

Technical Notes

Dual Credit and Exam-Based Courses in U.S. Public High Schools: 2010–11

Data Disclosure Warning

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Data perturbations were conducted on some background data to preclude identification of individuals and institutions.

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 and Response Rates

The sample for the FRSS survey of Dual Credit and Exam-Based Courses consisted of approximately 1,500 regular public high schools in the 50 states and the District of Columbia. The nationally representative sample was selected from the 2009–2010 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 18,921 regular high schools. For purposes of this study, “regular” high schools included schools with a grade 11 or 12, including

charter schools. Excluded from the sampling frame were schools with a highest grade lower than 11, along with special education, vocational, and alternative/other schools, and schools outside the 50 states and the District of Columbia.

To select the sample, the public school sampling frame was stratified by enrollment size (less than 300, 300 to 499, 500 to 999, 1,000 to 1,499, and 1,500 or more) and percent combined enrollment of Black, Hispanic, Asian, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, and students of two or more races (missing, less than 6 percent, 6 to 20 percent, 21 to 49 percent, and 50 percent or more) to create 25 primary strata. Within each of the strata, schools were sorted by community type (city, suburban, town, rural) and region (Northeast, Southeast, Central, West) prior to selection to induce additional implicit stratification. These variables are defined in more detail in the “Definitions of Selected Analysis Variables” section of this report. Within each primary stratum, schools were selected systematically at rates that depended on the enrollment size class of the school.

Questionnaires and cover letters were mailed to the principal of each sampled school in September 2011. The letter stated the purpose of the study and requested that the questionnaire be completed by the person most knowledgeable about dual credit and exam-based courses in the school, often the school’s lead guidance counselor or director of school guidance counselors. Respondents had the option of completing the survey via the Web or on paper. Telephone follow-up for survey nonresponse and data clarification was initiated in October 2011 and completed in February 2012.

Of the approximately 1,500 public high schools in the sample, approximately 50 were found to be ineligible because the school was closed, did not have grade 11 or 12, or did not meet some other criteria for inclusion in the sample (e.g., was an alternative school). For the eligible schools, an unweighted response rate of 91 percent was obtained for this survey (about 1,320 responding schools divided by the approximately 1,450 eligible schools in the sample). The corresponding weighted response rate using the initial base weights was 91 percent. Of the schools that completed the survey, 66 percent completed it via the Web, 33 percent completed it by paper (sent by mail, fax, or e-mail), and 2 percent completed it by telephone.

Cases with missing data were re-contacted by telephone to collect the missing information. If this data retrieval was unsuccessful, missing data were imputed. Although item nonresponse was very low, missing data were imputed for the 23 items with a response rate of less than 100 percent. Table 1 shows the weighted percent of schools with imputed data for each questionnaire item. The missing items included both numerical data such as enrollments in dual credit courses taught via distance education with an academic course focus, as well as categorical data, such as whether students earned a postsecondary certificate by taking dual credit courses. 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 matching characteristics included enrollment size, community type, region, percent eligible for free or reduced-price lunch, and percent combined enrollment of Black, Hispanic, Asian, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, and students of two or more races. In addition, other relevant questionnaire items were used to form appropriate imputation groupings. Once a donor was found, it was used to derive 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 enrollment items, the imputed value was calculated by taking the donor’s response for that item and dividing that number by the total enrollment in the donor school. This ratio was then multiplied by the total number of students enrolled in the recipient school to provide an imputed value. Imputation flags are included in the data.

Table 1. Weighted percent of public high schools with imputed data, by questionnaire item: School year 2010–11

Questionnaire item		Percent imputed (weighted)
Question 2.	During the 12-month 2010–11 school year, what was the total number of enrollments in AP and IB courses for your students?	
Q2	AP and IB course enrollments (duplicated).....	0.27
Question 3.	During the 12-month 2010–11 school year, did any of your students take any AP courses for which they could earn dual credit <u>without</u> taking the AP exam?	
Q3	AP courses taken for dual credit without taking AP exam.....	0.07
Question 4.	Of the enrollments reported in question 2, what was the total number of enrollments in AP courses for which students could earn dual credit <u>without</u> taking the AP exam?	
Q4	Enrollments in AP courses taken for dual credit without taking AP exam	1.87
Question 8.	During the 12-month 2010–11 school year, did any of your students earn the following from a postsecondary institution by taking dual credit courses?	
Q8a	Postsecondary credential earned: Certificate.....	0.07
Question 10.	During the 12-month 2010–11 school year, what was the total number of high school enrollments for each of the following types of dual credit courses?	
Q10aCOL1	Academic focus: Enrollments in courses taught primarily through distance ed.....	0.29
Q10aCOL2	Career and tech/voc focus: Enrollments in courses taught primarily through distance ed.....	0.46
Q10bCOL1	Academic focus: Enrollments in courses taught at locations for secondary school students	0.75
Q10bCOL2	Career and tech/voc focus: Enrollments in courses taught at locations for secondary school students.....	0.67
Q10cCOL1	Academic focus: Enrollments in courses taught at postsecondary institutions	0.58
Q10cCOL2	Career and tech/voc focus: Enrollments in courses taught at postsecondary institutions.....	0.64
Question 11.	Which of the following best describes the instructors of the courses for dual credit that were taught at locations for secondary school students (<i>e.g., high school campus or career center</i>), excluding distance education?	
Q11COL1	Academic focus: Type of instructors for dual credit courses taught at secondary school locations	0.12
Question 12.	What was the most common student composition for the courses for dual credit taught on the campus of a postsecondary institution, excluding distance education?	
Q12COL1	Academic focus: Student composition for dual credit courses taught at postsecondary institutions.....	0.17
Q12COL2	Career and tech/voc focus: Student composition for dual credit courses taught at postsecondary institutions	0.20
Question 13.	Were students awarded postsecondary credit immediately upon completion of courses? Were students offered “credit in escrow,” meaning that they must enroll in a specific postsecondary institution after high school graduation in order to receive the credit?	
Q13aCOL1	Academic focus: Were students awarded postsecondary credit immediately upon completion of courses.....	0.11
Q13bCOL1	Academic focus: Were students offered credit in escrow	0.11
Q13cCOL1	Academic focus: Were students awarded other (specify) postsecondary credit.....	0.11
Question 14.	During the 12-month 2010–11 school year, did most of your students (and their parents) generally pay out of pocket for each of the following dual credit course expenses?	
Q14bCOL1	Academic focus: Whether students generally paid out of pocket for dual credit course fees.....	0.11
Q14cCOL1	Academic focus: Whether students generally paid out of pocket for dual credit course books.....	0.11
Question 16.	During the 12-month 2010–11 school year, which source(s) were responsible for your students’ transportation costs for participation in the dual credit course(s)?	
Q16a	Responsible for dual credit course transportation: School/district.....	0.17
Q16b	Responsible for dual credit course transportation: State.....	0.17
Q16c	Responsible for dual credit course transportation: Postsecondary institution	0.17
Q16d	Responsible for dual credit course transportation: Parents/students	0.17
Q16e	Responsible for dual credit course transportation: Other source(s) (specify)	0.17

NOTE: Percents are calculated as the weighted number of imputed cases divided by the weighted number of questionnaire respondents for whom the question applied (i.e., respondents instructed to skip the question are excluded from the base). Only questionnaire items with missing data are listed in the table.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), “Dual Credit and Exam-Based Courses,” FRSS 104, 2011.

Weighting Procedures and Sampling Errors

The response data were weighted to produce national estimates (see table 2). The weights were designed to reflect the variable probabilities of selection of the sampled schools and were adjusted for differential unit (questionnaire) 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 $whi=1/fh$ where fh is the overall sampling rate used to select schools in stratum h .

Table 2. Number and percentage of responding public high schools in the study sample, and estimated number and percentage of public high schools the sample represents, by school characteristics: School year 2010–11

School characteristic	Respondent sample (unweighted)		National estimate (weighted) ¹	
	Number	Percent	Number	Percent
All public high schools	1,318	100	17,800	100
Enrollment size				
Less than 500	363	28	8,300	47
500 to 1,199	420	32	5,000	28
1,200 or more	535	41	4,500	25
Community type				
City	273	21	3,300	18
Suburban	357	27	3,600	20
Town	193	15	2,600	15
Rural	495	38	8,400	47
Percent combined enrollment of Black and other races/ethnicities²				
Less than 6 percent	237	18	4,000	22
6 to 20 percent	341	26	4,500	25
21 to 49 percent	333	25	3,900	22
50 percent or more	407	31	5,400	31

¹Weighted count of responding high schools using the final nonresponse-adjusted weights. The weighted count is an estimate of the number of eligible schools in the study universe (see text for definition of the types of schools included in the study).

²Other races/ethnicities include Hispanic, Asian, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, and students of two or more races.

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), “Dual Credit and Exam-Based Courses,” FRSS 104, 2011.

Although the survey had a high response rate, adjustment of the base weights was necessary to compensate for the survey nonrespondents (i.e., whole questionnaire or unit nonresponse). The nonresponse weighting adjustments were made within classes defined by sampling stratum, community type, and region. Within the final weighting classes, the base weights (i.e., the reciprocal of schools’ probabilities of selection) of the responding high schools were inflated by the inverse of the weighted response rate for the class.

The survey findings are presented in a *First Look* report titled *Dual Credit and Exam-Based Courses in U.S. Public High Schools: 2010–11* (NCES 2013–001). 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 high schools with students enrolled in dual credit courses is 82 percent, and the standard error is 1.4 percent. The 95 percent confidence interval for the statistic extends from $82 - (1.4 \times 1.96)$ to $82 + (1.4 \times 1.96)$, or from 79.3 to 84.7 percent.

Because the data from the FRSS school survey on dual credit and exam-based courses 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 under- or overestimation 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, 100 stratified subsamples of the full sample were created and then dropped one at a time to define 100 jackknife replicates. A computer program (WesVar) was used to calculate the estimates of standard errors using the JK1 option.

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 guidance counselors or other school-level personnel considered to be the most knowledgeable about dual credit and exam-based courses in the school. 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 also extensively reviewed by NCES and the data requester at the Office of Elementary and Secondary Education (OESE), U.S. Department of Education.

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.”

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.

Enrollment size (SIZE)—This variable indicates the total number of students enrolled in the school based on data from the 2009–10 CCD Public School Universe file. The variable was collapsed into the following three categories:

Less than 500 students

500 to 1,199 students

1,200 or more students

Community type (URBAN)—This variable indicates the type of community in which the school is located, as defined in the 2009–10 CCD Public School Universe file. These codes are based on the location of school buildings. 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. 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 combined enrollment of Black and other races/ethnicities (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 2009–10 CCD Public School Universe file.

- American Indian/Alaska Native
- Asian
- Black
- Native Hawaiian/Pacific Islander
- Hispanic
- Two or more races

The variable was collapsed into the following four categories:

Less than 6 percent

6 to 20 percent

21 to 49 percent

50 percent or more