The Educational Opportunity Project at Stanford University

Stanford Education Data Archive Technical Documentation

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What is SEDA2022?

The Stanford Education Data Archive (SEDA) is created by the Educational Opportunity Project (EOP) at Stanford University (https:\\edopportunity.org). The EOP aims to generate and share data and research that can help scholars, policymakers, educators, and parents learn how to improve educational opportunities for all children. SEDA is the flagship data product of the EOP; it showcases how state accountability test data can be used to study educational opportunity in the U.S.

SEDA2022 is a special release of the Stanford Education Data Archive, done as part of a larger partnership with Harvard University's Center for Education Policy Research. This release is designed to provide insight into how school district average achievement in 2022, two years after the onset of the COVID-19 pandemic, compares to achievement in 2019, the year prior to the pandemic. The construction of SEDA2022 was supported by grants from the Bill and Melinda Gates Foundation and the Carnegie Corporation of New York. Some of the data used in constructing the SEDA files were provided by SchoolDigger and by the National Center for Education Statistics (NCES). The findings and opinions expressed in our research and reported here are those of the authors alone; they do not represent the views of the U.S. Department of Education, NCES, or any of the aforementioned funding agencies.

Source Data

The data used to construct SEDA2022 test score estimates come from two primary sources: (1) the ED*Facts* 2019 proficiency data; and (2) the publicly-released 2022 proficiency data from state websites. The ED*Facts* proficiency data was provided via restricted-use license to our team. The data are reported by school, subject, grade, year, and subgroup and include schools in every state. The state-released proficiency data was collected from public websites by SchoolDigger. The data we used were reported by school district, subject, grade, year, and subgroup. Not all states had released proficiency data by the time of the SEDA2022 launch, therefore only a subset of U.S. states is included in the current data. Additional states will be added, as data becomes available.

Because different states use different tests and proficiency thresholds, the test score estimates derived from the aforementioned data sources were not readily comparable across states, grade, or years. Therefore, we also draw on the National Assessment of Educational Progress (NAEP) 2019 and 2022 national and state assessment data in 4^{th} and 8^{th} grade to link the estimates to a scale that is comparable among states and over grades and years.

Definitions

Administrative school district: Administrative school districts are defined per NCES and the schools associated with each district are identified using the NCES "leaid." We use term "sedaadmin" to refer to administrative school districts in our datasets. Note that this is distinct from the "sedalea" or geographic district used in SEDA 4.1.

Subgroup: Subgroups are defined per state accountability reporting requirements; our data include the following subgroups: all, Black, Hispanic, White, poor (economically disadvantaged), and non-poor (not disadvantaged).

Construction

Construction of the SEDA2022 test score estimates occurs in a series of steps. These steps are largely similar to those described in the SEDA 4.1 Technical Documentation. Here we provide a brief overview of the process and highlight where the SEDA2022 process deviates from the SEDA 4.1 process.

Step 1: Creating the Crosswalk. This step links each public school to an administrative school district (e.g., NCES leaid) in 2019. This deviates from the SEDA 4.1 process, which uses geographic school districts, rather than administrative districts. A school-to-leaid crosswalk is not needed in 2022 as the proficiency data are already reported by NCES leaid.

The use of administrative districts (rather than geographic districts) was preferred for SEDA2022 for two reasons. First, while the data gathered from state websites for 2022 was often reported by both school and administrative district, the administrative district data was subject to less suppression and therefore provided higher quality input data. Aggregating school-level data to administrative districts or other units would have led to sample losses. Second, as one goal of this data could be to examine how district decision-making has influenced recovery from COVID-19, it is more effective to group schools into their existing administrative units, which control policy and funding allocation.

Step 2: Data Cleaning. This step removes data not used in the estimation of mean test scores. The rules for removing data are the same in SEDA2022 as in SEDA 4.1. Notably, the auxiliary participation rate data used to determine state-level removals is not available in the 2022 source data, so only 2019 cases are excluded for low state-level participation.

Step 3: Estimating and Linking Cutscores. This step uses Heteroskedastic Ordered Probit (HETOP) models to estimate the state-grade-subject-year cutscores, link the estimated cutscores to the NAEP scale, and standardize the linked cutscores to the Cohort Standardized (CS) scale. The resulting cutscores are comparable across states and years.

In SEDA2022, for some states the 2022 district-level proficiency data is insufficient for the HETOP estimation due to partial suppression. In these state-subject-grade-year cases, we calculate the cutscores from overall state totals using the state proficiency counts and the inverse cumulative standard normal distribution.

Step 4: Selecting Data for Mean Estimation. This step selects data for district-subgroup-subject-grade-year cases that will be used in estimation. The same rules are used in SEDA2022 and SEDA 4.1. We exclude cases with low participation in the assessment or high percentages of students taking alternate assessments. We also exclude cases for which we have insufficient data to produce an estimate. Notably, the information to make exclusions based on participation and alternate assessments is not available for the 2022 data, so only 2019 cases are excluded by those rules.

Step 5: Estimating Means. This step uses the pooled HETOP model to estimate district-subgroup-subject-grade-year means and standard deviations, along with their standard errors, based on the cutscores from Step 3 and the data prepared in Step 4. Unlike SEDA 4.1, the SEDA2022 means are estimated separately by year. So, we estimate one pooled HETOP model in 2019 and a separate model in 2022. The resulting estimates are on the CS scale, which is comparable across states, within subjects and grades.

Step 6: Creating Additional Reporting Scales. This step creates the three scales reported in SEDA 2022: the Year Standardized (YS), Grade Year Standardized (GYS), and NAEP Point (NP) scales.

To create the YS scale, we standardize the estimates to the 2019 national average in each grade and subject. In this scale, each unit is equivalent to a 2019 national standard deviation in the same subject and grade.

To create the GYS scale, we first approximate the average amount student test scores grow in a grade on NAEP using the 4^{th} and 8^{th} grade estimates by subject in 2019. We calculate the amount the test scores changed between 4th and 8th grade as the average score in 8th grade in 2019 minus the average score in 4th grade in 2019. Then, to get an estimate of per-grade growth, we divide that value by 4. We scale the data using these parameters, such that in the GYS scale each unit is interpretable as 1 grade level equivalent.

To put out estimates on the NAEP scale, we interpolate NAEP means in each grade and subject and use those to scale such that each unit is interpretable as 1 NAEP point.

Step 7: Calculating Achievement Gaps. At this time, we do not calculate or report achievement gaps in SEDA2022.

Step 8: Pooling Mean and Gap Estimates. We use a different HLM pooling model in SEDA2022 than in SEDA 4.1. Separately for each subject, state and scale, we fit the model shown in Equation (1):

$$
\begin{aligned}
mn_{dgy}^{scale} &= \beta_{0d} + \beta_{1d}\left(grade_{dgy} - 5.5\right) + \beta_{2d}\left(D2022_{dgy}\right) \\
&\quad + \beta_{3}\left(\left[grade_{dgy} - 5.5\right] \times D2022_{dgy}\right) + e_{dgy} \\
\beta_{0d} &= \gamma_{00} + v_{0d} \\
\beta_{1d} &= \gamma_{10} + v_{1d} \\
\beta_{2d} &= \gamma_{20} + v_{2d} \\
e_{dgy} &\sim N\left(0, \hat{\omega}_{dgy}^{2}\right);\ \epsilon_{dgy} \sim N(0, \sigma^{2});\ \begin{bmatrix} v_{0d} \\ v_{1d} \\ v_{2d} \end{bmatrix} \sim MVN(0, \boldsymbol{\tau}^{2})
\end{aligned}
\tag{1}
$$

$grade$ is the grade-level and $D2022$ is a dummy variable equal to one is the year is 2022. In this model, β_{0d} is the average score on the selected scale for district d in 2019, adjusting for linear trend across grades 3-8 in 2019. β_{2d} is the change in average score between 2019 and 2022 for district d, adjusting for linear trend across grades. This model is estimated using HLM software, and produces both ordinary least squares ("OL") or shrunken Empirical Bayes ("EB") estimates of the changes.

Step 9: Suppressing Data for Release. The step suppresses estimates that do not reflect the performance of at least 20 unique students in the 2019 school year. We do not suppress based on 2022 sample size because all 2022 source data was public.

We also suppress estimates that are too imprecise to be useful. The precision threshold we use is 0.33 grade levels. For each district and subgroup, we keep both math and reading estimates when one or both have a change estimate (β_{2d}) with a standard error less than 0.33 grade levels.