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# EIR MIDPHASE IMPACT STUDY AT THE WEST COAST SCHOOL DISTRICT: USING THE 2023-2024 AND 2024-2025 STUDENT OUTCOME DATA

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## Table of Contents

# EIR Midphase Impact Study at the West Coast School District: Using the 2023-2024 and 2024-2025 Student Outcome Data

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## Analysis Overview

This is a preliminary report presenting the initial analysis results we found using the school year 2023-2024 (SY23-24) and school year 2024-2025 (SY24-25) student data from the West Coast school district. In here we present Literacy Design Collaborative (LDC) effect Year 1 results and Year 2 results for (a) students at Cohort 1 schools that started receiving LDC training in school year 2023-2024, (b) students at Cohort 2 schools that started receiving LDC training in school year 2024-2025, and (c) the combined sample of these two groups of students.

The Literacy Design Collaborative (LDC) intervention was designed to be a schoolwide intervention, therefore the sample recruitment and assignment were conducted at the school level. Schools were randomly assigned within blocks (e.g., school location and school size) to avoid unequal distribution of schools to treatment and control conditions. Blocking for this analysis was conducted within the West Coast school district and cohorts.

To estimate the impact of the Literacy Design Collaborative (LDC) intervention on students' English language arts (ELA)/reading and science achievement scores, we use hierarchical linear models (HLM), which we adjust for randomization blocks, baseline achievement, and grade level. Please see Appendix A for model specifications of the impact analysis. Model results are produced in R using the package lme4, and then cluster robust standard errors are obtained using the R package club Sandwich (version 0.6.0; Pustejovsky, 2024) in R (version 4.3.0; R Core Team, 2023).

The model-based parameter estimate, , provides a covariate adjusted estimate of the LDC impact on student scale scores (ELA/reading or science). The hypothesis test will determine whether or not the intervention has a statistically significant impact on the given outcome. The sample outcomes are standardized scores within the district, grade level, and assessment. The model-based parameter estimate, , is adjusted to obtain a Hedges *g* effect size, and cluster robust standard errors of are adjusted to obtain a standard error of the Hedges *g* effect size. These are recommended by the What Works Clearinghouse (What Works Clearinghouse,

Institute of Education Sciences, 2020a). Please see Appendix B for equations used to calculate the effect size (Hedges *g*) and the standard error of the effect size.

Grade-level indicator variables and a baseline measure of academic achievement (prior standardized score calculated in the same fashion as the outcome measure) are included as covariates a priori. Additional student characteristic covariates will be included in the model if attrition is high and the covariate does not meet baseline equivalence standards (i.e., has an effect size > .05). Covariates tested for inclusion may include free or reduced-fee lunch status, English learner status, race/ethnicity, and gender.

### Treatment of Missing Data (Only If Attrition Is Low)

Missing baseline assessment data are imputed using dummy variable adjustments (Puma et al., 2009). The prior assessment scores with missing values are imputed with a constant value (e.g., 0), and a dummy variable is created to indicate whether a missing value was imputed for the observation or not. There were no instances of missing data in the grade-level variables when an outcome score was present. Cases where the outcome score is missing are dropped from the analysis.

### Benjamini-Hochberg Correction

Our study focuses on one primary outcome measure per assessment domain—ELA/reading and science achievement scores. For studies that examine measures in multiple outcome domains, WWC applies the Benjamini-Hochberg (BH) correction to the set of findings within the same domain rather than across different domains (What Works Clearinghouse, 2019). We plan to apply BH adjustments to any statistically significant findings within each outcome domain. This approach is consistent with WWC practice and is intended to account for inflated chance of a Type I error (i.e., finding a statistically significant effect in the sample when one does not exist in the population). We plan to report BH adjustments to the primary analyses where we have combined the West Coast school district data with the forthcoming East Coast school district data.

## Year 1 Analysis: Cohorts 1 and 2

This section focuses on presenting the analysis conducted for Cohorts 1 and 2 schools and students at the end of their Year 1 intervention. We provide information on cluster-level attrition, student-level attrition, treatment of missing data, baseline demographics/equivalence, and primary model results and Hedges *g* effects.

### Cluster-Level Attrition

The LDC intervention is designed to be a schoolwide intervention, therefore the sample recruitment and assignment were conducted at the school level. Schools were randomly

assigned within blocks (e.g., school location and school size) to avoid unequal distribution of schools to treatment and control conditions. Blocking for this analysis was conducted within the West Coast school district and cohorts, described more specifically below.

We calculated the cluster-level attrition for each cohort of schools and for the combined schools across both cohorts.

### *Year 1 Cohort 1 Schools*

Originally, there were five blocks of Cohort 1 schools. One school in a Cohort 1 block of two schools that was randomized to be a control school mistakenly received the intervention. As a result, this block of two schools was removed from the analysis. A total of four blocks and 10 schools (five treatment and five control schools) are included in the Cohort 1 analysis.

The pool of study schools consists of those interested in the intervention, as demonstrated by their principals signing the MOUs with LDC. At the time of randomization, there were 12 Cohort 1 schools. Attrition at the cluster (school) level for each outcome is calculated as the proportion of schools at the time of random assignment that drop out of the study and are thus not a part of the analytic sample. Since two of the 12 Cohort 1 schools were lost to attrition, our overall attrition rate in Cohort 1 is 16.7%.

Attrition is also calculated for treatment and control schools separately for each outcome so that overall and differential attrition can be assessed (Wolf et al., 2016). One treatment school and one control school were lost, so the differential attrition rate is 0.0% (16.7% treatment – 16.7% control). According to the What Works Clearinghouse (WWC) attrition boundaries, with an overall attrition percentage of 16 or 17 and with zero differential attrition, our study would qualify under both the cautious boundary and optimistic boundary (What Works Clearinghouse, 2019, Figure II.2, p. 11).

### *Year 1 Cohort 2 Schools*

The pool of study schools consists of those interested in the intervention, as demonstrated by their principals signing the MOUs with LDC. At the time of randomization, there were three blocks comprised of a total of 15 schools in Cohort 2.

Attrition at the cluster (school) level for each outcome is calculated as the proportion of schools at the time of random assignment that drop out of the study and are thus not a part of the analytic sample. All 15 Cohort 2 schools participated in the study, leading to an overall attrition rate in Cohort 2 of 0.0%.

### *Combined Year 1 Cohorts 1 and 2 Schools*

Combined attrition of Cohorts 1 and 2 at the cluster (school) level for each outcome is calculated as the proportion of schools at the time of random assignment that drop out of the study. Since two of the 27 combined Cohort 1 and Cohort 2 schools were lost to attrition, our overall combined attrition rate was 7.4%.

Attrition is also calculated for treatment and control schools separately for each outcome so that overall and differential attrition can be assessed (Wolf et al., 2016). Across both cohorts of schools, one treatment school and one control school were lost, so the differential attrition rate is 0.5% (7.1% treatment – 7.6% control). According to the What Works Clearinghouse (WWC) attrition boundaries, with an overall attrition percentage of 7 or 8 and with close to zero differential attrition, our study would qualify under both the cautious boundary and optimistic boundary (What Works Clearinghouse, 2019, Figure II.2, p. 11).

## Student-Level Attrition

Students could be lost from the analytic sample for a few possible reasons. Students who were not enrolled in the fall semester were not included in the analyses. Students who did not take the state assessments in spring 2024 or 2025 depending on which cohort they belong to, or who exited the treatment or control school before taking the state assessments were also not included in the analyses.

For the ELA outcome analyses, we conducted the overall analyses, and we also conducted three student subgroup analyses. For the science outcome, we were only able to run the overall analysis, due to limited sample size.

### *Year 1 Cohort 1 Students*

The Cohort 1 study student pool consists of all students who were enrolled in Grades 6–8 in the study intervention and control schools, and who were enrolled in ELA courses in the fall semester of 2023. The sample of enrolled students in fall 2023 includes 6,268 students. The final analytic sample has 6,053 of these students who also have ELA outcome scores in SY23-24. Please see Table 1 for the sample sizes for intervention and control students in the original pools and for the final analytical samples for the various analyses.

Table 1

*Year 1 Cohort 1: Sample Sizes for Both Intervention and Control Students in the Original Pools and the Final Analytical Samples for the Various Analyses Conducted*

| | Treatment | | Control | | Overall | |
|---|---|---|---|---|---|---|
| Group | Pool | Sample | Pool | Sample | Pool | Sample |
| **ELA overall** | **3,201** | **3,093** | **3,067** | **2,960** | **6,268** | **6,053** |
| ELA low performers | 1,924 | 1,866 | 2,065 | 2,000 | 3,989 | 3,866 |
| ELA free or reduced-fee lunch status | 2,571 | 2,502 | 2,728 | 2,661 | 5,299 | 5,163 |
| ELA EL sample | 381 | 369 | 641 | 623 | 1,022 | 992 |
| **Science overall** | **1,148** | **1,144** | **1,031** | **1,027** | **2,179** | **2,171** |

### *Year 1 Cohort 2 Students*

The Cohort 2 study student pool consists of all students who were enrolled in Grades 6–8 in the study intervention and control schools, and who were enrolled in ELA courses in the fall semester of 2024. The sample of enrolled students in fall 2024 includes 7,083 students. The final analytic sample has 6,734 of these students who also have ELA outcome scores in SY24-25. Please see Table 2 for the sample sizes for both intervention and control students in the original pools and final analytical samples for the various analyses.

Table 2

*Year 1 Cohort 2: Sample Sizes for Both Intervention and Control Students in the Original Pools and the Final Analytical Samples for the Various Analyses Conducted*

| | Treatment | | Control | | Overall | |
|---|---|---|---|---|---|---|
| Group | Pool | Sample | Pool | Sample | Pool | Sample |
| **ELA overall** | **3,805** | **3,605** | **3,278** | **3,129** | **7,083** | **6,734** |
| ELA low performers | 2,023 | 1,936 | 2,206 | 2,122 | 4,229 | 4,058 |
| ELA free or reduced-fee lunch status | 2,892 | 2,758 | 2,967 | 2,862 | 5,859 | 5,620 |
| ELA EL sample | 537 | 512 | 647 | 621 | 1,184 | 1,133 |
| **Science overall** | **1,378** | **1,330** | **1,353** | **1,294** | **2,708** | **2,624** |

### *Combined Year 1 Cohorts 1 and 2 Students*

Please see Table 3 for the sample sizes for both intervention and control students in the original pools and final analytical samples used for the various analyses for Cohort 1 and Cohort 2 students. The final overall ELA analytic sample has 12,787 of these students who have ELA outcome scores in SY23-24 for students in Cohort 1 schools and ELA outcome scores in SY24-25 for students in Cohort 2 schools. The final overall science analytic sample has 4,795 students who took the science assessments in SY23-24 as Cohort 1 students and in SY24-25 as Cohort 2 students.

Table 3

*Year 1 Combined Cohorts 1 and 2: Sample Sizes for Both Intervention and Control Students in the Original Pools and the Final Analytical Samples for the Various Analyses Conducted*

| | Treatment | | Control | | Overall | |
|---|---|---|---|---|---|---|
| Group | Pool | Sample | Pool | Sample | Pool | Sample |
| **ELA overall** | 7,006 | 6,698 | 6,345 | 6,089 | 13,351 | 12,787 |
| ELA low performers | 3,947 | 3,802 | 4,271 | 4,122 | 8,218 | 7,924 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ELA free or reduced-fee lunch status | 5,463 | 5,260 | 5,695 | 5,523 | 11,158 | 10,783 |
| ELA EL sample | 918 | 881 | 1,288 | 1,244 | 2,206 | 2,125 |
| **Science overall** | 2,526 | 2,474 | 2,384 | 2,321 | 4,887 | 4,795 |

## Baseline Demographics/Equivalence (Only If Attrition Is High)

Since none of the samples of interest have high attrition, we are not employing baseline equivalence testing at this time. If the observed baseline differences exist after adding in the East Coast school district data for primary analyses, we will explore models that control for the baseline differences. Meanwhile, we present the student baseline information for reference.

### *Year 1 Cohort 1 Students*

There are some differences between Cohort 1 intervention and control students in their demographics and prior score variables at baseline year (see Table 4). As presented, Cohort 1 control students were more likely to be receiving free or reduced-fee lunch at schools, and are more likely to be English learners (EL) and Hispanic, while they also scored lower on the ELA assessment in the baseline year.

Table 4

*2023-2024 Year 1 Cohort 1 ELA and Science Analytic Samples: 2022–2023 Baseline Information by Treatment Status*

| | ELA analytic sample | | Science analytic sample | |
|---|---|---|---|---|
| Variable | Intervention (*n* = 2,936) | Control (*n* = 2,827) | Intervention (*n* = 1,052) | Control (*n* = 943) |
| Percent male | 49.5 | 54.0 | 47.6 | 56.3 |
| Percent free or reduced-fee lunch status | 85.2 | 94.1 | 85.7 | 94.5 |
| Percent EL | 12.6 | 22.0 | 10.7 | 17.2 |
| Percent Hispanic | 82.5 | 91.4 | 82.2 | 90.2 |
| Percent White | 5.7 | 2.5 | 6.6 | 2.9 |
| Percent Black | 7.4 | 3.5 | 6.6 | 4.1 |
| Percent Asian | 0.9 | 0.8 | 0.6 | 0.7 |
| Standardized prior ELA score | -0.090 | -0.251 | -0.070 | -0.247 |

*Note.* Percentages are based on non-missing 2022–2023 data from the ELA analytic sample.

### *Year 1 Cohort 2 Students*

As with Cohort 1, there were some differences between Cohort 2 intervention and control students in their demographics and prior score variables at the baseline year (see Table 5). Cohort 2 control students are more likely to be receiving free or reduced-fee lunch at schools, and are more likely to be English learners and Hispanic. Intervention students were more likely to be White. Intervention students also scored higher on the ELA assessment in the baseline year.

Table 5

*2024-2025 Year 1 Cohort 2 ELA and Science Analytic Samples: 2023–2024 Baseline Information by Treatment Status*

| Variable | ELA analytic sample | | Science analytic sample | |
|---|---|---|---|---|
| | Intervention (*n* = 3,220) | Control (*n* = 2,910) | Intervention (*n* = 1,214) | Control (*n* = 1,179) |
| Percent male | 49.3 | 52.5 | 48.0 | 54.3 |
| Percent free or reduced-fee lunch status | 83.8 | 96.1 | 80.7 | 96.6 |
| Percent EL | 14.6 | 20.2 | 12.9 | 19.5 |
| Percent Hispanic | 68.0 | 83.5 | 66.1 | 84.9 |
| Percent White | 14.3 | 2.7 | 15.2 | 2.5 |
| Percent Black | 7.4 | 3.5 | 11.8 | 10.6 |
| Percent Asian | 1.6 | 0.6 | 1.8 | 0.7 |
| Standardized prior ELA score | -0.074 | -0.383 | -0.055 | -0.443 |

*Note.* Percentages are based on non-missing 2023–2024 data from the ELA analytic sample. The full ELA analytic samples including missing 2023-2024 data are 3,605 for intervention students and 3,129 for control students. The full science analytic samples including missing 2023-2024 data are 1,330 for intervention students and 1,294 for control students.

### *Combined Year 1 Cohorts 1 and 2 Students*

See Table 6 for demographics and prior score variables at baseline for combined samples from the Cohort 1 and Cohort 2 schools. For both ELA and science analytical samples, control students are more likely to be receiving free or reduced-fee lunch at schools and are more likely to be English learners and Hispanic. Intervention students were more likely to be White. Intervention students also scored higher on the ELA assessment in the baseline year.

Table 6

*Year 1 Combined Cohorts 1 and 2 ELA and Science Analytic Samples: 2023–2024 Baseline Information by Treatment Status*

| | ELA analytic sample | | Science analytic sample | |
|---|---|---|---|---|
| Variable | Intervention (*n* = 6,147) | Control (*n* = 5,727) | Intervention (*n* = 2,266) | Control (*n* = 2,122) |
| Percent male | 49.4 | 53.3 | 47.8 | 55.2 |
| Percent free or reduced-fee lunch status | 84.5 | 95.2 | 83.1 | 95.7 |
| Percent EL | 13.6 | 21.0 | 11.9 | 18.5 |
| Percent Hispanic | 74.9 | 87.4 | 73.7 | 87.3 |
| Percent White | 10.2 | 2.6 | 11.2 | 2.6 |
| Percent Black | 9.7 | 7.3 | 9.4 | 7.7 |
| Percent Asian | 1.2 | 0.7 | 1.2 | 0.7 |
| Standardized prior ELA score | -0.082 | -0.318 | -0.062 | -0.356 |

*Note.* Percentages are based on non-missing baseline data from the ELA analytic sample. The full ELA analytic samples including missing data are 6,698 for intervention students and 6,089 for control students. The full science analytic samples including missing data are 2,474 for intervention students and 2,321 for control students.

## Primary Model Results and Hedges *g* Effects

Model results are produced in R using the package lme4, and then cluster robust standard errors are obtained using the R package club Sandwich. We present the initial treatment coefficients as well as the cluster robust coefficients and Hedges *g* effect size coefficients. The final LDC effect size magnitudes and determinations of significance are based on Hedges *g* calculations.

### *Year 1 Cohort 1 Analysis Results*

All the SY23-24 Cohort 1 analysis results for the West Coast school district can be found in Table 7. As reported, the overall LDC effects on the student ELA assessment was positive, in favor of LDC students, and the effect on the science assessment was close to zero. For the ELA assessment, we also ran additional analyses for three student groups—students at a low performance level[1] based on baseline ELA assessment, students who qualified to receive free or reduced-fee lunch at schools, and students who were classified as English learners. While the effects are generally positive in favor of LDC students, none of the differences were large enough to reach significance.

Table 7

*Year 1 Cohort 1: Estimated Average Treatment Effect on the Treated in Student Outcomes by School and by Assessment (Models Based and Hedges* g *Effect Sizes, Standard Errors, and* p *Values)*

| Student samples | lme4 model based | lme4 model based *SE* of | Cluster robust | Cluster robust *SE* of | Hedges *g* effect size | Hedges *g* *SE* | *p* value |
|---|---|---|---|---|---|---|---|
| **ELA overall** | 0.045 | 0.066 | 0.045 | 0.063 | 0.048 | 0.068 | .495 |
| ELA low performers | 0.069 | 0.069 | 0.069 | 0.066 | 0.093 | 0.089 | .325 |
| ELA free or reduced-fee lunch status | 0.038 | 0.058 | 0.038 | 0.056 | 0.041 | 0.061 | .514 |
| ELA EL sample | -0.026 | 0.038 | -0.026 | 0.040 | -0.041 | 0.063 | .530 |
| **Science overall** | -0.002 | 0.108 | -0.002 | 0.107 | -0.002 | 0.117 | .985 |

*$p < .05$.

[1] Low performance is defined as Level 1 (standard not met) or Level 2 (standard nearly met).

### *Year 1 Cohort 2 Analysis Results*

All the SY24-25 Cohort 2 analysis findings for the West Coast school district can be found in Table 8. As reported, the LDC effects on student ELA assessments are both positive and of statistical significance in favor of LDC students for three out of the four ELA analyses we conducted. For the ELA assessment, we found that overall LDC students scored statistically significantly higher than the control students, and the difference was an effect size of 0.179 Similar effects were found for students of low performance level based on baseline ELA assessment and for students who qualified to receive free or reduced-fee lunch at schools. We found that LDC students who were classified as English learners scored higher than the control students who were classified as English learners, but the difference did not reach statistical significance. For the LDC effect on the science assessment, we found the effect to be positive but not statistically significant.

Table 8

*Year 1 Cohort 2: Estimated Average Treatment Effect on the Treated in Student Outcomes by School and by Assessment (Models Based and Hedges* g *Effect Sizes, Standard Errors, and* p *Values)*

| Student samples | lme4 model based | lme4 model based *SE* of | Cluster robust | Cluster robust *SE* of | Hedges *g* effect size | Hedges *g* *SE* | *p* value |
|---|---|---|---|---|---|---|---|
| **ELA overall** | 0.170 | 0.066 | 0.170 | 0.066 | **0.179** | **0.069** | **.021*** |
| ELA low performers | 0.174 | 0.073 | 0.174 | 0.072 | **0.230** | **0.095** | **.029*** |
| ELA free or reduced-fee lunch status | 0.150 | 0.059 | 0.150 | 0.058 | **0.163** | **0.063** | **.021*** |
| ELA EL sample | 0.158 | 0.073 | 0.158 | 0.076 | 0.226 | 0.109 | .055 |
| **Science overall** | 0.099 | 0.117 | 0.099 | 0.112 | 0.109 | 0.123 | .392 |

*$p < .05$.

### *Combined Year 1 Cohorts 1 and 2 Analysis Results*

Besides conducting the LDC Year 1 effect analysis for each cohort, we also combined the student samples for Cohorts 1 and 2 for a set of combined analyses, SY23-24 for Cohort 1 students and SY24-25 for Cohort 2 students. Table 9 reports the analysis results for the combined analysis for Year 1 effects. As reported, the LDC effects on student ELA assessments are both positive and of statistical significance for three out of the four ELA analyses we conducted, in favor of LDC students. For the ELA assessment, we found that the overall LDC students scored statistically significantly higher than the control students, and the difference was an effect size of 0.126. Similar effects were found for students of low performance level based on the baseline ELA assessment and for students who qualified to receive free or reduced-fee lunch at schools. We found that LDC students who were classified as English learners scored higher than the control students who were classified as English learners, but the difference did not reach statistical significance. For the LDC effect on the science assessment, we found the effect to be positive but not of statistical significance.

Table 9

*Combined Year 1 Cohorts 1 and 2: Estimated Average Treatment Effect on the Treated in Student Outcomes by School and by Assessment (Models Based and Hedges* g *Effect Sizes, Standard Errors, and* p *Values)*

| Student samples | lme4 model based | lme4 model based *SE* of | Cluster robust | Cluster robust *SE* of | Hedges *g* effect size | Hedges *g* *SE* | *p* value |
|---|---|---|---|---|---|---|---|
| **ELA overall** | 0.118 | 0.048 | 0.118 | 0.047 | **0.126** | **0.049** | **.018*** |
| ELA low performers | 0.131 | 0.052 | 0.131 | 0.050 | **0.174** | **0.066** | **.014*** |
| ELA free or reduced-fee lunch status | 0.105 | 0.043 | 0.105 | 0.042 | **0.113** | **0.045** | **.019*** |
| ELA EL sample | 0.077 | 0.048 | 0.077 | 0.048 | 0.114 | 0.072 | .125 |
| **Science overall** | 0.056 | 0.082 | 0.056 | 0.077 | 0.062 | 0.085 | .475 |

*$p < .05$.

# Year 2 Analysis: Cohorts 1 and 2

As with the earlier section on Year 1 Analysis, this section focuses on presenting the analysis conducted for Cohort 1 schools and students at the end of their Year 2 intervention. We will add in the Year 2 analysis results for Cohort 2 when their data become available. In the following, we provide information on cluster-level attrition, student-level attrition, treatment of missing data, baseline demographics/equivalence, and primary model results and Hedges *g* effects.

## Cluster-Level Attrition

The LDC intervention is designed to be a schoolwide intervention, therefore the sample recruitment and assignment were conducted at the school level. Schools were randomly assigned within blocks (e.g., school location and school size) to avoid unequal distribution of schools to treatment and control conditions. Blocking for this analysis was conducted within the West Coast school district and cohorts, described more specifically below.

We calculated the cluster-level attrition for Cohort 1 schools.

### *Year 2 Cohort 1 Schools*

Originally, there were five blocks of schools in Cohort 1. One school in a Cohort 1 block of two schools that was randomized to be a control school mistakenly received the intervention. As a result, this block of two schools was removed from the analysis. A total of four blocks and 10 schools (five treatment and five control schools) are included in the Cohort 1 analysis.

The pool of study schools consists of those interested in the intervention, as demonstrated by their principals signing the MOUs with LDC. At the time of randomization there were 12 Cohort 1 schools. Attrition at the cluster (school) level for each outcome is calculated as the proportion of schools at the time of random assignment that drop out of the study and are thus not a part of the analytic sample. Since two of 12 Cohort 1 schools were lost to attrition, our overall attrition rate in Cohort 1 is 16.7%.

Attrition is also calculated for treatment and control schools separately for each outcome so that overall and differential attrition can be assessed (Wolf et al., 2016). One treatment school and one control school were lost, so the differential attrition rate is 0.0% (16.7% treatment – 16.7% control). According to the WWCs attrition boundaries, with an overall attrition percentage of 16 or 17 and with zero differential attrition, our study would qualify under both the cautious boundary and optimistic boundary (What Works Clearinghouse, 2019, Figure II.2, p. 11).

### *Year 2 Cohort 2 Schools*

This analysis will be conducted in fall 2026 when 2025–2026 student assessment data become available.

### *Combined Year 2 Cohorts 1 and 2 Schools*

This analysis will be conducted in fall 2026 when 2025–2026 student assessment data become available.

## Student-Level Attrition

Students could be lost from the analytic sample for a few possible reasons. Students who were not enrolled in the fall semester were not included in the analyses. Students who did not take the state assessments in spring 2024 or 2025 depending on which cohort they belong to, or who exited the treatment or control school before taking the state assessments were also not included in the analyses.

### *Year 2 Cohort 1 Students*

The study student pool consists of all students who were enrolled in Grades 6–8 in the study intervention and control schools and who were enrolled in ELA courses in the fall semester of 2024. Students could be lost from the analytic sample for a few possible reasons. Students who were not enrolled in the fall semester are not included in the analyses. Students who did not take the state assessments in spring 2025 or who exited the treatment or control school before taking the state assessments in spring 2025 are also not included in the analyses.

The sample of enrolled students in fall 2024 includes 6,121 students. The final analytic sample has 5,960 of these students who also have ELA outcome scores in SY24-25. Please see Table 10 for the sample sizes for both intervention and control students in the original pools and final analytical samples for the various analyses. For the ELA outcome analyses, we conducted the overall analyses, and we also conducted three student subgroup analyses. For the science outcome, we were only able to run the overall analysis, due to sample size.

Table 10

*Year 2 Cohort 1: Sample Sizes for Both Intervention and Control Students in the Original Pools and the Final Analytical Samples for the Various Analyses Conducted*

| Group | Treatment | | Control | | Overall | |
|---|---|---|---|---|---|---|
| | Pool | Sample | Pool | Sample | Pool | Sample |
| **ELA overall** | **3,191** | **3,120** | **2,930** | **2,840** | **6,121** | **5,960** |
| ELA low performers | 1,836 | 1,803 | 1,890 | 1,836 | 3,726 | 3,639 |
| ELA free or reduced-fee lunch status | 2,643 | 2,593 | 2,702 | 2,633 | 5,299 | 5,163 |
| ELA EL sample | 500 | 406 | 647 | 557 | 1,147 | 963 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Science overall** | **1,185** | **1,156** | **1,113** | **1,080** | **2,298** | **2,236** |

***Year 2 Cohort 2 Students***

This analysis will be conducted in fall 2026 when 2025–2026 student assessment data become available for Cohort 2 students.

***Combined Year 2 Cohorts 1 and 2 Students***

This analysis will be conducted in fall 2026 when 2025–2026 student assessment data become available for Cohort 2 students.

## Baseline Demographics/Equivalence (Only If Attrition Is High)

Since none of the samples of interest have high attrition, we are not employing baseline equivalence testing at this time. If the observed baseline differences exist after adding in the East Coast school district data for primary analyses, we will explore models that control for the baseline differences.

***Year 2 Cohort 1 Students***

There are some differences between Cohort 1 intervention and control students in their demographics and prior score variables at baseline (see Table 11). Cohort 1 control students are more likely to be receiving free or reduced-fee lunch at schools, and more likely to be English learners and Hispanic, while they also scored lower on the ELA assessment in the baseline year. Meanwhile, we present the student baseline information for reference.

Table 11

*2024–2025 Year 2 Cohort 1 ELA and Science Analytic Samples: 2023–2024 Baseline Information by Treatment Status*

| | ELA analytic sample | | Science analytic sample | |
|---|---|---|---|---|
| Variable | Intervention (*n* = 3,012) | Control (*n* = 2,757) | Intervention (*n* = 1,108) | Control (*n* = 1,040) |
| Percent male | 51.8 | 54.1 | 52.7 | 52.7 |
| Percent free or reduced-fee lunch status | 86.1 | 95.5 | 86.6 | 94.9 |
| Percent EL | 13.5 | 20.2 | 13.2 | 20.0 |
| Percent Hispanic | 83.5 | 91.7 | 83.0 | 91.5 |
| Percent White | 5.1 | 2.6 | 5.7 | 3.0 |
| Percent Black | 6.7 | 3.6 | 7.8 | 3.6 |
| Percent Asian | 1.1 | 0.9 | 0.6 | 0.6 |

| | | | | |
|---|---|---|---|---|
| Standardized prior ELA score | -0.072 | -0.239 | -0.074 | -0.267 |

*Note.* Percentages are based on non-missing 2023–2024 data from the ELA analytic sample.

### *Year 2 Cohort 2 Students*

This analysis will be conducted when the 2025–2026 student assessment data become available.

### *Combined Year 2 Cohorts 1 and 2 Students*

This analysis will be conducted when the 2025–2026 student assessment data become available.

## Primary Model Results and Hedges *g* Effects

Model results are produced in R using the package lme4, and then cluster robust standard errors are obtained using the R package club Sandwich. We present the initial treatment coefficients as well as the cluster robust coefficients and Hedges *g* effect size coefficients. The final LDC effect size magnitudes and determinations of significance are based on Hedges *g* calculations.

### *Year 2 Cohort 1 Analysis Results*

All the 2023–2024 Cohort 1 analysis findings for the West Coast school district can be found in Table 12. There were no significant findings for Cohort 1 students on the SY23-24 outcomes.

Table 12

*Year 2 Cohort 1: Estimated Average Treatment Effect on the Treated in Student Outcomes by School and by Assessment (Models Based and Hedges* g *Effect Sizes, Standard Errors, and* p *Values)*

| Student samples | lme4 model based | lme4 model based *SE* of | Cluster robust | Cluster robust *SE* of | Hedges *g* effect size | Hedges *g* *SE* | *p* value |
|---|---|---|---|---|---|---|---|
| **ELA overall** | 0.063 | 0.057 | 0.063 | 0.060 | 0.068 | 0.064 | .318 |
| ELA low performers | 0.050 | 0.057 | 0.050 | 0.059 | 0.067 | 0.080 | .419 |
| ELA free or reduced-fee lunch status | 0.041 | 0.050 | 0.041 | 0.052 | 0.044 | 0.056 | .450 |
| ELA EL sample | 0.033 | 0.065 | 0.033 | 0.065 | 0.051 | 0.100 | .621 |
| **Science overall** | 0.031 | 0.090 | 0.031 | 0.098 | 0.033 | 0.107 | .885 |

*$p < .05$.

### *Year 2 Cohort 2 Analysis Results*

This analysis will be conducted when the 2025–2026 student assessment data become available.

### *Combined Year 2 Cohorts 1 and 2 Analysis Results*

This analysis will be conducted when the 2025–2026 student assessment data become available.

## Summary of LDC Effects: Effect Sizes, Months of Learning, and Scale Score

Table 13 summarizes the Year 1 LDC effects on students' ELA scores for Cohort 1, Cohort 2, and both cohorts combined, and Year 2 LDC effects on students' ELA scores for Cohort 1. Table 14 has the corresponding results for the LDC effects on students' science scores. As reported in Table 13, LDC intervention was found to have a positive effect on the students at the treatment schools when compared to the students at the control schools on both student ELA and science scores. While the positive ELA score difference did not reach statistical significance for the Year 1 Cohort 1 student sample or for the Year 2 Cohort 1 student sample, the positive effects for the other two samples/groups are statistically significant. Specifically, the positive effects are statistically significant for the treatment students at the Cohort 2 schools (effect size of 0.179) and at the combined Cohorts 1 and 2 schools (effect size of 0.126). In these two cases, LDC treatment students scored 0.179 and 0.126 standard deviations higher than the control students in ELA, respectively.

Table 13

*Estimated Average Treatment Effect on the Treated in Student Outcomes by Year and Cohort for ELA Overall (Models Based and Hedges* g *Effect Sizes, Standard Errors, and* p *Values)*

| Cohort | lme4 model based | lme4 model based *SE* of | Cluster robust | Cluster robust *SE* of | Hedges *g* effect size | Hedges *g* *SE* | *p* value |
|---|---|---|---|---|---|---|---|
| Year 1 Cohort 1 | 0.045 | 0.066 | 0.045 | 0.063 | 0.048 | 0.068 | .495 |
| Year 1 Cohort 2 | 0.170 | 0.066 | 0.170 | 0.066 | **0.179** | **0.069** | **.021*** |
| Year 1 Cohorts 1 and 2 | 0.118 | 0.048 | 0.118 | 0.047 | **0.126** | **0.049** | **.018*** |
| Year 2 Cohort 1 | 0.063 | 0.057 | 0.063 | 0.060 | 0.068 | 0.064 | .318 |

*$p < .05$.

Table 14

*Estimated Average Treatment Effect on the Treated in Student Outcomes by Year and Cohort for Science Overall (Models Based and Hedges* g *Effect Sizes, Standard Errors, and* p *Values)*

| Cohort | lme4 model based | lme4 model based *SE* of | Cluster robust | Cluster robust *SE* of | Hedges *g* effect size | Hedges *g* *SE* | *p* value |
|---|---|---|---|---|---|---|---|
| Year 1 Cohort 1 | -0.002 | 0.108 | -0.002 | 0.107 | -0.002 | 0.117 | .985 |
| Year 1 Cohort 2 | 0.099 | 0.117 | 0.099 | 0.112 | 0.109 | 0.123 | .392 |
| Year 1 Cohorts 1 and 2 | 0.056 | 0.082 | 0.056 | 0.077 | 0.062 | 0.085 | .475 |
| Year 2 Cohort 1 | 0.031 | 0.090 | 0.031 | 0.098 | 0.033 | 0.107 | .885 |

*$p < .05$.

As reported in Table 14, while the LDC has a positive effect on the treatment students, none of the LDC effects on student science score differences were statistically significant.

## Converting to Months of Learning

Additionally, to help the reader contextualize the LDC effects, we further calculated the LDC effects in terms of months of learning and scale scores. For the conversion to months of learning, we utilize an approach developed by Hill et al. (2008), which involves benchmarking against average student gains over the course of a school year. The authors reviewed annual achievement gains in seven nationally normed reading assessments: California Achievement Test (CST) fifth edition, Stanford Achievement Test (SAT) ninth edition, TerraNova-Comprehensive Test of Basic Skills (CTBS), Gates-MacGinitie Reading Test, Metropolitan Achievement Test (MAT) eighth edition, Terra Nova-CAT, and SAT tenth edition. They found that students gained an average of 0.32 standard deviations from Grade 5 to 6, 0.23 standard deviations from Grade 6 to 7, and 0.26 standard deviations from Grade 7 to 8. A simple mean of these three average gains is 0.27. As science is tested in Grade 8, we use the 0.26 standard deviations change from Grade 7 to 8 in our calculation.

## Converting to Raw Scale Scores

To convert the effect sizes to raw scale scores, we need to know the standard deviations as the effect sizes have the mean of zero. Based on the ELA student data received from the district, the 2023–2024 districtwide standard deviation for Grade 6 was 109.4, for Grade 7 was 118.0, and for Grade 8 was 119.0. We calculate a simple ELA average standard deviation for the three grades, (109.4+118.0+119.0)/3 = 115. We calculate the science standard deviation based on the district, the 2023–2024 districtwide Grade 8 standard deviation of 21.5. ELA and science standard deviations for 2024–2025 were calculated in the same way as for 2023–2024. The 2024–2025 ELA districtwide standard deviation for Grade 6 was 111.3, the 2024–2025 districtwide standard deviation for Grade 7 was 117.9, and the 2024–2025 districtwide standard deviation for Grade 8 was 119.1. We calculate the science standard deviation based on the district, the 2023–2024 districtwide Grade 8 standard deviation of 21.5.

Averaging the simple average standard deviations from 2023–2024 and 2024–2025 we obtain 115.8 ((115.5+116.1)/2) for ELA and 21.6 ((21.5+21.7)/2) for science. Since the standard deviations were generated from the district data and the effects generated by the regression were based on the district-wide means, we decided to convert the regression-based effects (see model based  in Table 13) instead of the Hedges *g* effects. The scale score effect is equal to the model based  multiplied by the calculated standard deviation as described in more detail below.

## Summary Results for ELA

The conversion of the LDC effects in effect sizes to months of learning and raw scale scores for ELA is provided by year and cohort below. Table 15 shows the summary LDC effects for ELA, the converted months of learning, and the converted raw scale scores for easier communication.

- **Year 1 Cohort 1 ELA Effect in Months of Learning:** The 0.048 overall ELA effect estimate for students is of a similar magnitude to 1.6 months of learning [(.048/0.27)*9 = 1.6 months].
- **Year 1 Cohort 1 Effect in ELA Scale Score:** The regression-based LDC effect of 0.045 on student ELA outcome would equate to about 5.2 scale points (.045*115.5).
- **Year 1 Cohort 2 ELA Effect in Months of Learning:** The 0.179 overall ELA effect estimate for students is of a similar magnitude to 6.0 months of learning [(.179/0.27)*9 = 6.0 months].
- **Year 1 Cohort 2 Effect in ELA Scale Score:** The regression-based LDC effect of 0.170 on student ELA outcome would equate to about 19.7 scale points (.170*116.1).
- **Combined Year 1 Cohorts 1 and 2 ELA Effect in Months of Learning:** The 0.126 overall ELA effect estimate for students is of a similar magnitude to 4.2 months of learning [(.126/0.27)*9 = 4.2 months].
- **Combined Year 1 Cohorts 1 and 2 Effect in ELA Scale Score:** The regression-based LDC effect of 0.118 on student ELA outcome would equate to about 13.7 scale points (.118*115.8).
- **Year 2 Cohort 1 ELA Effect in Months of Learning:** The 0.068 overall ELA effect estimate for students is of a similar magnitude to 2.3 months of learning [(.068/0.27)*9 = 2.3 months].
- **Year 2 Cohort 1 Effect in ELA Scale Score:** The regression-based LDC effect of 0.063 on student ELA outcome would equate to about 7.3 scale points (.063*116.1).

Table 15

*ELA Impact of LDC by Cohort and Year: Effect Sizes, Months of Learning, and Scale Points Added*

| Cohort | LDC analytical sample | Hedges *g* | Months of | Scale points |
|---|---|---|---|---|

| | No. of schools | No. of students | | effect size | learning | added |
|---|---|---|---|---|---|---|
| | | Treatment | Control | | | |
| Year 1 Cohort 1 | 10 | 3,093 | 2,960 | 0.048 | 1.6 | 5.2 |
| Year 1 Cohort 2 | 15 | 3,605 | 3,129 | 0.179 | 6.0 | 19.7 |
| Year 1 Cohorts 1 and 2 | 25 | 6,698 | 6,089 | 0.126 | 4.2 | 13.7 |
| Year 2 Cohort 1 | 10 | 3,120 | 2,840 | 0.068 | 2.3 | 7.3 |

## Summary Results for Science

The conversion of the LDC effects in effect sizes to months of learning and raw scale scores for science is provided by year and cohort below. Table 16 shows the summary LDC effects for science, the converted months of learning, and the converted raw scale scores for easier communication.

- **Year 1 Cohort 1 Science Effect in Months of Learning:** The -0.002 overall science effect estimate for students of a similar magnitude to zero months of learning [(.002/0.26)*9 = -0.1 months].
- **Year 1 Cohort 1 Effect in Science Scale Score:** The regression-based LDC effect of 0.002 on student science outcome would equate to about -0.04 scale points (.002*21.5).
- **Year 1 Cohort 2 Science Effect in Months of Learning:** The 0.109 overall science effect estimate for students of a similar magnitude to 3.8 months of learning [(.109/0.26)*9 = 3.8 months].
- **Year 1 Cohort 2 Effect in Science Scale Score:** The regression-based LDC effect of 0.099 on student science outcome would equate to about 2.1 scale points (0.099*21.7).
- **Combined Year 1 Cohorts 1 and 2 Science Effect in Months of Learning:** The 0.062 overall science effect estimate for students is of a similar magnitude to 2.2 months of learning [(.062/0.26)*9 = 2.2 months].
- **Combined Year 1 Cohorts 1 and 2 Effect in Science Scale Score:** The regression-based LDC effect of 0.056 on student science outcome would equate to about 1.2 scale points (0.056*21.6).
- **Year 2 Cohort 1 Science Effect in Months of Learning:** The 0.033 overall science effect estimate for students is of a similar magnitude to 1.1 months of learning [(.033/0.26)*9 = 1.1 months].
- **Year 2 Cohort 1 Effect in Science Scale Score:** The regression-based LDC effect of 0.031 on student science outcome would equate to about 0.7 scale points (.031*21.7).

Table 16

*Science Impact of LDC by Cohort and Year: Effect Sizes, Months of Learning, and Scale Points Added*

| Cohort | LDC analytical sample | | | Hedges *g* effect size | Months of learning | Scale points added |
|---|---|---|---|---|---|---|
| | No. of schools | No. of students | | | | |
| | | Treatment | Control | | | |
| Year 1 Cohort 1 | 10 | 1,144 | 1,027 | -0.002 | -0.1 | -0.04 |
| Year 1 Cohort 2 | 15 | 1,330 | 1,294 | 0.109 | 3.8 | 2.1 |
| Year 1 Cohorts 1 and 2 | 25 | 2,474 | 2,321 | 0.062 | 2.2 | 1.2 |
| Year 2 Cohort 1 | 10 | 1,156 | 1,080 | 0.033 | 1.1 | 0.7 |

## Planned Data Request and Analysis

UCLA and the East Coast school district reached an agreement on the data use terms in December 2025; it is to be fully executed shortly. We hope to receive the 2023–2024 and 2024–2025 student data by February 2026 and have an updated evaluation report in April 2026.

We will submit the data request for 2025–2026 data to both school districts in spring 2026, hoping to receive the data in fall 2026.

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# Appendix A:
# Model Specifications of the Impact Analysis

Level 1: (student level)

Level 2: (school level)

Where:

- is the outcome variable for student *i* in school *j*.
- is the level 1 covariates characteristics including measures of baseline performance for student *i* in school *j*.
- is covariate-adjusted outcome score in control school *j*.
- is the vector of parameters for the effects of student-level covariates for school *j*.
- is the level 1 residual for student *i* in school *j*.
- is the average covariate-adjusted outcome across control schools.
- is estimated treatment impact across schools.
- is the vector of parameters for the randomization block effects.
- is a dummy coded treatment variable for school *j*, where 1 indicates treatment and 0 indicates control.
- is a blocking variable for school j; where different values indicate State by district group by school size.
- is the level 2 residual for the intercept of school *j*.

# Appendix B:
# Equations to Calculate Effect Size and Standard Error

The sample outcomes will be standardized scores from each state and grade level. The grade level means and standard deviations will be obtained from each state. A standardized effect size (Hedges' *g)* will be calculated by dividing the corrected impact estimate () by the pooled standard deviation derived from the sample standard deviations for the outcome in the intervention and comparison groups (What Works Clearinghouse, 2020b):

In the above formula for Hedges' *g,* is the coefficient from the impact analysis model (), and and are the student sample sizes; si and sc are the student-level SDs. A correction $(\omega)$ is applied in the formula to create an unbiased effect size where = 1 – (3 /4 −9), and N is the total student sample size (What Works Clearinghouse, 2020b).

This formula has been updated with a bias adjustment =

The formula for the standard error of the effect size is:

where ;

where:

- is the total student sample size
- is total number of students in the intervention
- is total number of students in the comparison
- is the average number of students per cluster
- is the intraclass correlation coefficient (ICC) obtained from the multilevel model
- is the cluster corrected regression coefficient standard error of the treatment variable


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