elementary schools, the mean absolute relative bias across the categories of variables included in the nonresponse bias analysis went from 4.3 percent before adjustment to 2.1 percent after adjustment. Similarly, for secondary/combined schools, the mean absolute relative bias across all categories went from 5.2 percent before adjustment to 2.2 percent after adjustment. A comparison of weighted estimates of selected characteristics available in the CCD files also seems to support the supposition that the nonresponse adjustments were effective in reducing biases. Except for some district-level attributes (which were not controlled for in the weighting process), the weight adjustment procedures eliminated or reduced the difference between the nonresponse-adjusted estimate for the respondent sample and the corresponding base-weighted estimate for the selected sample. Further evidence of the potential bias reductions for numeric variables is given by a comparison of weighted estimates of selected survey items before and after nonresponse adjustment, where it was found that for numeric variables related to counts of computers or devices, the nonresponse-adjusted estimates were generally greater than the corresponding base-weighted estimates prior to adjustment. Since the responding schools tend to be smaller and less urban than the population as a whole, the observed differences suggest that the unadjusted estimates understate the values of these types of numeric variables.

Although it is possible to conduct more in-depth analysis and possibly refine the weighting procedures, the results of this analysis suggested that any potential improvements would be modest at best. Therefore, NCES determined that no additional analysis or adjustments to the weights was needed.

Definitions of Selected Analysis Variables

Many of the school characteristics, described below, may be related to each other. For example, school enrollment size and community type are related, with city schools typically being larger than rural schools. Other relationships between these analysis variables may exist.

Instructional Level (LEVEL)—This variable is based on the grades reported in question 16 on the survey questionnaire. There was no item nonresponse for this question. This variable includes the categories below.

Elementary school—Had grade 6 or lower and no grade higher than grade 8
Secondary school—Had no grade lower than grade 7 and had grade 7 or higher
Combined school—Had both elementary and secondary grades as defined above

School Enrollment Size (SIZE)—This variable indicates the total number of students enrolled in the school based on data from the 2005–06 CCD School Universe file. There were no missing data for the responding schools. The variable was collapsed into the three categories below.

Less than 300 students
300 to 999 students
1,000 or more students

Community Type (URBAN)—This variable indicates the type of community in which the school is located, as defined in the 2005–06 CCD Public School Locale Code file. These codes identify the geographic status of a school based on a school's physical address. This classification system is referred to as the "urban-centric" classification system to distinguish it from the previous "metro-centric" classification system. The urban-centric locale codes are assigned through a methodology developed by the U.S. Census Bureau's Population Division in 2005. This classification system has four major locale categories—city, suburban, town, and rural—each of which is subdivided into three subcategories. These 12 categories are based on several key concepts that Census uses to define an area's urbanicity: principal city, urbanized area, and urban cluster, as discussed below.

- A principal city is a city that contains the primary population and economic center of a metropolitan statistical area, which, in turn, is defined as one or more contiguous counties that have a "core" area with a large population nucleus and adjacent communities that are highly integrated economically or socially with the core.

- Urbanized areas and urban clusters are densely settled "cores" of Census-defined blocks with adjacent densely settled surrounding areas. Core areas with populations of 50,000 or more are designated as urbanized areas; those with populations between 25,000 and 50,000 are designated as urban clusters. Rural areas are designated by Census as those areas that do not lie inside an urbanized area or urban cluster.

This variable was based on the 12-category urban-centric locale variable from CCD and collapsed into the four categories below. There were no missing data for the responding schools.

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

Geographic Region (OEREG)—This variable classifies schools into one of the four geographic regions used by the Bureau of Economic Analysis of the U.S. Department of Commerce. Data were obtained from the 2005–06 CCD School Universe file. There were no missing data for the responding schools. The variable was collapsed into the four categories below.

Northeast—Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont
Southeast—Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia
Central—Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin
West—Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington, and Wyoming

Percent Combined Enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/Alaska Native students (MINST)—This variable indicates the percentage of students enrolled in the school whose race or ethnicity is classified as one of the categories below based on data in the 2005–06 CCD School Universe file.

- American Indian/Alaska Native is defined in CCD as a person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition. American Indian includes Alaska Native.

- Asian/Pacific Islander is defined in CCD as a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa. Asian includes Native Hawaiian or other Pacific Islander.

- Black, non-Hispanic is defined in CCD as a person having origins in any of the black racial groups of Africa. Black includes African American.

- Hispanic is defined in CCD as a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race. Hispanic includes Latino.

There were no missing data for the responding schools. This variable was collapsed into the four categories below.

Less than 6 percent
6 to 20 percent
21 to 49 percent
50 percent or more

Percent of Students Eligible for Free or Reduced-Price Lunch (POVST)—This item serves as a measurement of the concentration of poverty at the school. This variable is based on responses to question 15 on the survey questionnaire. If question 15 was not answered, this variable was obtained from the 2005–06 CCD School Universe file. Data were available for all responding schools from either question 15 or CCD. This variable was collapsed into the four categories below.

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

District Enrollment Size (DISTSIZE)—This variable indicates the total number of students enrolled in the school district based on data from the 2005–06 CCD Local Education Agency file. There were no missing data for the responding schools. The variable was collapsed into the three categories below.

Less than 2,500 students
2,500 to 9,999 students
10,000 or more students

District Leadership (DISTLEAD)—This variable indicates whether the school district employs an individual devoted full-time to educational technology leadership. This variable is based on responses to question 14 on the FRSS survey *Educational Technology in Public School Districts, Fall 2008,* which was conducted in coordination with the school survey. The district survey included districts that administered one or more schools sampled for the school survey. There are some missing data (coded as not ascertained) for this item. This is a result of survey (unit) nonresponse on the district survey (i.e., a sampled school completed the school survey but the district that administered the school did not complete the district survey). Item nonresponse for question 14 on the district survey was imputed using hot-deck procedures similar to those described in the Sample and Response Rates section above. This variable was created by recoding responses to the question below from the district survey.

Does your district employ an individual who is responsible for educational technology leadership (e.g., a Chief Information Officer or comparable role)?
    Yes, full-time devoted to this role
    Yes, part-time devoted to this role
    No

Only responses of "yes, full-time devoted to this role" were recoded to "yes." The responses of "yes, part-time devoted to this role" were recoded to "no." The resulting recoded variable and responses are shown below.

Does your district employ an individual who is devoted full-time to educational technology leadership?
    Not ascertained
    Yes
    No

Definitions of Terms

The following is the exact wording of the definitions that were included on the questionnaire.

Technology: Information technology such as computers, devices that can be attached to computers (e.g., LCD projector, interactive whiteboard, digital camera), networks (e.g., Internet, local networks), and computer software. We specifically are not including non-computer technologies such as overhead projectors and VCRs.

Classroom response system: Wireless system allowing a teacher to pose a question and students to respond using "clickers" or hand-held response pads, with responses compiled on a computer.

Document camera: Device that transmits images of 2- or 3-dimensional objects, text, or graphics to a computer monitor or LCD projector.

Descriptions of the acronyms for the following were not included on the questionnaire.

LCD projector: Liquid Crystal Display.

DLP projector: Digital Light Processing.

Windows ME: Millennium Edition.

Voice-over IP (Internet Protocol): Technology, also referred to as VoIP, used to make voice calls via a broadband Internet connection instead of a regular (or analog) phone line. Some VoIP services can only be used to call other people using the same service, but others can be used to call anyone who has a telephone number. Calls can be transmitted directly from a computer, a special VoIP phone, or a traditional phone connected to a VoIP adapter.[2]

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[2] This is based on the definition provided by the Federal Communications Commission at http://www.fcc.gov/voip/.

Attachment

Nonresponse Bias Analysis Report

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Nonresponse Bias Analysis Report
Educational Technology in U.S. Public Schools, Fall 2008

As required by the 2002 revised statistical standards and guidelines for the National Center for Education Statistics (NCES), a nonresponse analysis was conducted for the Fast Response Survey System (FRSS) survey, *Educational Technology in U.S. Public Schools, Fall 2008* (FRSS 92). A nonresponse bias analysis is generally required if the unit response rate at any stage of data collection is less than 85 percent. For FRSS 92, nonresponse occurred when an eligible sampled school did not complete the school questionnaire. The overall unweighted and weighted response rates for FRSS 92 are 78 and 79 percent, respectively, where the weight used in the response rate calculations is the base weight defined to be the reciprocal of the school's selection probability as defined in section 1.

This report summarizes the findings of an initial analysis of nonresponse in FRSS 92. The purpose of the initial analysis is to look for potential nonresponse biases to determine whether more in-depth analysis is required. We will also examine whether any additional weighting adjustments for nonresponse beyond the usual FRSS procedures should be considered.

This report is divided into eight sections. Sections 1 and 4 describe the sample design and development of base weights and nonresponse adjustments. The nonresponse adjustments were developed using standard FRSS procedures and are used for comparison purposes in this report. In section 2, we examine response rates by the classification variables (school characteristics). An alternative but equivalent way of examining response by school characteristics is presented in section 3. It involves comparing the base-weighted distributions of school characteristics for the total sample versus the respondents. In both sections 2 and 3, we identify school characteristics where the response rates vary significantly for subgroups. Next, we present comparisons before and after the standard FRSS nonresponse adjustments are made to the weights. These comparisons involve distributions of respondents by school characteristics (section 5), estimates of CCD data items (section 6), and selected FRSS 92 survey results (section 7). Section 8 contains a summary and conclusion.

1.   Sample Design and Base Weights

A total of 2,005 regular public schools were selected for FRSS 92 from a sampling frame constructed from the 2005–06 Common Core of Data (CCD) Public School Universe file. The sample included 1,004 elementary schools and 1,001 secondary/combined schools. Within the two instructional levels, the schools were stratified explicitly by enrollment size class and categories of poverty status based on the percent of students eligible for free/reduced-price lunch. A total of 50 sampling strata defined by level, enrollment size (five classes), and poverty status (five categories) were created for sampling purposes. The specified sample sizes were allocated to the 50 strata in rough proportion to the sum of the square root of the estimated number of full-time-equivalent (FTE) teachers in the schools in the stratum. Within the strata, schools were selected systematically with probabilities proportionate to the square root of the number of FTE teachers. The use of the square root of the number of FTE teachers in sample selection was designed to provide a reasonably efficient sample of schools for FRSS 92, as well as for a related survey of teachers to be conducted under FRSS 95.

For subsequent weighting purposes, a base weight was calculated for each sampled school. The base weight, w_{hi}, for school i in sampling stratum h was computed as $w_{hi} = 1/P_{hi}$, where P_{hi} is the corresponding probability of selecting the school from the stratum. Under the FRSS 92 sample design, P_{hi}

is proportional to the square root of the number of FTE teachers in the school. The base weights are statistically unbiased if there is no nonresponse in the survey. When survey nonresponse is relatively high (e.g., 15 percent or higher), use of the base weights can lead to potentially serious biases in the sample-based estimates. To minimize the bias, adjustments such as those described in section 4 are made to the base weights to compensate for differential nonresponse losses.

2.   Response Rates by Selected School Characteristics

In addition to the overall unweighted and (base) weighted response rates, response rates were calculated by instructional level (elementary and secondary/combined); locale (city, urban fringe, town, and rural);[3] region (Northeast, Southeast, Central, and West); categories of poverty status defined by percent of students eligible for free/reduced-price lunch; race/ethnicity status defined by percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/Alaska Native students; and enrollment size class. These school characteristics are based on data obtained from the 2005–06 CCD file at the time of sampling.

The results are given in table 1a for the total sample and in tables 1b and 1c for elementary and secondary/combined schools, respectively. As indicated in table 1a, 56 (2.8 percent) of the 2,005 sampled schools were determined to be ineligible for the survey (e.g., closed, inactive, or nonregular schools) and are excluded from the calculation of the response rates summarized below. The last column of the tables shows the p-value of a test of association between response status and each of the selected school characteristics. A p-value of 0.05 or less indicates that there is a statistically significant association between the (weighted) response rate and the specified characteristic.

For the total sample (table 1a), locale, race/ethnicity status, and enrollment size are all significantly correlated with response rate. By locale, the unweighted and weighted response rates are higher in towns and rural areas (84+ percent) than in urban fringe areas (77 and 79 percent) and cities (68 percent). By race/ethnicity status, the unweighted and weighted response rates are higher in the less-than-6 percent group (85+ percent) than in the other race/ethnicity status groups (79 percent or less). By enrollment size class, schools with less than 300 students had the highest response rates (84 percent, unweighted and weighted) compared with schools with larger enrollments (no more than 79 percent). For the remaining school characteristics, the unweighted and weighted response rates did not vary significantly by the individual categories.

Response rates were also calculated separately for the two instructional levels (tables 1b and 1c). Among elementary schools, the characteristic showing the highest correlation with response rate is locale. The unweighted and weighted response rates in towns and rural areas are substantially higher (86+ percent) than the response rates in cities (68 percent). The response rates for elementary schools in urban fringe areas (80, 81 percent) fall in between those observed for schools in towns/rural area and cities. Among secondary/combined schools, response rates varied significantly by region, with the Northeast and West regions having lower response rates (69 to 76 percent) than the Southeast and Central regions (80+ percent). In addition to region, response rates among secondary/combined schools also vary significantly by locale and enrollment size class.

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[3] The metro-centric locale variable from 2005-06 CCD was used in sampling, weighting, and nonresponse bias analysis whereas the urban-centric locale variable was used as a classification variable in the *First Look* report titled *Educational Technology in U.S. Public Schools: Fall 2008* (NCES 2010-034).

3. Comparison of Respondents and Nonrespondents by Selected Characteristics

Base-weighted distributions of respondents and nonrespondents were calculated for the same categories of school characteristics for which the response rates summarized in the previous section were computed. The base-weighted distributions of responding schools (respondent sample) can then be compared with the corresponding base-weighted distributions of the total sample to obtain a measure of the potential impact of nonresponse on the survey-based estimates. These comparisons, which are presented in tables 2a to 2c, provide an alternative but equivalent way of examining response rates for selected subgroups. The p-value shown in column 5 of these tables corresponds to a test of the hypothesis that the weighted distribution of the respondent sample is the same as the distribution of the total sample for the given characteristic. A p-value of 0.05 or less indicates that the two distributions are significantly different, which implies that the distribution of respondents is significantly different from that of the nonrespondents. (The tests associated with the p-values shown in the *last* column of these tables are discussed in section 5.)

Overall, there are significant differences in the distributions of the respondents and nonrespondents by locale, race/ethnicity status, and enrollment size class. These are the same results as shown in table 1a. For example, by locale, the respondent sample has a greater percentage of schools in rural areas (35.12 percent) than the total sample (32.35 percent) and a smaller percentage of schools in cities (19.88 percent) than the total sample (23.21 percent). By race/ethnicity status, the percentage of responding schools in the less-than-6 percent category (22.74 percent) is higher than for the total sample (20.97 percent), reflecting the lower response rates for schools with a large percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/Alaska Native students. By enrollment size class, the percentage of responding schools with less than 300 students (25.82 percent) is higher than for the total sample (24.42 percent), reflecting the lower response rates among the larger schools.

Base-weighted distributions for selected school characteristics were also calculated separately by instructional level (tables 2b and 2c) and are comparable to the information in tables 1b and 1c.

4. Calculation of Nonresponse-Adjusted Weights

In general, weights for FRSS surveys are adjusted for nonresponse within classes defined by the variables used for sample stratification. In addition, other variables that are potentially correlated with response rates are sometimes used as secondary variables to define the weighting cells. For FRSS 92, the variables used explicitly in stratification included instructional level, enrollment size, and a measure of poverty status defined by the percent of students eligible for free/reduced-price lunch. Locale was used to define detailed subcells within some (but not all) of the primary weighting cells. Thus, the nonresponse-adjusted weight, w_{ki}^{NR}, for the ith responding school in weighting class k was computed as: $w_{ki}^{NR} = (1/R_k)$ w_{ki}^{B}, where w_{ki}^{B} is base weight (i.e., reciprocal of the selection probability) for the ith responding school in weighting class k, and R_k is the base-weighted response rate of schools in weighting class k. The resulting nonresponse-adjusted weights are the weights used in the production of the estimates and standard errors for the draft First Look report.

5. Comparisons Before and After Nonresponse Adjustments for Distributions of Respondents

As noted in section 3, the (base) weighted distribution of the respondent sample differed significantly from the total sample for some characteristics. However, the weighting adjustments

described above are designed to compensate for such distributional differences resulting from differential response rates. For example, in column 5 of table 2a, it can be seen that the base-weighted distribution of the respondent sample is significantly different from the corresponding distribution of the total sample by locale, race/ethnicity status, and enrollment size class. However, after nonresponse adjustment, the differences by race/ethnicity status and enrollment size class disappear as indicated in the last column of the table, which presents the p-value of a test comparing the weighted distribution of the respondent sample using the nonresponse-adjusted weights with the corresponding weighted distribution of the total sample using the base weights. Since locale could not always be used to form explicit nonresponse-adjustment classes because of small sample sizes, the weight adjustments were less effective in ameliorating differences by locale. However, despite the statistical significance of the test, the differences appear to be tolerably small (e.g., in table 2a, comparing the base-weighted distribution by locale in column 2 with the corresponding nonresponse-adjusted distribution in column 6, the largest difference is for cities: 23 percent using the base weights versus 21 percent using the nonresponse-adjusted weights). Tables 2b and 2c summarize the corresponding results for elementary and secondary/combined schools respectively. For each level, only the distributions by locale have significant differences between the estimates using the base and nonresponse-adjusted weights.

6.   Comparisons Before and After Nonresponse Adjustments for Estimates of CCD Data Items

Another way of gauging the effectiveness of the weighting procedures is to compare weighted estimates of characteristics before and after the nonresponse adjustments. Tables 3a to 3c summarize such comparisons for the total sample and separately for elementary and secondary/combined schools, respectively. The variables presented in these tables include a range of school- and district-level characteristics from the 2005–06 CCD file that are available for both responding and nonresponding schools. The p-value given in column 5 of these tables corresponds to a test comparing the base-weighted estimate for respondents with the corresponding base-weighted estimate for the total sample (which is an unbiased estimate of the true population value). The p-value shown in the last column of these tables corresponds to a test comparing the nonresponse-adjusted estimate for respondents with the corresponding base-weighted estimate for the total sample. In table 3a, for example, estimates of the mean number of FTE teachers, mean number of students eligible for free/reduced-price lunch, mean number of Black students, and mean number of Hispanic students based on the respondent sample are significantly different from the corresponding means based on the total sample *prior* to nonresponse adjustment. However, after nonresponse adjustment, only the mean number of Hispanic students remains significant but is considerably closer to the total sample mean than the estimate using base weights before the nonresponse adjustment. Note that while the estimated mean number of White students increased after the nonresponse adjustment, the p-value is only marginally significant and the magnitude of the difference appears to be relatively small.

For elementary schools (table 3b), the estimated mean number of students eligible for free/reduced-price lunch and mean number of Hispanic students based on the respondent sample prior to nonresponse adjustment were both significantly different from the corresponding mean based on the total sample, but these differences were eliminated after the nonresponse adjustment. For secondary/combined schools (table 3c), the estimated mean number of FTE teachers, mean number of Black students, and mean number of Hispanic students based on the respondent sample prior to nonresponse adjustment were significantly different from the corresponding mean based on the total sample; only the mean number of Hispanic students remained significant after the nonresponse adjustment.

In addition to means of numeric variables, similar comparisons were made for selected attribute variables. Except for two district-level attributes (i.e., whether the school was in a "large" school district or in a district in a core-based statistical area (CBSA) defined by OMB), the differences were not

statistically significant. For these two district-level variables, the difference between the estimates was significant both before and after the nonresponse adjustment. Note that in general, no district-level variables were used in the nonresponse-adjustment weighting process. Despite the statistically significant results, the nonresponse-adjusted estimates were closer to the total sample estimate than the pre-adjustment estimate, providing some evidence that the weighting adjustments may be moderately effective for variables not explicitly used in the nonresponse-adjustment weighting procedures.

7.   Comparisons Before and After Nonresponse Adjustments for Selected Survey Results

The final set of comparisons conducted in this phase of the nonresponse bias analysis involved a comparison of weighted estimates of selected survey characteristics using the base weights and nonresponse-adjusted weights. The results are summarized in tables 4a to 4c and table 5. The p-value given in these tables corresponds to a test of the hypothesis that there is no difference between the two weighted estimates. In table 4a, the difference between the base-weighted and nonresponse-adjusted estimates was statistically significant for 10 of the 16 numeric variables considered in the analysis. Moreover, in all instances, the nonresponse-adjusted estimate was consistently larger than the corresponding base-weighted estimate, suggesting that the nonresponse adjustments will be effective in offsetting a portion of what appears to be a negative bias of the unadjusted estimate. Separate results for elementary and secondary/combined schools are shown in tables 4b and 4c, respectively. Because of the smaller sample sizes involved in the comparisons, there are fewer significant results for elementary schools. For secondary/combined schools, the difference between the base-weighted and nonresponse-adjusted estimates was statistically significant for 10 of the 16 numeric variables. Moreover, it should be noted that for all of the numeric variables considered in tables 4b and 4c, the effect of the nonresponse-adjustments was to increase or not change the mean value of the survey variable.

On the other hand, it can be seen that for the attribute variables considered in tables 4a to 4c, there were no statistically significant differences. This does not necessarily mean that the nonresponse adjustments were ineffective in reducing the bias of the types of attributes collected in the survey, but rather that the sample sizes were insufficient to detect the magnitude and direction of the bias reductions. The absence of statistically significant differences also suggests that the correlation between the survey responses and the variables used in the weighting adjustment (which are expected to be among the most important predictors of response propensity) is sufficiently small that any adjustment methodology involving these variables will not have an appreciable impact on the weighted estimates.

Finally, table 5 presents the two sets of weighted estimates (base-weighted and nonresponse-adjusted) for selected ratios and percentages as examples of those that may be reported in the First Look report. The estimates include the ratio of students to instructional computers with Internet access, the percentage of instructional computers that are less than 1 year old, and the percentage of schools using their district network or the Internet to provide access for students to online distance learning. The two types of weighted estimates are shown for the total sample and by school characteristics. As indicated by the large p-values, the two weighted estimates are not significantly different for any of the comparisons given in the table. In addition, the estimates in the First Look report will be rounded to whole numbers (for percents) and to one decimal place for the ratio. Since the analysis summarized earlier suggests that the nonresponse adjustments will be reasonably effective in compensating for differential nonresponse losses, the lack of significant results indicates that further adjustment of the weights is unlikely to alter the results for the types of estimates expected to be included in the First Look report.

8.   Summary and Conclusion

The overall response rates for the FRSS 92 survey on educational technology were 78 percent unweighted and 79 percent weighted. Response rates varied significantly by locale, region, minority status, and enrollment size of school (see sections 2 and 3). To compensate for the differential survey response rates, weight adjustments were developed and applied to the base weights (section 4). In general, such weight adjustments will reduce nonresponse bias if the variables used in forming the weight adjustment classes are correlated with response propensity (the probability that a sampled school will respond to the survey) and with the characteristics obtained from the survey.

There are reasons to believe that the current nonresponse-adjusted weights developed for the survey will be reasonably effective in reducing potential biases. First, the weight adjustments removed most of the disparities between the weighted distributions of the respondents and the distributions of the total sample (section 5). Although some differences were not eliminated completely (i.e., by locale), the differences do not seem to be large enough to have a material impact on the weighted estimates derived from the survey. A comparison of weighted estimates of selected characteristics available in the CCD files seems to bear this out. Except for some district-level attributes (which were not controlled for in the weighting process), the weight adjustment procedures seem to have eliminated or reduced the difference between the nonresponse-adjusted estimate for the respondent sample and the corresponding base-weighted estimate for the selected sample (section 6). Further evidence of the potential bias reductions is given by a comparison of weighted estimates of selected survey items before and after nonresponse adjustment, where it was found that for numeric variables related to counts of computers or devices, the nonresponse-adjusted estimates were generally greater than the corresponding base-weighted estimates prior to adjustment (section 7).

Although it is possible to conduct more in-depth analysis and possibly refine the weighting procedures described in section 4, the results of this preliminary analysis suggest that any potential improvements will be modest at best. For this reason and because it would adversely affect the schedule for releasing the survey results, we do not feel that there is a need to conduct additional nonresponse bias analyses for the survey.

Table 1a. Sample sizes by response status, response rates, and test of association between response status and school characteristic for sampled schools, by selected school characteristics: Fall 2008

School characteristic	Sample sizes by response status				Unweighted response rate	Weighted response rate[1]	Test of association (p-value)[2]
	Total	Response	Non-response	Ineligible			
1	2	3	4	5	6	7	8
All schools........................	2,005	1,519	430	56	77.94	79.32	
Instructional level							0.174
Elementary.........................	1,004	784	200	20	79.67	79.90	
Secondary/combined...........	1,001	735	230	36	76.17	77.58	
Locale							#
City.....................................	506	322	155	29	67.51	67.93	
Urban fringe........................	715	543	160	12	77.24	79.28	
Town	186	152	30	4	83.52	84.50	
Rural...................................	598	502	85	11	85.52	86.13	
Region							0.301
Northeast	403	297	94	12	75.96	79.76	
Southeast	460	366	90	4	80.26	80.74	
Central	510	402	90	18	81.71	81.44	
West....................................	632	454	156	22	74.43	76.27	
Percent of students eligible for							
free or reduced-price lunch							0.126
Less than 35 percent	897	691	188	18	78.61	79.85	
35 to 49 percent	362	276	81	5	77.31	80.02	
50 to 74 percent	426	331	81	14	80.34	82.93	
75 percent or more..............	293	202	76	15	72.66	72.68	
Percent combined enrollment							
of Black, Hispanic,							
Asian/Pacific Islander, or							
American Indian/							
Alaska Native students[3]							0.007
Less than 6 percent	383	321	57	5	84.92	86.03	
6 to 20 percent	460	357	101	2	77.95	78.83	
21 to 49 percent	488	361	106	21	77.30	77.83	
50 percent or more..............	674	480	166	28	74.30	76.49	
Enrollment size							0.025
Less than 300......................	338	252	49	37	83.72	83.88	
300 to 499..........................	449	350	91	8	79.37	78.96	
500 or more	1,218	917	290	11	75.97	77.15	

Rounds to zero.

[1] Weighted response rates are calculated using base weights.

[2] Test of association between response status and school characteristic.

[3] Black includes African American and Hispanic includes Latino.

NOTE: Detail may not sum to totals because of rounding. School characteristics are based on data available on the frame at the time of sampling and may differ from classification variables used in other reports.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 1b. Sample sizes by response status, response rates, and test of association between response status and school characteristic for sampled elementary schools, by selected school characteristics: Fall 2008

School characteristic	Sample sizes by response status				Unweighted response rate	Weighted response rate[1]	Test of association (p-value)[2]
	Total	Response	Non-response	Ineligible			
1	2	3	4	5	6	7	8
All elementary schools.........	1,004	784	200	20	79.67	79.90	
Locale							#
City..	262	173	81	8	68.11	67.76	
Urban fringe	410	326	79	5	80.49	80.80	
Town	80	66	11	3	85.71	85.52	
Rural......................................	252	219	29	4	88.31	87.59	
Region							0.356
Northeast	201	161	36	4	81.73	83.07	
Southeast	245	198	47	0	80.82	80.84	
Central....................................	242	189	46	7	80.43	80.88	
West	316	236	71	9	76.87	76.50	
Percent of students eligible for free or reduced-price lunch							0.142
Less than 35 percent................	374	302	69	3	81.40	80.94	
35 to 49 percent......................	166	126	35	5	78.26	80.01	
50 to 74 percent......................	243	200	38	5	84.03	84.72	
75 percent or more..................	210	147	56	7	72.41	72.45	
Percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/ Alaska Native students[3]							0.049
Less than 6 percent..................	161	139	21	1	86.88	87.25	
6 to 20 percent........................	202	160	41	1	79.60	79.55	
21 to 49 percent......................	266	202	52	12	79.53	78.07	
50 percent or more..................	375	283	86	6	76.69	77.45	
Enrollment size							0.252
Less than 300..........................	173	137	22	14	86.16	84.75	
300 to 499..............................	314	247	63	4	79.68	78.96	
500 to 599..............................	152	118	34	0	77.63	77.75	
600 to 749..............................	159	124	33	2	78.98	79.34	
750 or more	206	158	48	0	76.70	76.91	

\# Rounds to zero.
[1] Weighted response rates are calculated using base weights.
[2] Test of association between response status and school characteristic.
[3] Black includes African American and Hispanic includes Latino.
NOTE: Detail may not sum to totals because of rounding. School characteristics are based on data available on the frame at the time of sampling and may differ from classification variables used in other reports.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 1c. Sample sizes by response status, response rates, and test of association between response status and school characteristic for sampled secondary/combined schools, by selected school characteristics: Fall 2008

School characteristic	Sample sizes by response status				Unweighted response rate	Weighted response rate[1]	Test of association (p-value)[2]
	Total	Response	Non-response	Ineligible			
1	2	3	4	5	6	7	8
All secondary/combined schools	1,001	735	230	36	76.17	77.58	
Locale							#
City...	244	149	74	21	66.82	68.58	
Urban fringe	305	217	81	7	72.82	72.16	
Town	106	86	19	1	81.90	82.29	
Rural.......................................	346	283	56	7	83.48	83.35	
Region							0.009
Northeast	202	136	58	8	70.10	69.02	
Southeast	215	168	43	4	79.62	80.40	
Central....................................	268	213	44	11	82.88	82.94	
West	316	218	85	13	71.95	75.61	
Percent of students eligible for free or reduced-price lunch							0.568
Less than 35 percent................	523	389	119	15	76.57	77.36	
35 to 49 percent	196	150	46	0	76.53	80.04	
50 to 74 percent	183	131	43	9	75.29	75.97	
75 percent or more..................	83	55	20	8	73.33	74.18	
Percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/ Alaska Native students[3]							0.061
Less than 6 percent..................	222	182	36	4	83.49	83.41	
6 to 20 percent........................	258	197	60	1	76.65	77.17	
21 to 49 percent	222	159	54	9	74.65	76.91	
50 percent or more..................	299	197	80	22	71.12	72.56	
Enrollment size							0.017
Less than 300..........................	165	115	27	23	80.99	81.55	
300 to 499...............................	135	103	28	4	78.63	78.92	
500 to 999...............................	273	216	52	5	80.60	80.41	
1,000 to 1,499.........................	176	116	57	3	67.05	66.71	
1,500 or more..........................	252	185	66	1	73.71	74.17	

Rounds to zero.
[1] Weighted response rates are calculated using base weights.
[2] Test of association between response status and school characteristic.
[3] Black includes African American and Hispanic includes Latino.
NOTE: Detail may not sum to totals because of rounding. School characteristics are based on data available on the frame at the time of sampling and may differ from classification variables used in other reports.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 2a. Comparisons of weighted distributions of sampled schools, by response status and selected school characteristics: Fall 2008

School characteristic	Base-weighted data				Nonresponse-adjusted data	
	Percent distribution of sample			Test of association (p-value)[1]	Percent distribution for respondents	Test of association (p-value)[2]
	Total	Respondents	Non-respondents			
1	2	3	4	5	6	7
All schools	100.00	100.00	100.00	---	100.00	---
Instructional level				0.171		0.974
Elementary	75.00	75.55	72.89		75.00	
Secondary/combined	25.00	24.45	27.11		25.00	
Locale				#		#
City..	23.21	19.88	36.00		20.95	
Urban fringe	35.57	35.55	35.65		36.66	
Town	8.87	9.45	6.65		9.10	
Rural...	32.35	35.12	21.71		33.30	
Region				0.296		0.595
Northeast	18.70	18.80	18.30		18.92	
Southeast	21.83	22.22	20.34		22.11	
Central..	27.58	28.31	24.75		27.97	
West	31.89	30.66	36.61		30.99	
Percent of students eligible for free or reduced-price lunch				0.123		0.635
Less than 35 percent...................	41.11	41.37	40.10		41.29	
35 to 49 percent..........................	18.52	18.68	17.91		18.36	
50 to 74 percent..........................	22.97	24.01	18.98		23.29	
75 percent or more......................	17.40	15.94	23.01		17.06	
Percent combined enrollment of Black, Hispanic, Asian/ Pacific Islander, or American Indian/ Alaska Native students[3]				0.008		0.127
Less than 6 percent......................	20.97	22.74	14.17		21.95	
6 to 20 percent............................	22.25	22.11	22.78		21.79	
21 to 49 percent..........................	23.45	23.01	25.15		22.85	
50 percent or more......................	33.33	32.14	37.89		33.40	
Enrollment size				0.025		0.995
Less than 300..............................	24.42	25.82	19.03		24.42	
300 to 499...................................	29.29	29.16	29.81		29.29	
500 or more	46.29	45.02	51.15		46.29	

Rounds to zero.

[1] Test comparing distribution of total sample versus respondent sample using base weights.

[2] Test comparing distribution of respondent sample using nonresponse-adjusted weights with distribution of total sample using base weights.

[3] Black includes African American and Hispanic includes Latino.

NOTE: Detail may not sum to totals because of rounding. School characteristics are based on data available on the frame at the time of sampling and may differ from classification variables used in other reports.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 2b. Comparisons of weighted distributions of sampled elementary schools, by response status and selected school characteristics: Fall 2008

School characteristic	Base-weighted data				Nonresponse-adjusted data	
	Percent distribution of sample			Test of association (p-value)[1]	Percent distribution for respondents	Test of association (p-value)[2]
	Total	Respondents	Non-respondents			
1	2	3	4	5	6	7
All elementary schools............	100.00	100.00	100.00	---	100.00	---
Locale				#		0.005
City..	24.53	20.81	39.36		22.01	
Urban fringe	39.07	39.51	37.32		40.36	
Town	8.10	8.67	5.84		8.26	
Rural...	28.29	31.01	17.48		29.36	
Region				0.352		0.533
Northeast	19.08	19.83	16.08		19.85	
Southeast	22.67	22.94	21.63		22.90	
Central..	26.74	27.07	25.45		26.71	
West	31.51	30.16	36.85		30.53	
Percent of students eligible for free or reduced-price lunch				0.146		0.536
Less than 35 percent...................	38.03	38.48	36.22		38.10	
35 to 49 percent.........................	17.48	17.48	17.46		17.36	
50 to 74 percent.........................	24.33	25.77	18.58		24.82	
75 percent or more......................	20.16	18.26	27.75		19.71	
Percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/ Alaska Native students[3]				0.053		0.201
Less than 6 percent.....................	19.05	20.80	12.09		20.02	
6 to 20 percent...........................	20.67	20.58	21.04		20.18	
21 to 49 percent.........................	24.58	24.02	26.82		23.73	
50 percent or more......................	35.69	34.60	40.05		36.07	
Enrollment size				0.259		0.959
Less than 300.............................	23.72	25.16	18.00		23.72	
300 to 499..................................	33.39	33.00	34.96		33.39	
500 to 599..................................	14.22	13.84	15.75		14.22	
600 to 749..................................	13.59	13.49	13.97		13.59	
750 or more	15.08	14.51	17.32		15.08	

\# Rounds to zero.

[1] Test comparing distribution of total sample versus respondent sample using base weights.

[2] Test comparing distribution of respondent sample using nonresponse-adjusted weights with distribution of total sample using base weights.

[3] Black includes African American and Hispanic includes Latino.

NOTE: Detail may not sum to totals because of rounding. School characteristics are based on data available on the frame at the time of sampling and may differ from classification variables used in other reports.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 2c.   Comparisons of weighted distributions of sampled secondary/combined schools, by response status and selected school characteristics: Fall 2008

School characteristic	Base-weighted data				Nonresponse-adjusted data	
	Percent distribution of sample			Test of association (p-value)[1]	Percent distribution for respondents	Test of association (p-value)[2]
	Total	Respondents	Non-respondents			
1	2	3	4	5	6	7
All secondary/combined schools	100.00	100.00	100.00	---	100.00	---
Locale				#		0.026
City...	19.25	17.02	26.98		17.77	
Urban fringe..............................	25.08	23.33	31.14		25.55	
Town	11.15	11.83	8.81		11.59	
Rural...	44.52	47.83	33.07		45.10	
Region				0.008		0.086
Northeast	17.57	15.63	24.29		16.14	
Southeast	19.30	20.01	16.87		19.74	
Central......................................	30.08	32.15	22.89		31.74	
West..	33.05	32.21	35.95		32.39	
Percent of students eligible for free or reduced-price lunch				0.580		0.321
Less than 35 percent	50.40	50.39	50.46		50.95	
35 to 49 percent	21.66	22.40	19.12		21.36	
50 to 74 percent	18.85	18.51	20.04		18.66	
75 percent or more.....................	9.08	8.70	10.37		9.03	
Percent combined enrollment of Black, Hispanic, Asian/Pacific Islander, or American Indian/ Alaska Native students[3]				0.062		0.517
Less than 6 percent	26.73	28.74	19.78		27.75	
6 to 20 percent	26.97	26.83	27.46		26.64	
21 to 49 percent	20.07	19.90	20.66		20.21	
50 percent or more.....................	26.23	24.53	32.10		25.40	
Enrollment size				0.013		0.949
Less than 300.............................	26.50	27.85	21.80		26.50	
300 to 499.................................	17.00	17.29	15.98		17.00	
500 to 999.................................	26.72	27.70	23.35		26.72	
1,000 to 1,499	13.68	11.76	20.31		13.68	
1,500 or more............................	16.11	15.40	18.56		16.11	

Rounds to zero.
[1] Test comparing distribution of total sample versus respondent sample using base weights.
[2] Test comparing distribution of respondent sample using nonresponse-adjusted weights with distribution of total sample using base weights.
[3] Black includes African American and Hispanic includes Latino.
NOTE: Detail may not sum to totals because of rounding. School characteristics are based on data available on the frame at the time of sampling and may differ from classification variables used in other reports.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 3a. Comparisons of weighted estimates of CCD data for sampled schools, by response status and selected school characteristics: Fall 2008

	Base-weighted data				Nonresponse-adjusted data	
	Estimates for CCD data items[1]				Estimates for CCD data items for	
CCD data item	Total	Respondents	Non-respondents	T-test [2]	respondents[1]	T-test [3]
1	2	3	4	5	6	7
Numeric variables		(Mean)		(P-value)	(Mean)	(P-value)
FTE teachers................................	35.52	34.78	38.34	0.012	35.53	0.881
Students eligible for free or reduced-price lunch.....................	186.06	177.84	217.63	0.005	184.47	0.224
Migrant students prior year.............	4.93	4.45	6.80	0.122	4.63	0.321
Ungraded students	1.27	0.98	2.38	0.098	1.10	0.310
White students	328.89	330.11	324.21	0.731	332.78	0.049
Black students[4].............................	97.29	92.58	115.36	0.029	96.88	0.847
Hispanic students[5]...........................	109.84	99.55	149.32	0.001	105.25	0.022
Attribute variables		(Percent)		(P-value)	(Percent)	(P-value)
Title I eligible................................	58.66	59.62	55.01	0.168	59.56	0.141
Charter school	2.36	2.18	3.04	0.530	2.10	0.349
In small district (<1,000 students)..	8.42	9.02	6.14	0.124	8.64	0.485
In large district (25,000+ students).	39.98	36.42	53.65	#	37.77	#
In district in a CBSA	23.50	20.09	36.59	#	21.06	#
In district where 30 percent or more are below poverty...............	9.96	10.22	8.96	0.534	10.36	0.338

Rounds to zero.

[1] For numeric variables, estimates are means per school. For attributes, estimates are percentages of schools.

[2] Test comparing base-weighted estimate of total sample with base-weighted estimate of respondent sample.

[3] Test comparing nonresponse-adjusted estimate of respondent sample with base-weighted estimate of total sample.

[4] Black includes African American.

[5] Hispanic includes Latino.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 3b. Comparisons of weighted estimates of CCD data for sampled elementary schools, by response status and selected school characteristics: Fall 2008

CCD data item	Base-weighted data				Nonresponse-adjusted data	
	Estimates for CCD data items[1]				Estimates for CCD data items for respondents[1]	
	Total	Respondents	Non-respondents	T-test [2]		T-test [3]
1	2	3	4	5	6	7
Numeric variables	(Mean)			(P-value)	(Mean)	(P-value)
FTE teachers...	31.27	30.98	32.39	0.273	31.35	0.575
Students eligible for free or reduced-price lunch......................................	179.64	172.49	208.05	0.022	178.62	0.492
Migrant students prior year..................	4.24	3.91	5.55	0.365	4.06	0.638
Ungraded students	1.00	0.67	2.33	0.098	0.75	0.194
White students......................................	271.38	276.26	251.95	0.179	273.71	0.284
Black students[4]	89.83	87.46	99.27	0.327	91.24	0.563
Hispanic students[5]	101.96	93.97	133.76	0.008	98.90	0.135
Attribute variables	(Percent)			(P-value)	(Percent)	(P-value)
Title I eligible......................................	65.15	66.16	61.13	0.234	66.39	0.077
Charter school	2.02	1.59	3.71	0.262	1.56	0.209
In small district (<1,000 students)	6.23	6.60	4.77	0.448	6.27	0.935
In large district (25,000+ students)......	43.83	40.01	59.03	#	41.43	0.004
In district in a CBSA	25.22	21.37	40.52	#	22.49	0.001
In district where 30 percent or more are below poverty	9.73	9.99	8.71	0.640	10.16	0.410

Rounds to zero.
[1] For numeric variables, estimates are means per school. For attributes, estimates are percentages of schools.
[2] Test comparing base-weighted estimate of total sample with base-weighted estimate of respondent sample.
[3] Test comparing nonresponse-adjusted estimate of respondent sample with base-weighted estimate of total sample.
[4] Black includes African American.
[5] Hispanic includes Latino.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 3c. Comparisons of weighted estimates of CCD data for sampled secondary/combined schools, by response status and selected school characteristics: Fall 2008

CCD data item	Base-weighted data				Nonresponse-adjusted data	
	Estimates for CCD data items[1]				Estimates for CCD data items for respondents[1]	
	Total	Respondents	Non-respondents	T-test [2]		T-test [3]
1	2	3	4	5	6	7
Numeric variables	(Mean)			(P-value)	(Mean)	(P-value)
FTE teachers..	48.26	46.51	54.32	0.020	48.09	0.467
Students eligible for free or reduced-price lunch......................................	205.34	194.35	243.37	0.061	202.00	0.334
Migrant students prior year..................	7.02	6.11	10.18	0.160	6.32	0.209
Ungraded students	2.08	1.94	2.54	0.631	2.15	0.817
White students....................................	501.44	496.50	518.51	0.539	510.00	0.121
Black students[4]..................................	119.66	108.40	158.63	0.023	113.83	0.142
Hispanic students[5]	133.48	116.81	191.16	0.007	124.32	0.031
Attribute variables	(Percent)			(P-value)	(Percent)	(P-value)
Title I eligible....................................	39.20	39.39	38.56	0.805	39.06	0.857
Charter school	3.38	4.00	1.26	0.047	3.72	0.225
In small district (<1,000 students)	14.99	16.48	9.81	0.043	15.78	0.165
In large district (25,000+ students)......	28.44	25.33	39.19	0.002	26.79	0.016
In district in a CBSA	18.36	16.15	26.02	0.003	16.77	0.006
In district where 30 percent or more are below poverty	10.65	10.95	9.62	0.617	10.96	0.597

[1] For numeric variables, estimates are means per school. For attributes, estimates are percentages of schools.
[2] Test comparing base-weighted estimate of total sample with base-weighted estimate of respondent sample.
[3] Test comparing nonresponse-adjusted estimate of respondent sample with base-weighted estimate of total sample.
[4] Black includes African American.
[5] Hispanic includes Latino.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.

Table 4a.   Comparisons of selected weighted survey estimates for responding schools before and after nonresponse adjustments: Fall 2008

Survey item	Survey respondents		
	Base-weighted estimates[1]	Nonresponse-adjusted estimates[1]	T-test [2]
1	2	3	4
Numeric variables	(Mean)		(P-value)
Q1 - Number of computers			
Total..	201.9	206.4	0.002
Administrative use only	17.4	17.6	0.102
Instructional use	184.5	188.8	0.001
Q2 – Number of instructional computers, by type			
Desktops	141.2	144.4	0.002
Laptops	41.9	43.0	0.006
Other	1.4	1.4	0.338
Q3 – Number of instructional computers, by location			
Laptops on carts..	25.8	26.4	0.012
In classrooms (excluding laptops on carts)............	94.8	97.2	0.003
In computer labs (excluding laptops on carts)........	49.0	50.0	0.006
In library/media centers (excluding laptops on carts).............	12.0	12.2	0.009
Q4 – Number of instructional computers:			
With Internet access..	181.3	185.5	0.002
Available to take home...	4.3	4.6	0.264
Less than 1 year old	28.5	29.2	0.014
Q6 – Number of handheld devices			
For administrators	1.1	1.1	0.052
For teachers...	1.5	1.5	0.558
For students to use in specific classes	0.8	0.8	0.271
Attribute variables	(Percent)		(P-value)
Q5 - Operating system used on instructional computers			
Windows	90.8	90.9	0.228
MAC OS	34.1	34.2	0.443
Other	2.3	2.3	0.218
Q8 - Wireless network access in the school			
None...	21.6	21.7	0.673
Part of school	30.3	30.1	0.417
Whole school	38.8	38.9	0.640
Q11 – School has full-time technology support	31.0	31.2	0.381

[1] For numeric variables, estimates are means per school. For attributes, estimates are percentages of schools. Responses include imputed values.
[2] Test of difference between base-weighted and nonresponse-adjusted estimates.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008.

Table 4b. **Comparisons of selected weighted survey estimates for responding elementary schools before and after nonresponse adjustments: Fall 2008**

| Survey item | Survey respondents | | |
	Base-weighted estimates[1]	Nonresponse-adjusted estimates[1]	T-test [2]
1	2	3	4
Numeric variables	(Mean)		(P-value)
Q1 - Number of computers			
Total	169.9	171.9	0.063
Administrative use only	14.6	14.6	0.850
Instructional use..	155.3	157.3	0.048
Q2 – Number of instructional computers, by type			
Desktops	119.6	121.1	0.059
Laptops	34.7	35.2	0.140
Other..	1.0	1.0	0.651
Q3 – Number of instructional computers, by location			
Laptops on carts..	20.2	20.3	0.440
In classrooms (excluding laptops on carts)	87.5	89.1	0.020
In computer labs (excluding laptops on carts)........	35.2	35.3	0.635
In library/media centers (excluding laptops on carts)............	9.7	9.8	0.462
Q4 – Number of instructional computers:			
With Internet access..	152.2	154.1	0.056
Available to take home	3.3	3.4	0.562
Less than 1 year old	23.0	23.2	0.394
Q6 – Number of handheld devices			
For administrators...	0.9	0.9	0.727
For teachers	1.7	1.8	0.383
For students to use in specific classes	0.7	0.7	0.697
Attribute variables	(Percent)		(P-value)
Q5 - Operating system used on instructional computers			
Windows...	88.4	88.5	0.368
MAC OS...	32.1	32.1	0.961
Other..	1.5	1.4	0.141
Q8 - Wireless network access in the school			
None	23.5	23.7	0.421
Part of school...	28.1	27.9	0.307
Whole school..	39.8	39.9	0.570
Q11 – School has full-time technology support	27.0	27.1	0.518

[1] For numeric variables, estimates are means per school. For attributes, estimates are percentages of schools. Responses include imputed values.
[2] Test of difference between base-weighted and nonresponse-adjusted estimates.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008.

Table 4c. Comparisons of selected weighted survey estimates for responding secondary/combined schools before and after nonresponse adjustments: Fall 2008

Survey item	Survey respondents		
	Base-weighted estimates[1]	Nonresponse-adjusted estimates[1]	T-test [2]
1	2	3	4
Numeric variables	(Mean)		(P-value)
Q1 - Number of computers			
Total	300.7	309.9	0.024
Administrative use only	26.0	26.6	0.100
Instructional use..	274.7	283.3	0.021
Q2 – Number of instructional computers, by type			
Desktops	207.9	214.6	0.025
Laptops	64.2	66.0	0.032
Other...	2.7	2.7	0.702
Q3 – Number of instructional computers, by location			
Laptops on carts..	43.2	44.6	0.030
In classrooms (excluding laptops on carts)	117.4	121.2	0.042
In computer labs (excluding laptops on carts)........	91.6	94.3	0.030
In library/media centers (excluding laptops on carts)............	18.9	19.4	0.019
Q4 – Number of instructional computers:			
With Internet access..	271.3	279.7	0.023
Available to take home	7.7	8.0	0.304
Less than 1 year old	45.8	47.2	0.047
Q6 – Number of handheld devices			
For administrators...	1.9	1.9	0.121
For teachers	0.6	0.6	0.773
For students to use in specific classes	1.2	1.2	0.233
Attribute variables	(Percent)		(P-value)
Q5 - Operating system used on instructional computers			
Windows..	98.1	98.1	0.700
MAC OS..	40.2	40.6	0.181
Other...	4.8	4.7	0.570
Q8 - Wireless network access in the school			
None	15.6	15.5	0.710
Part of school	36.9	36.8	0.679
Whole school	35.8	35.9	0.869
Q11 – School has full-time technology support	43.5	43.5	0.988

[1] For numeric variables, estimates are means per school. For attributes, estimates are percentages of schools. Responses include imputed values.
[2] Test of difference between base-weighted and nonresponse-adjusted estimates.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008.

Table 5. Comparison of selected weighted survey estimates for responding schools before and after nonresponse adjustment, by school characteristics: Fall 2008

School characteristic	Ratio of students to instructional computers with Internet access			Percent of instructional computers less than 1 year old			Percent of schools using district network or Internet to provide access for students to online distance learning		
	Base weight	Non-response adjusted weight	T-test (p-value)[1]	Base weight	Non-response adjusted weight	T-test (p-value)[1]	Base weight	Non-response adjusted weight	T-test (p-value)[1]
1	2	3	4	5	6	7	8	9	10
All schools..................................	3.07	3.08	0.458	15.47	15.45	0.791	42.34	42.32	0.929
Instructional level									
Elementary	3.21	3.22	0.604	14.78	14.72	0.564	34.31	34.13	0.478
Secondary/combined	2.83	2.85	0.099	16.66	16.65	0.946	67.14	66.88	0.416
Locale									
City..	3.29	3.29	0.924	14.58	14.43	0.401	34.48	34.87	0.343
Urban fringe................................	3.17	3.17	0.922	15.44	15.46	0.822	36.91	37.27	0.324
Town	2.73	2.73	0.993	17.56	17.67	0.785	44.93	45.16	0.736
Rural..	2.87	2.86	0.312	15.50	15.56	0.719	51.58	51.77	0.581
Region									
Northeast	2.76	2.75	0.885	16.25	16.29	0.809	34.50	34.62	0.773
Southeast	2.89	2.89	0.938	17.05	17.12	0.728	46.63	46.41	0.586
Central...	3.07	3.08	0.434	14.50	14.49	0.969	43.73	43.90	0.656
West...	3.48	3.49	0.527	14.20	14.06	0.401	42.74	42.67	0.856
Percent of students eligible for free or reduced-price lunch									
Less than 35 percent	3.10	3.10	0.623	16.28	16.34	0.615	43.65	43.83	0.565
35 to 49 percent	2.95	2.97	0.291	15.50	15.16	0.149	42.93	42.13	0.286
50 to 74 percent	3.09	3.10	0.363	13.03	13.00	0.798	43.66	43.82	0.716
75 percent or more.......................	3.19	3.19	0.724	17.12	17.07	0.872	36.16	36.63	0.393
Percent combined enrollment of Black, Hispanic, Asian/ Pacific Islander, or American Indian/ Alaska Native students[2]									
Less than 6 percent	2.78	2.79	0.432	14.01	13.96	0.678	45.73	45.83	0.773
6 to 20 percent	2.96	2.95	0.453	15.67	15.68	0.919	43.21	43.24	0.927
21 to 49 percent	3.18	3.17	0.380	15.44	15.50	0.767	42.02	41.96	0.845
50 percent or more.......................	3.23	3.25	0.322	16.11	15.98	0.472	39.56	39.65	0.817
Enrollment size									
Less than 300...............................	2.22	2.21	0.369	13.78	13.75	0.851	48.54	48.53	0.978
300 to 499....................................	2.91	2.91	0.805	15.77	15.75	0.925	34.09	34.05	0.917
500 or more	3.29	3.28	0.411	15.68	15.63	0.650	44.12	44.27	0.675

[1] Test of difference between base-weighted and nonresponse-adjusted estimates.
[2] Black includes African American and Hispanic includes Latino.
NOTE: Detail may not sum to totals because of rounding. School characteristics are based on data available on the frame at the time of sampling and may differ from classification variables used in other reports.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Educational Technology in U.S. Public Schools, Fall 2008," FRSS 92, 2008; and Common Core of Data, "Public Elementary/Secondary School Universe Survey," 2005–06.