THE UNIVERSITY OF MEMPHIS | Center for Research in Educational Policy

LASER Focused: A Model For Teaching Inquiry-Based Science to English Learners
2018-2019 District Report: Aurora Public Schools

Results:

For both the 3rd and 6th grade cohorts, the treatment group closed the EL/Non-EL achievement gap more than the comparison group in:

- Mathematics
- English language arts

Administrators and teachers perceived increased support for inquiry science instruction and English Learners, compared to two years ago.

Teachers reported moderate use of components of the STC Units. 60% felt that the STC Units made science learning easier for English Learners.

Observers noted moderate to high implementation of English Learner support pedagogies in visited classrooms.

Half of observed classrooms placed a strong emphasis on inquiry-based science.

Intervention Activities:

- Two 2.5-day summer PD sessions for STC Unit implementation and EL support (2017 and 2018)
- One half-day of Condensed PD (Fall 2017)
- Free Family Nights at the Denver Museum of Nature & Science
- Support for implementation of one STC Unit in each science class

2018-2019 Program Evaluation:

- 10 administrator surveys
- 27 teacher surveys
- 45 classroom observations
- Attendance estimates for DMNS Family Nights
- 22 STC Unit Logs submitted by teachers
- Baseline vs. 2019 analysis of student achievement

This report was produced in August 2020 for Aurora Public Schools by the Center for Research in Educational Policy at the University of Memphis, and authored by Christine Bertz, PhD; Todd Zoblotsky, EdD; Brenda McSparrin Gallagher, EdD; Cindy Muzzi, MS; and Allison Schimmel-Bristow, MS.

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Introduction

History of the LASER Intervention in Colorado

In 2014, the Center for Research in Educational Policy (CREP) began conducting a longitudinal evaluation of the impact of the Smithsonian Science Education Center's (SSEC) Leadership Assistance for Science Education Reform (LASER) model on students' science achievement and attitudes toward science in Colorado's Denver Public Schools (DPS) school district. The LASER model is a set of strategies designed to provide district and school-based leadership with the infrastructures to support and promote high-quality, inquiry-oriented science instruction in the nation's K-8 classrooms. Among the elements of the LASER model is the use of grade-specific, self-contained, research-based, inquiry-centered science units, the Science and Technology Concepts™ (STC) curriculum. These STC units, each of which has an associated kit composed of all the materials necessary for hands-on science lessons, were developed through a partnership between the SSEC and Carolina Biological with support from a National Science Foundation grant. The STC units provide an inquiry-based science curriculum for grades K–8 that delivers a strong background in the concepts of STEM through three basic strands of instruction: life, earth, and physical sciences (Carolina Biological, n.d.).

In conjunction with the STC curriculum, the LASER model provides training workshops that support higher-order teaching strategies through two types of unit-based professional development (PD) with the goal of ultimately improving student learning:

1) Introductory-level PD workshops provide teachers with lesson-by-lesson instruction to implement STC units in the classroom. Workshops include an introduction to hands-on, inquiry-based science education, an overview of materials management, pedagogical strategies, and the basics of student notebooking and standards alignment.
2) Intermediate-level PD workshops focus on scientific content knowledge. Teachers analyze case studies and student work and delve deeper into science content in order to address student misconceptions and improve instructional practices for the unit.

This differentiated PD addresses the needs of teachers throughout the novice-to-expert continuum in an effort to build teacher leaders at all levels and increase expertise in both science content knowledge and pedagogical practices. In addition, SSEC's "train the trainer" model promotes sustainability of the LASER model by training teachers on-site to deliver its PD.

Aurora Public Schools (APS) was not a part of the original *Colorado LASER Pilot* from 2014 through 2016. However, in 2016-17, a new program, *LASER Focused,* was funded through the U.S. Department of Education's Office of English Language Acquisition (OELA). This award was based on evidence suggesting that the LASER model may be particularly effective for improving academic achievement in English Learners (ELs) (Zoblotsky, Bertz, Gallagher, & Alberg, 2016a, 2016b). APS in particular has the potential to benefit from this work, as Colorado is sixth in the nation in their number and share of ELs (MPI, 2015). APS district leadership expressed great enthusiasm for participating in *LASER Focused*, and nine schools in APS were recruited to join seven DPS schools to participate in the study.

Thus, the purpose of *LASER Focused* has been to develop and implement a new component of the LASER model specifically targeted to support ELs in the Denver and Aurora Public School Systems over a three-year period. As part of this study, SSEC developed and incorporated an EL "Focus" in its PD and science instruction, along with Family Connections events at the Denver Museum of Nature & Science with the potential to engage EL parents, families, and communities. Through these combined activities, *LASER Focused* hopes to provide participating schools with powerful tools to improve inquiry-based instruction and EL student performance.

CREP's goals are 1) to assess student achievement on standardized and end-of-grade tests in science, math, and ELA in schools implementing the LASER PD and curriculum, relative to student achievement in control schools conducting business-as-usual; 2) to obtain teacher and administrator opinions of *LASER Focused*'s effects on their classrooms and schools; and 3) to consider these outcomes in the light of schools' fidelity of program implementation. A full project timeline outlining activities (three years of implementation, plus one planning year and one year of data analysis) is available in Appendix A.

Participants

Nine APS elementary and middle schools participated in Introductory *LASER Focused* PD in summer 2017. Teachers had the opportunity to implement these strategies beginning in the 2017-18 academic year. The schools represent a mixture of public and charter schools, encompassing approximately 85 teachers of science and 5,100 students from the Aurora school district (Table 1) and a variety of diverse backgrounds (Table 2). The predominant race for all the schools is Hispanic and five of the schools have 25% or more of students identified as English Learners.

Table 1: APS Schools participating in *LASER Focused*: Teacher and student counts as of 2018-19 AY

Participating Schools	District	Grades	Science Teachers	Students
Aurora Frontier PK-8	Aurora Public Schools	PK-8	18	685
Dartmouth Elementary	Aurora Public Schools	PK-5	14	331
Jewell Elementary	Aurora Public Schools	PK-5	12	399
Mrachek Middle School	Aurora Public Schools	GR 6-8	6	948
North M.S. Health Sci. & Tech. Campus	Aurora Public Schools	GR 6-8	6	727
Park Lane Elementary	Aurora Public Schools	PK-5	13	295
Rocky Mountain Prep (RMP3/Fletcher)	APS Charter School	PK-3	1	337
South Middle School	Aurora Public Schools	GR 6-8	2	787
Vanguard Classical School West	APS Charter School	K-12	13	707
		TOTAL	**85**	**5,216**

***Numbers retrieved from the Common Core of Data, 2018-2019*

Table 2*:* Demographics of participating schools at the beginning of the 2016-17 AY

School	African American	American Indian / Alaskan Native	Asian American/ Pacific Islander	Hispanic	Caucasian	Other / Unknown	Qualified for Free or Reduced Lunch	English Learners
Aurora Frontier PK-8	9.2%	0.4%	18.4%	29.3%	35.8%	6.7%	30.9%	12.9%
Dartmouth Elementary	17.2%	0.0%	2.1%	40.2%	31.7%	8.2%	56.8%	14.1%
Jewell Elementary	24.8%	0.8%	4.3%	45.9%	16.0%	7.5%	72.4%	24.5%
Mrachek Middle School	20.5%	0.2%	5.2%	50.1%	15.6%	6.9%	65.9%	32%
North M.S. Health Sci. & Tech. Campus	12.9%	1.2%	3.3%	74.7%	3.9%	2.8%	87.2%	17.9%
Park Lane Elementary	10.5%	0.3%	5.1%	66.4%	8.1%	5.1%	80.7%	38.5%
Rocky Mountain Prep (RMP3/ Fletcher)	16.6%	0.9%	3.0%	71.2%	6.8%	1.2%	84.6%	47.2%
South Middle School	20.5%	0.9%	3.0%	63.5%	5.5%	4.4%	91.1%	40.6%
Vanguard Classical School West	38.3%	0.1%	2.1%	35.9%	19.5%	3.5%	49.6%	12.9%

**N/A indicates data are unavailable*

Implementation

For *LASER Focused*, each school selected grade-band-aligned Life Sciences STC™ Units (Carolina Biological, n.d.) for their grade K-8 classrooms. A small number of schools elected not to select units to teach at certain grade levels, usually because they felt the available materials did not align sufficiently with state standards. Although *LASER Focused* did not include funds to purchase supplies, the SSEC assisted schools in acquiring STC units for teachers to use. The minimum goal was for each pair of elementary teachers of science to have one STC unit to share between them, and for each middle school teacher to receive an STC unit of their own. At each school, the SSEC recruited a site coordinator from among participating teachers to serve as point-of-contact with SSEC and CREP researchers. Site coordinators were compensated for their time with a small stipend during 2017-18 and 2018-19.

In summer 2017 and summer 2018, teachers at participating schools were encouraged to attend a 2.5-day Introductory (2017) and Intermediate (2018) professional development workshop. These workshops included basic orientation to the STC units, a deeper dive into the science content of the lessons, and strategies for teaching and assessing English Learners in ways that current research shows best serves the needs of this special class of student. Teachers in DPS who completed the PD (80% or more attendance) had the opportunity to receive two Continuing Education Units (CEUs) from the University of Memphis each year, with a possible total of four CEUs awarded for participants who completed both Introductory and Intermediate PD. The APS school district elected not to offer CEUs to participating teachers. Teachers who were unable to attend the summer workshops had the opportunity to attend Condensed Unit Training in Fall 2017.

During the 2018-19 academic year, CREP and the SSEC also partnered with the Denver Museum of Nature & Science (DMNS) to host three *Family Connections* Family Nights at the museum. On these three nights, *LASER Focused* students and their families were invited to explore the museum free of charge. On November 5, 2018, approximately 290 students and their families, representing 13 schools, explored the *Mindbender* Mansion and *¡Cuba!* exhibits, along with an opportunity to see a Planetarium show. On May 13, 2019, approximately 346 students and their families, representing 12 schools, were given free access to the *Our* Senses exhibit, a Planetarium show, an IMAX show, and other select museum halls. Finally, on June 2, 2019, DMNS held a free Community Day from 9am through 5pm. This event was open to all area residents, but students and their families from the project schools were specifically invited to attend. They again had access to the *Our Senses* and other museum exhibits, along with space-oriented activities provided by community business and organization volunteers. The SSEC was among those who hosted a booth for this event, providing free $STEM_2D$ posters printed in both English and Spanish. For each of these events, DMNS provided information in both English and Spanish in support of EL students. At the end of each evening, one family received a free annual family membership to the Museum.

Evaluation

This evaluation was submitted to the University of Memphis Institutional Review Board, FWA00006815, prior to initiation of any data collection. On November 21, 2016, this evaluation was granted an exemption from IRB review.

CREP's 2018-19 evaluation of *LASER Focused* assessed outcomes for school administrators, teachers, and students, as illustrated in Table 4. Annual surveys were completed at baseline (2016-17) and each spring of implementation thereafter. Teachers were asked to complete STC Unit Logs each time they finished using an STC Unit in their classroom. Classroom observations were completed by trained site researchers, who followed school and district regulations for site visits, using two CREP instruments: The Student Observation Measure for English Learners (SOM-EL) and the Rubric for Inquiry-Based Assessment (RIBA). Student academic outcomes in math and English language arts were assessed using anonymized standardized test results and/or end-of-grade scores provided to CREP by the APS Department of Accountability and Research.

Table 3: *LASER Focused* stakeholders and data sources used to evaluate the effects of the program for each group

Data Sources for *LASER Focused* Outcomes		
Administrators: • Annual survey	Teachers: • Annual survey • STC Unit Logs • Observations	Students: • Standardized tests • End-of-grade tests

Administrators

School administrators (a principal or assistant principal) completed anonymous administrator surveys prior to program implementation in spring 2017, and again after two years of *LASER Focused* implementation in spring 2019. Administrators rated their level of agreement with items on a five-point, Likert-type scale (Possible responses: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree).

Teachers

Annual survey

Teachers of science completed surveys about their classroom practices prior to program implementation in spring 2017, and again after two years of *LASER Focused* implementation in spring 2019. Teachers rated their level of agreement with items on a five-point, Likert-type scale (Possible responses: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree).

STC Unit Logs

All teachers of science in grades K-8 in the sixteen participating schools were asked to complete an online STC Unit Log each time they completed use of an STC Unit.

Observations

During the 2018-19 academic year, CREP-trained observers conducted a total of 80 observations in science classrooms within participating schools using the SOM-EL (School Observation Measure for English Learners) and RIBA (Rubric for Inquiry-Based Instruction) instruments. Five observations were completed per school, with 35 total observations occurring in DPS schools and 45 in APS schools. These targeted observations occurred throughout the school year whenever science was being taught, and each consisted of a single visit that lasted for the duration of the class period (i.e., at least 30 minutes). For both instruments used, observers recorded the frequency (not the quality) of pedagogies employed during the class period.

Observers also scored nine selected video segments to which an expert rating on both the SOM-EL and RIBA had been assigned. These scores were used to conduct an inter-rater reliability analysis to determine the level of agreement among observers, and thus the extent to which they were likely to be scoring different classroom observations in consistent ways across all observations. Inter-rater reliability between each rater and expert pair on the SOM and RIBA was assessed using Cohen's weighted Kappa, which determines the extent of agreement between two observers that is greater than expected by chance (chance corrected agreement). For these analyses, the weighted Kappa statistic (k_w) is

particularly appropriate when ratings are provided in ordered-categorical form, as in this case, and where raters scored on a continuum with five levels ranging from 0-4 (i.e., Not Observed=0, Rarely Observed=1, Occasionally Observed=2, Frequently Observed=3, Extensively Observed=4). For items like these, k_w would assign less "weight" to ratings that were farther apart (more disagreement). For the interpretation of k_w, whether weighted or not, values between 0.21 and 0.40 are conventionally interpreted as an indication of "fair" agreement between two raters, 0.41 to 0.60 are an indication of "moderate" agreement, 0.61 to 0.80 are an indication of "substantial" agreement, while values of 0.81 or higher are conventionally interpreted as signs of "almost perfect" agreement (Landis & Koch, 1977).

Because STC Units were available to teachers regardless of whether they attended the summer PD, teachers could implement the STC Units without being trained to use either the Units or *LASER Focused* strategies for teaching and assessing English Learners. If the *LASER Focused* PD (and not just materials support) improves teacher practices and student outcomes, then it follows that these outcomes could vary widely from school to school, based on the percentage of teachers who attended the full summer PD. To address this variable, each time an observer completed an observation, they requested the training status of the teacher whose classroom they had just visited. Teacher names were not retained with observation data, but the teacher's training status was recorded following each observation. Teacher training status was defined as one of the following:

- Trained: Teachers who had completed either the 2.5-day Introductory (2017-18) or Intermediate (2018-19) summer PD with SSEC
- Condensed Trained: Teachers who attended, but did not complete, the 2.5-day summer PD (i.e., attended less than 80% of the sessions), and/or received a half-day of Condensed Training during the fall semester with SSEC
- Untrained: Teachers using the STC Units without *LASER Focused* training, including teachers that received some form of training during the *Colorado LASER Pilot* (which did not include EL-focused pedagogies)

Students

Study Design and School Matching

To assess the impact of the LASER Focused curriculum on reducing the achievement gap between English Learners (ELs) and non-English Learners (non-ELs) in treatment schools, the current study utilized a quasi-experimental design, with treatment and control schools matched within district (Aurora Public Schools or Denver Public Schools). An intent-to-treat (ITT) design was used, with students analyzed based upon their original group assignment (treatment or control) as long as they had both baseline and outcome data available (e.g., a student who left a treatment or control school would still be analyzed with their respective group as long as they had both pre- and posttest scores and were enrolled in a study school).

Treatment and control schools were matched using publicly available school-level data from the 2016-17 school year obtained from the Colorado Department of Education website. School-level matching variables included:

- School grade structure (e.g., elementary school, middle school)
- Total enrollment
- Attendance rate
- Percent females
- Percent African American, Hispanic, and white students
- Percent minority
- Percent of students who were English learners (EL)
- Percent of students who were economically disadvantaged, and
- Mean (i.e., average) science, English language arts, and mathematics scaled scores from the Colorado Measures of Academic Success (CMAS).

Propensity score analyses were used to determine which schools should be selected as controls. After the school pairs were established, effect sizes (Hedges' *g*) were computed to determine baseline equivalence between treatment and control schools on the matching variables. According to the What Works Clearinghouse (2017), baseline equivalence is established when the effect size difference (which quantifies the magnitude of the difference between groups) is $g \leq 0.25$. Baseline equivalence was established for all matching variables in both districts with the following two exceptions:

- For Denver, percent females was the only variable that had an effect size larger than 0.25 (with the treatment group having the higher percentage).
- For the Aurora matches, percent African-American was the only variable with an effect size (Hedges' *g*) exceeding 0.25 (with the control group having the higher percentage)

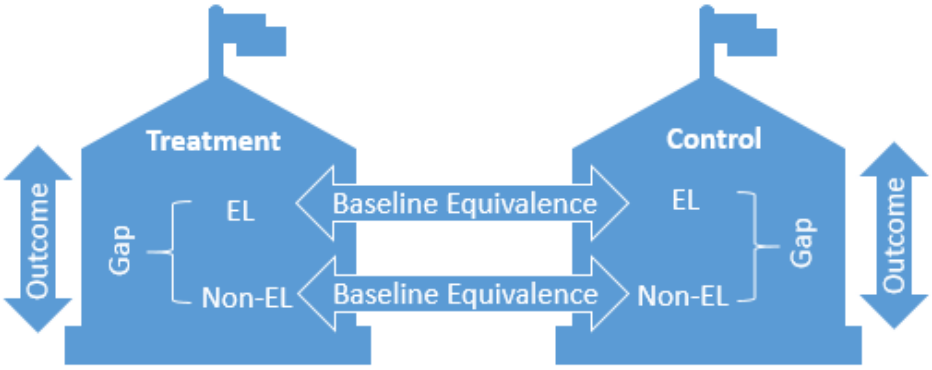
Most importantly**, therefore, the percentage of EL students was similar between the treatment and control groups in both districts.**

Achievement Gap Analysis

The purpose of *LASER Focused* is to produce a larger reduction in the EL/non-EL achievement gap in treatment schools compared to control schools. Therefore, the first step in the analyses was to determine whether the initial (pre-intervention) EL/non-EL achievement gap was similar between the treatment and control groups within the two districts (Aurora and Denver). If the initial EL/non-EL achievement gap is similar (i.e., if there is baseline equivalence), then a direct comparison between the treatment and control groups in the *change* in the EL/non-EL achievement gap over time is possible (i.e., an "apples-to-apples" comparison). Consequently, (a) EL treatment and control students and (b) non-EL treatment and control students were compared within district and subject area on their baseline (i.e., pre-assessment) achievement (see Figure 1). According to the WWC (2020):

> If the reported [effect size] difference of a specified baseline characteristic is greater than 0.25 standard deviation in absolute value, based on the variation of that characteristic in the pooled sample of intervention and comparison group members, the WWC considers the intervention and comparison groups to be nonequivalent.

Figure 1: 3rd and 6th Grade Cohort EL and non-EL Treatment vs. Control Group Baseline Equivalence Comparisons



A lack of baseline equivalence would mean the EL/non-EL achievement gaps would not be similar between the treatment and control groups. This would potentially hamper the ability to judge the impact of *LASER Focused* over time as the treatment and control groups would not be starting from a similar level of achievement. Finding baseline equivalence would also serve as a check on the school matching process as schools were matched based on *historical* school level data, while the analysis of test score outcomes is conducted using *current* student-level data.

Results

Administrators

Summary: *After implementation of* LASER Focused*, there was an increase in administrator perceptions of support for inquiry-based science education, especially for English Learners.*

Due to a low response rate, these data include aggregated responses from DPS and APS.

Of the 13 survey items positively related to inquiry-based science instruction and English Learners, 10 of them (77%) increased after two years of program implementation (i.e., administrators chose "Agree" or "Strongly Agree" in response to the statement). Table 4 below summarizes results for all Likert-scale items on the annual administrator survey.

Table 4: Comparison of school administrator feedback on support for inquiry science and English Learners at baseline (2017) and after two years of *LASER Focused* implementation (2019)

Item	% Agree + Strongly Agree		% Change
	2017 (*n* = 11)	2019 (*n* = 10)	
Please think about the following three questions as they relate to all of the students at your school.			
My district provides support for inquiry-based science instruction.	33%	50%	+52%
Teachers at my school are expected to use inquiry-based strategies to teach science.	58%	60%	+3%
My school regularly uses STC units or other commercial kits as part of the science curriculum.	50%	80%	+60%
Please think about the remaining questions as they relate particularly to EL students at your school.			
My district provides designated support for EL students.	83%	90%	+8%
Teachers at my school tailor science learning objectives and instruction for EL students.	33%	60%	+82%
Teachers at my school use specific resources and materials to assist EL students in science.	33%	60%	+82%
Teachers at my school have received sufficient guidance and professional development to adapt science instruction for EL students' needs.	25%	50%	+100%
My school's science instruction sufficiently meets the needs of EL students.	25%	20%	-20%
My school provides designated support for EL students beyond what the district provides.	50%	55%	+10%
My school facilitates cultural awareness and opportunities to integrate cultural heritage into the learning experience.	50%	70%	+40%
Teachers at my school possess knowledge and skills that facilitate EL parent, family, and community engagement.	42%	70%	+67%

Item	% Agree + Strongly Agree		% Change
	2017 (*n* = 11)	2019 (*n* = 10)	
My school provides designated support for EL families (e.g., translation during family nights and extracurricular events, referrals for additional assistance, etc.)	75%	70%	-7%
My school provides opportunities for EL families to get involved in students' science learning.	25%	20%	-20%

Teachers

Summary: *After two years of program implementation, there was increased agreement with 91% of survey items positively associated with inquiry-based science instruction and support for ELs. However, STC Unit Logs indicated that a majority of participating teachers had not attended formal PD. Despite this, most teachers using the STC Units reported feeling confident in their ability to present them as they were intended to be taught, although they still tended to adapt the units to meet their classroom needs. Respondents in APS did not strongly emphasize student notebooking in their assessment of students, preferring to evaluate student responses to their own questions to determine what students had learned. Participating teachers reported frequent use of a variety of EL supports, including differentiated assignments, but seldom reported EL parent or family involvement in the classroom. Most teachers had visual supports present in their classrooms and relied on them heavily for instruction, but few displayed or used realia or sentence frames, which the WIDA English Language Development Standards consider to be valuable tools for ELs. Cooperative/collaborative learning was seldom emphasized classrooms that observers visited, although about half of APS classrooms placed strong emphasis on hands-on learning and use of the STC Units.*

Teacher Surveys

Teachers of science completed surveys about their classroom practices prior to program implementation in spring 2017, and again after one year of *LASER Focused* implementation in spring 2018. Teachers rated their level of agreement with items on a five-point, Likert-type scale (Possible responses: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree).

Of 34 original items positively related to inquiry-based science instruction and teacher support for ELs, there was an increase in 31 of them (91%) following two years of program implementation (i.e., an increase in the percentage of respondents selecting "Agree" or "Strongly Agree"). Responses from teachers in participating APS schools are reported in Table 5.

Table 5*:* APS teacher feedback on support for inquiry science and English Learners at baseline (2017) vs. after two years of *LASER Focused* implementation (2019)

Item	% Agree + Strongly Agree		% Change
	2017 (*n* = 30)	2019 (*n* = 27)	
Student Learning			
I put strong emphasis on inquiry-based strategies when teaching science.	72%	82%	+14%
I regularly use prepared science kits as a part of the science curriculum.	48%	67%	+40%
I have an extensive understanding of the science concepts I teach.	72%	74%	+3%
The professional development I receive adequately supports my science teaching needs with regard to the overall classroom.	10%	41%	+310%
The professional development I receive adequately supports my science teaching needs with regard to English Learners (ELs).	14%	44%	+214%
The LASER Focused professional development I have received has supported my science teaching needs with regard to EL students more effectively than what was previously available to me*.	N/A	52%	N/A
I feel confident in my ability to assess students' science learning in the overall classroom.	76%	85%	+12%
I feel confident in my ability to assess English Learners (ELs) science learning.	31%	82%	+165%
I regularly integrate my science lessons with other school subjects, such as math and reading.	69%	81%	+17%
Note: Please keep English Learners (ELs) in mind as you answer the questions below.			
EL Student/Family Engagement			
My school uses designated resources and materials to assist EL students in science.	0%	41%	+100%
My school provides designated support for EL families (e.g., translation during family nights and extracurricular events, referrals for additional assistance, etc.).	59%	74%	+25%
I possess knowledge and skill related to EL parent, family, and community engagement.	59%	82%	+39%
I facilitate opportunities for EL parents to engage with their students' science learning.	17%	48%	+182%
Teacher Talk			
I use simple sentence structure when delivering instruction to ELs.	69%	89%	+29%
I use a slower rate of speech when delivering instruction to ELs.	55%	78%	+42%
I reduce the number of steps when giving directions to ELs.	59%	74%	+25%

Item	% Agree + Strongly Agree		% Change
	2017 (*n* = 30)	2019 (*n* = 27)	
When teaching ELs, I use realia.	52%	67%	+29%
When teaching ELs, I use diagrams.	86%	93%	+8%
When teaching ELs, I use gestures/dramatization/modeling.	79%	85%	+8%
When teaching ELs, I use videos/pictures.	93%	93%	0%
Writing Skills			
I use sentence frames to support student writing products for beginning ELs. (e.g., I think magnets _____ because _____.)	59%	78%	+32%
I differentiate written products (e.g., science notebook entries/journals) based on ELs language proficiency.	38%	70%	+84%
I use graphic organizers when delivering instruction to ELs. (e.g., Venn diagrams, concept maps, t-charts)	62%	82%	+32%
Verbal Skills			
I group ELs with students of various language proficiencies. (e.g., non-ELs work in groups with ELs.)	86%	74%	-14%
I provide opportunities for ELs to practice language in low stress environments. (e.g., play-based, everyday conversation, small group)	66%	70%	+6%
I use scientific discourse sentence frames when facilitating discussion with ELs. (e.g., When I changed _____, then _____ happened. When I changed the amount of water flowing down the stream table, then more erosion and deposition happened.)	45%	63%	+40%
I scaffold discussions when delivering instruction to ELs.	48%	70%	+46%
I have ELs verbally summarize key points of teacher talk and group discussion to check for understanding.	48%	67%	+40%
Academic Vocabulary			
I use items from the unit as an introduction to activate prior knowledge when instructing ELs.	59%	70%	+19%
I facilitate learning experiences where ELs use vocabulary in context rather than memorization.	62%	78%	+26%
I use real life objects in word walls when instructing ELs.	35%	52%	+49%
Summary of WIDA Support Strategies			
I use WIDA sensory support strategies (e.g., realia, manipulatives, physical activities, videos) when teaching ELs.	59%	78%	+32%
I use WIDA graphic support strategies (e.g., charts, graphic organizers, tables) when teaching ELs.	55%	78%	+42%
I use WIDA interactive support strategies (e.g., pairs or partners, cooperative group strategies, native language use, mentors) when teaching ELs.	62%	85%	+37%

**This item was added in 2018-19.*

STC Unit Logs

Twenty-two Unit Logs were submitted for the 2018-19 academic year, representing a response rate of 26%. The potential maximum number of STC Unit Logs was 85 (based on one STC Unit per year which could be taught by 85 APS science teachers). Sample sizes vary among items and may not total 100% due to missing responses.

During the 2018-19 academic year, teachers reported an average total of 36.4 hours of instruction per STC Unit. Nineteen of the 22 respondents identified the Unit Logs they taught, with *Investigating Biodiversity & Interdependence* being the favored topic. The majority of responses indicated that teachers had all the materials they needed to teach the STC Units, and one-third of teachers supplemented the lessons with other materials. Few teachers provided information about the type of training they received; regardless, a majority of respondents indicated they found the materials easy to use, were comfortable with the science content associated with the unit, and felt they had sufficient training to teach the unit as it was intended to be taught. About 40% of teachers reported using substantial portions of the STC summative assessments, while the majority relied predominantly on their own questions to determine student progress. Some respondents did assess student notebook entries, but they most-commonly reported placing only moderate emphasis on the quality of those entries.

Most responses indicated that teachers commonly incorporated sensory, graphic, and interactive supports when working with ELs in the classroom. However, there was less evidence that teachers differentiated assignments for ELs or emphasized EL parent engagement with their children's science learning. About 60% of responses indicated the STC Unit itself made science learning easier for ELs. Teachers offering qualitative feedback on the STC Units generally indicated that both teachers and students enjoyed the kits, and that they were particularly beneficial to EL students due to their hands-on nature. However, teachers felt that there was not enough time to cover the materials in the STC Units, and sometimes reported problems with materials and lengthy prep time. Selected STC Unit Log responses are presented below in Table 6.

Table 6: Selected STC Unit Log responses by APS teachers, 2018-19 (*n* = 22)

Fidelity of Implementation	% Yes/Completely & To a Large Extent
Did you teach the lessons in the suggested sequence?	73%
Did you teach all of the lessons/activities in the unit?	50%
Did you have all of the materials you needed to teach the lessons as described in the Teacher's Guide?	91%
Did you supplement the lessons with materials from other sources (e.g., your own materials, other curricula)?	36%
Type of Training*	**% of responses**
Formal - by the Smithsonian with EL (Summer 2.5-day workshop)	27%
Formal - by the Smithsonian with EL (Condensed 1-day Kit Training)	0%
Formal - by the Smithsonian without EL (Summer 2.5-day workshop)	0%
Formal - by the Smithsonian without EL (Condensed 1-day Kit Training)	0%
Formal - by a colleague/district, with or without EL	0%
Informal - by a colleague or other individual, with or without EL	0%
Self-taught - received no training, formal or informal	5%
Assessment Strategies Used*	**% of responses**
I used the assessments provided with the unit.	36%
I assessed student notebook entries.	41%
I assessed student answers to my own strategic questions.	86%
Emphasis placed on STC Unit Notebooking*	**% of responses**
Not much emphasis this time around. I wasn't certain what to look for.	5%
Not much emphasis this time around. My students were too new to science writing.	27%
Moderate emphasis. I looked over their entries and gave some constructive feedback.	46%
Strong emphasis. I felt comfortable making the quality of their notebook entries a major focus.	23%
English Learner Supports Incorporated into Pedagogy	**% Yes/Completely & To a Large Extent**
Did you incorporate sensory supports (e.g., realia, manipulatives, physical activities, videos) when teaching ELs?	77%
Did you incorporate graphic supports (e.g., charts, graphic organizers, tables) when teaching ELs?	77%
Did you incorporate interactive supports (e.g., pairs or partners, cooperative group strategies, native language use, mentors) when teaching ELs?	86%
Did you differentiate assignments for ELs?	50%
Did you facilitate opportunities for EL parents to engage with their students' science learning?	36%
Do you feel that using this unit made learning science easier for your ELs?	59%

**Percentage does not total 100 because respondents checked all applicable answers*

Observations

During the 2018-19 academic year, 71% of observed APS teachers were trained, 9% of teachers had received condensed training, and 20% of teachers observed had not received *LASER Focused* training.

School Observation Measure for English Learners (SOM-EL)

The SOM-EL is divided broadly into four sections. *Teacher Instructional Strategies* and *Student Activities* contain items rated by frequency of occurrence on a five-point Likert-type scale (potential responses: Not observed, Rarely, Occasionally, Frequently, or Extensively). *Classroom Physical Context* defines the presence or absence ("yes" or "no") of specific supports for ELs in the classroom, and two *Summary Items* rate the amount of academically-focused time and the level of student engagement as "Low," "Moderate," or "High."

Results from SOM-EL observations in 45 APS classrooms are summarized in Table 7 below. Of the classrooms visited, realia and sentence frames were present less than one-quarter of the time, but visual supports were more common. The most prevalent teaching strategies observed are highlighted in green, while the least prevalent strategies observed are highlighted in red.

Table 7: Results from SOM-EL observations in APS classrooms, 2018-19 (*n* = 45)

Classroom Physical Context	% Yes	% No
Realia are present in the classroom	13%	87%
Sentence frames are displayed in the classroom	20%	80%
Visual supports are displayed in the classroom	71%	29%

Instructional Strategies/Orientation by Teachers	% Not Observed + % Rarely	% Occasionally	% Frequently + Extensively
Direct instruction (lecture)	25%	36%	40%
Teacher demonstrating	67%	27%	7%
Teacher using or referring to classroom realia	93%	4%	2%
Teacher using visual supports to enhance student learning	13%	36%	51%
Teacher providing higher-level instructional feedback	24%	44%	31%
Teacher using higher-level questioning strategies	18%	49%	33%
Teacher acting as a coach/facilitator	24%	27%	49%
Teacher using "teacher talk" strategies	33%	24%	42%
Teacher using sentence frames	64%	20%	4%
Parent and family involvement with English Learners	100%	0%	0%

Student Activities: Sensory and Graphic Support Strategies	% Not Observed + % Rarely	% Occasionally	% Frequently + Extensively
Students using experiential, hands-on learning, including manipulatives or simulations	38%	13%	49%
Students participating in discussion	29%	38%	33%
Students notebooking	51%	20%	29%
Students verbally summarizing key points of instruction or group discussion	60%	31%	9%
Students using visual supports to enhance learning	25%	36%	40%
Students engaging in physical activity	93%	4%	2%
Students engaging in independent inquiry	32%	22%	38%
English Learners completing differentiated writing assignments	100%	0%	0%
Student Activities: Interactive Support Strategies	**% Not Observed + % Rarely**	**% Occasionally**	**% Frequently + Extensively**
Students working in cooperative/ collaborative groups	38%	36%	27%
Students working in whole group	29%	38%	33%
Students working in their native language	100%	0%	0%
Students working with mentors	93%	2%	4%
Students using computers/tablets to receive instruction	89%	4%	7%
Students using technology as a learning tool or resource	87%	7%	7%
Summary	**% Low**	**% Moderate**	**% High**
Level of academically-focused class time	2%	27%	71%
Level of student attention / interest / engagement	7%	33%	60%

Rubric for Inquiry-Based Assessment (RIBA)

Observers used the RIBA concurrently with the SOM-EL to rate the frequency of inquiry-based learning strategies employed in the classroom, as well as to rate the overall level of class time dedicated to inquiry-based science.

Results from RIBA observations in 45 APS classrooms are summarized in Table 8, below. The most prevalent student activities are highlighted in green, and the least prevalent strategies are highlighted in red.

Table 8: Results from RIBA observations in APS classrooms, 2018-19 (n = 45)

Student Centered Activities	% Not Observed + % Rarely	% Occasionally	% Frequently + Extensively
Prepared science kits in use	47%	0%	53%
Students organizing data or preparing to organize data	62%	24%	13%
Students making predictions or hypothesizing	62%	18%	20%
Students designing their own procedures	69%	16%	16%
Teacher demonstrating	71%	22%	7%
Students engaged in experimentation	42%	11%	47%
Students initiating questions about the experiment	73%	20%	7%
Students gathering or recording evidence	33%	29%	38%
Students evaluating evidence	53%	31%	16%
Students reporting findings to others	89%	11%	0%
Summary Item			
High level of class time dedicated to inquiry-based science	33%	13%	53%

Students

Summary: *To date, results support the hypothesis that LASER Focused has had a positive impact on reducing the EL/non-EL achievement gap in APS for both the 3rd and 6th grade cohort treatment groups in both subject areas. The outcomes for the 3rd grade cohort are more difficult to interpret since APS had different pretest measures available, whereas the 6th grade cohort used CMAS as the pre- and posttest measure.*

3rd Grade Cohort

Pre-Assessment

For Aurora students, the Phonological Awareness Literacy Screening (PALS) summed scores from spring 2017 were used as the pre-assessment scores for the 3rd grade cohort. The datafile contained scores ranging from 0-76. To be included in the pre-assessment analyses, Aurora students had to have a PALS score from spring 2017 as well as a Colorado Measures of Academic Success (CMAS) scaled score in spring 2019 in either English language arts or mathematics.

Two-level hierarchical linear models (HLMs; Raudenbush & Bryk, 2002) were used as the analytic tools for the pre-assessment due to the nested structure of the data (i.e., students nested within schools). Failing to take this dependency into account can result in biased statistical results (Raudenbush & Bryk, 2002). In the current study, HLMs were estimated using HLM7 (Raudenbush, Bryk, & Congdon, 2011).

In addition, effect sizes, percentile ranks, and improvement indices associated with the treatment effect were calculated. The What Works Clearinghouse (WWC) (2017) translates the Hedges' *g* effect size (i.e., standardized mean difference) and Cox Index effect size (CIES; for dichotomous outcome variables) into an "improvement index", representing the difference between (a) the percentile rank corresponding to the intervention group mean and (b) the percentile rank corresponding to the comparison group mean (i.e., 50th percentile) in the comparison group distribution.

Results for the pre-assessment tests are reported in Table 9. For these analyses, control is coded as 0 and treatment is coded as 1.

For Aurora students:

- There were more students in the treatment group compared to the control group for both the EL (+22 in ELA and math) and non-EL (+18) groups in both subjects.
- **Baseline equivalence was established in both available subject areas**. There were no statistically significant differences or nonequivalent effects in either English language arts or mathematics between either (a) treatment and control EL students or (b) treatment and control non-EL students.

Table 9: 3rd Grade Cohort EL and non-EL Treatment vs. Control Group Pre-Assessment Results (Across Treatment and Control Group Comparison)

Subject	Group	Treatment *n*	Control *n*	Coefficient	*p value*	Effect Size	Percentile Rank	Improvement Index
ELA	EL	86	64	-2.96	*0.587*	-0.15	44	-6
	Non-EL	111	93	-3.54	*0.352*	-0.23	41	-9
Math	EL	86	64	-2.96	*0.587*	-0.15	44	-6
	Non-EL	111	93	-3.54	*0.352*	-0.23	41	-9

*Statistically significant at $p < 0.05$

A positive improvement index for these analyses would indicate that **treatment students** outperformed control students, while a negative improvement would indicate that **control students** outperformed treatment students.

Analyses

Two-level HLMs were again used as the analytic tool for the Year 3 outcomes for the 3rd Grade cohort. Hedges' *g* effect sizes, Cox Index effect sizes, percentile ranks, and improvement indices associated with the treatment effect were also calculated. To be included in the analyses, students had to have a pre-assessment (i.e., baseline) score from spring 2017 as well as a spring 2019 Colorado Measures of Academic Success (CMAS) scaled score in English language arts or mathematics (i.e., outcome). Results for the Year 3 analyses are reported in Table 2. For all analyses, non-EL is coded as 0 and EL is coded as 1. For these outcomes, a positive improvement index would indicate EL students outperformed non-EL students, while a negative improvement index would indicate non-EL students outperformed EL students.

Four sets of analyses were conducted, and improvement indices were calculated:

Within the treatment group:

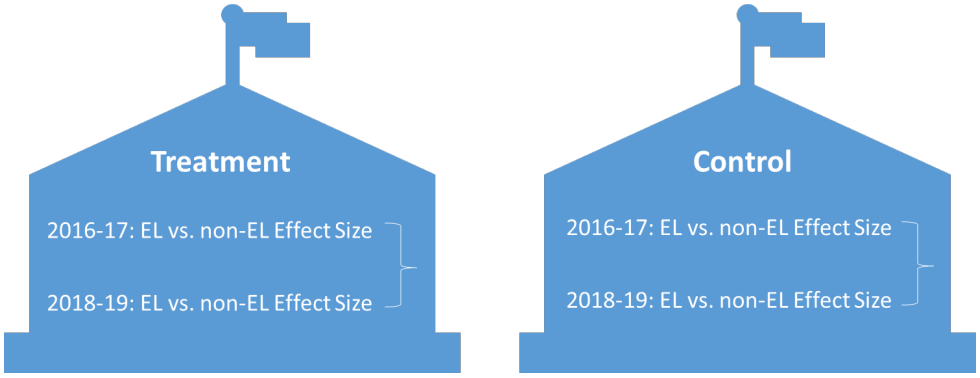
- 2016-17: EL vs. non-EL (Baseline)
- 2018-19: EL vs. non-EL (Year 3 outcome)

Within the control group:

- 2016-17: EL vs. non-EL (Baseline)
- 2018-19: EL vs. non-EL (Year 3 outcome)

The improvement indices were then compared between years within the treatment and control groups to determine if the achievement gap between EL and non-EL students got larger or smaller over time (see Figure 2). A positive improvement index for these analyses would indicate that EL students outperformed the non-EL students, while a negative improvement would indicate that non-EL students outperformed EL students.

Figure 2: EL vs. non-EL Outcome Comparisons (within District and Subject Area)



Results

On the pretest in 2016-17, EL control students in both English language arts and mathematics scored statistically significantly *lower* than non-EL control students. The improvement index for the control group in both English language arts and mathematics indicated that an average EL control student ranked 17 percentile points *lower* than an average non-EL control student. While not statistically significant, for the treatment group in both English language arts and mathematics, an average EL treatment student ranked 10 percentile points *lower* than an average non-EL treatment student.

On the posttest in 2018-19, there were no statistically significant differences between EL and non-EL students in either the treatment or control groups in English language arts. Although not statistically significant, the improvement index indicated that an average EL treatment student ranked 1 percentile point *higher* than an average non-EL treatment student in English language arts, while an average EL control student ranked 1 percentile *lower* than an average non-EL control student. As a result, treatment students' EL/non-EL gap in English language arts, based on the Improvement Index,

decreased by 110% from spring 2017 to spring 2019, while control students' EL/non-EL gap decreased by 94%, **a 14.5% larger decrease for the treatment group**.

In addition, there were no statistically significant differences between EL and non-EL students in either the treatment or control group in mathematics. Although not statistically significant, an average EL treatment student ranked 9 percentile points *higher* than an average non-EL treatment student in mathematics, while an average EL control student ranked the *same* as an average non-EL control student. The EL/non-EL gap in mathematics for both the treatment and control groups, decreased from spring 2017 to spring 2019, however, **the decrease for the treatment group (-190.0%) was 47% larger** than that of the control group (-100.0%).

See Table 10, Figure 3, and Figure 4.

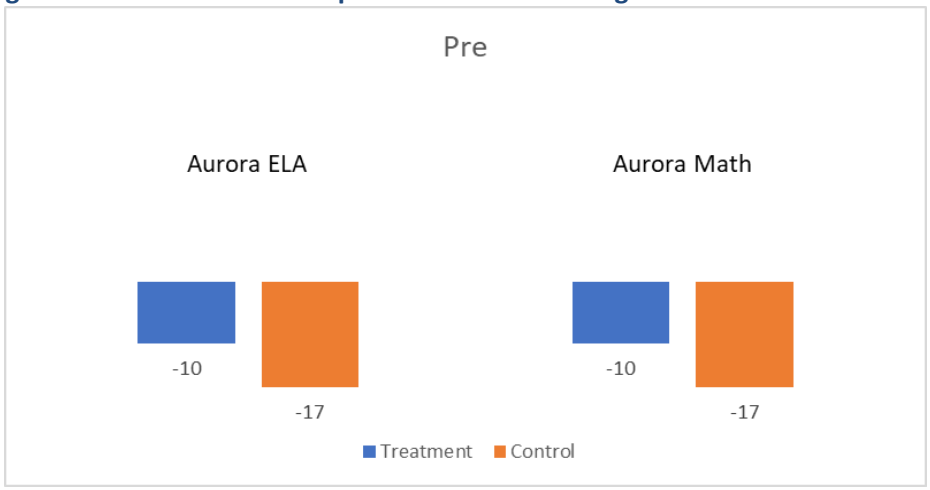
Table 10: APS 3rd Grade Cohort Year 3 Outcomes: EL vs. Non-EL by District (Within Treatment and Control Group Comparison)

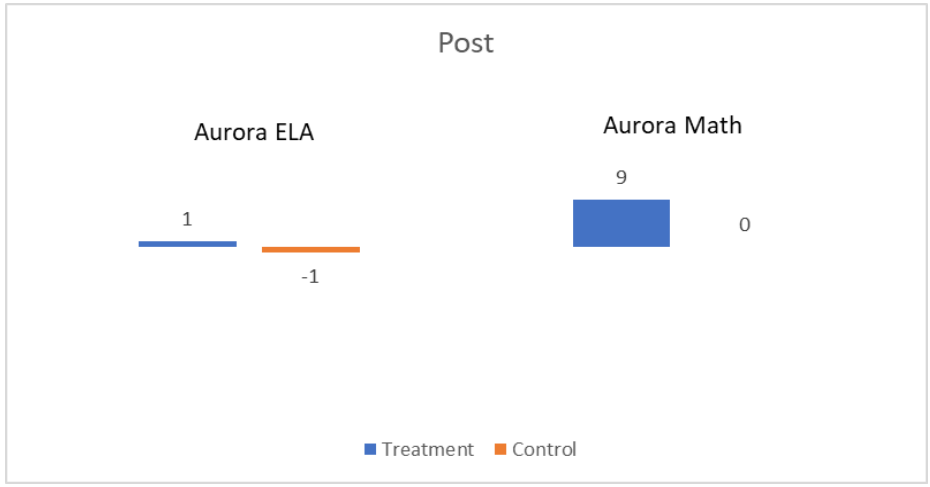
District/ Cohort	Subject Area	Group	EL *n*	Non-EL *n*	Pretest (2016-17)				Posttest (2018-19)				Change Pre to Post		
					Coefficient	Effect Size	Percentile Rank	Improvement Index	Coefficient	Effect Size	Percentile Rank	Improvement Index	Direction	Improvement Index Difference	% Change
Aurora 3	English language arts	Treatment	86	111	-4.62	-0.25	40	-10	2.14	0.03	51	1	+	11	-110.0%
		Control	64	93	-7.56*	-0.45	33	-17	-1.88	-0.1	49	-1	+	16	-94.1%
Aurora 3	Mathematics	Treatment	86	111	-4.62	-0.45	40	-10	18.01	0.23	59	9	+	19	-190.0%
		Control	64	93	-7.56*	-0.45	33	-17	1.07	0.01	50	0	+	17	-100.0%

*Statistically significant at $p < 0.05$

Note: Within subject area (English language arts or mathematics), cells in green under "% Change" indicate a larger treatment group achievement gap decrease based on the difference in the pretest and posttest improvement index, while red cells indicate a larger control group decrease. The pretest for Aurora is the (PALS) summed score. The pretest effect size for Aurora is Hedges' *g*. A positive improvement index for these analyses would indicate that EL students outperformed the non-EL students, while a negative improvement would indicate that non-EL students outperformed EL students.

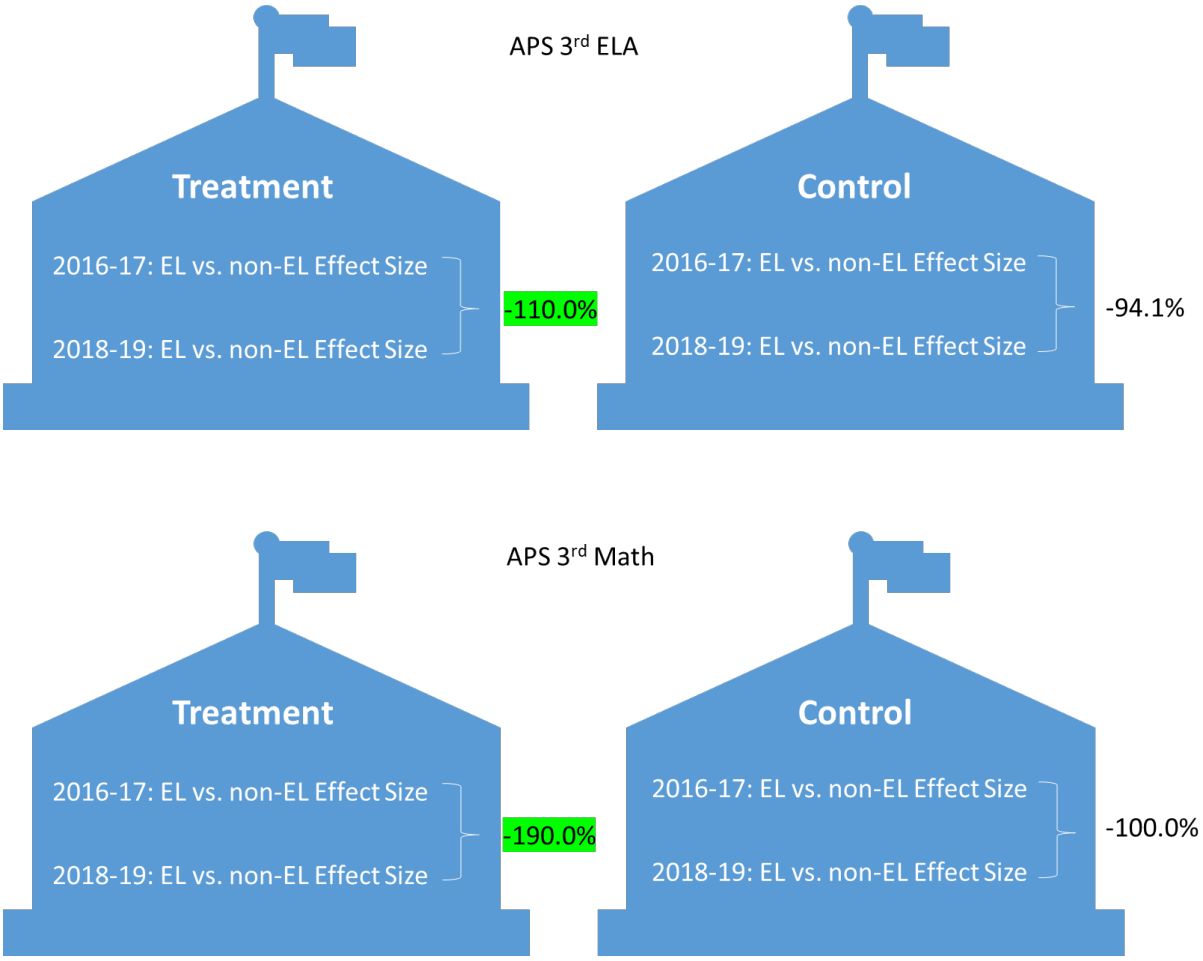
Figure 3: 3rd Grade Cohort Improvement Index Changes Pre to Post





Note: Values indicate the percentile point difference between the EL and Non-EL groups: A positive improvement index indicates the number of percentile points higher EL students scored compared to the average non-EL student, while a negative improvement index indicates the number of percentile points lower EL students scored compared to the average non-EL student.

Figure 4: Aurora 3rd Grade Cohort Outcomes



Note: Within subject area (English language arts or mathematics), percentages in green indicate a larger treatment group achievement gap decrease based on the % change in the pretest and posttest improvement indices, while percentages in red indicate a larger control group decrease.

6th Grade Cohort

Pre-Assessment

CMAS scaled scores in spring 2017 in English language arts and mathematics were used as pre-assessment scores for the 6th grade cohort in both Aurora and Denver. To be included in the pre-assessment analyses, students had to have both a spring 2017 and spring 2019 CMAS scaled score in either English language arts or mathematics.

Like the 3rd grade cohort analyses presented above, two-level HLMs were used as the analytic tool for the pre-assessment data due to the nested structure of the data (i.e., students nested within schools). In addition, Hedges' *g* effect sizes, percentile ranks, and improvement indices associated with the treatment effect were calculated. Results for the pre-assessment are reported in Table 11. For these analyses, control is coded as 0 and treatment is coded as 1.

For Aurora students, baseline equivalence was established as there were no statistically significant differences or nonequivalent effects between either (a) treatment and control EL students or (b) treatment and control non-EL students in either English language arts or mathematics. In English language arts, there were slightly more control students for the EL group (+7) and only one additional treatment student for the non-EL group. There were also slightly more EL (+14) students in the control group for mathematics.

Table 11: 6th Grade Cohort EL and non-EL Treatment and Control Group CMAS Pre-Assessment Results (Across Treatment and Control Group Comparison)

Subject	Group	Treatment *n*	Control *n*	Coefficient	*p*-value	Effect Size	Percentile Rank	Improvement Index
English language arts	EL	334	341	3.88	0.545	0.13	55	5
	Non-EL	366	365	0.26	0.948	0.01	50	0
Mathematics	EL	335	347	2.73	0.647	0.10	54	4
	Non-EL	366	366	2.83	0.616	0.10	54	4

*Statistically significant at $p < 0.05$ ⁺Nonequivalent effect

A positive improvement index for these analyses would indicate that **treatment students** outperformed control students, while a negative improvement would indicate that **control students** outperformed treatment students.

Analyses

Two-level HLMs were again used as the analytic tool for the Year 3 outcomes for the 6th grade cohort. Hedges' *g* effect sizes, percentile ranks, and improvement indices associated with the treatment effect were also calculated. To be included in the analyses, students had to have a spring 2017 pre-assessment (i.e., baseline) as well as a spring 2019 CMAS scaled score in English language arts or mathematics (i.e., outcome). Results for the Year 3 analyses are reported in **Table 4**. For all analyses, non-EL is coded as 0 and EL is coded as 1. A positive improvement index for these analyses would indicate that **EL students** outperformed the non-EL students, while a negative improvement would indicate that **non-EL students** outperformed EL students.

As with the 3rd grade cohort, four sets of analyses were conducted. Improvement indices compared between years within the treatment and control groups were used to determine the change in the EL/non-EL gap over time.

Results

On the pretest in 2016-17, **EL students** in both the treatment and control groups scored statistically significantly *lower* than non-EL students in English language arts, with an average EL student ranking more than 20 percentile points *lower* than an average non-EL student for both the treatment and control groups. Additionally, EL students in both the treatment and control groups scored statistically significantly *lower* than non-EL students in mathematics. An average EL student ranked 16 and 12 percentile points *lower* than an average non-EL student in the treatment and control groups respectively.

On the posttest in 2018-19, there were no statistically significant differences between EL and non-EL treatment or control group students in English language arts. Although not statistically significant, the improvement indices indicated that an average EL treatment student ranked 2 percentile points *higher* than an average non-EL treatment student in English language arts, while an average EL control student ranked 1 percentile *lower* than an average non-EL control student in English language arts. While the EL/non-EL gap in English language arts for both treatment and control groups decreased from spring 2017 to spring 2019, **the decrease for the treatment group was about 12% larger (-108% vs. -95.5% respectively)**.

On the posttest in 2018-19 in mathematics, there were no statistically significant differences between EL and non-EL students in either the treatment or control group. An average EL treatment student ranked the *same* as an average non-EL treatment student in mathematics, while an average EL control student ranked 1 percentile point *lower* than an average non-EL control student in mathematics. While the EL/non-EL gap in mathematics for both the treatment and control groups decreased from spring 2017 to spring 2019, **the decrease for the treatment group was about 8% larger (-100% vs. -91.7% respectively).**

See Table 12, Figure 5, and Figure 6.

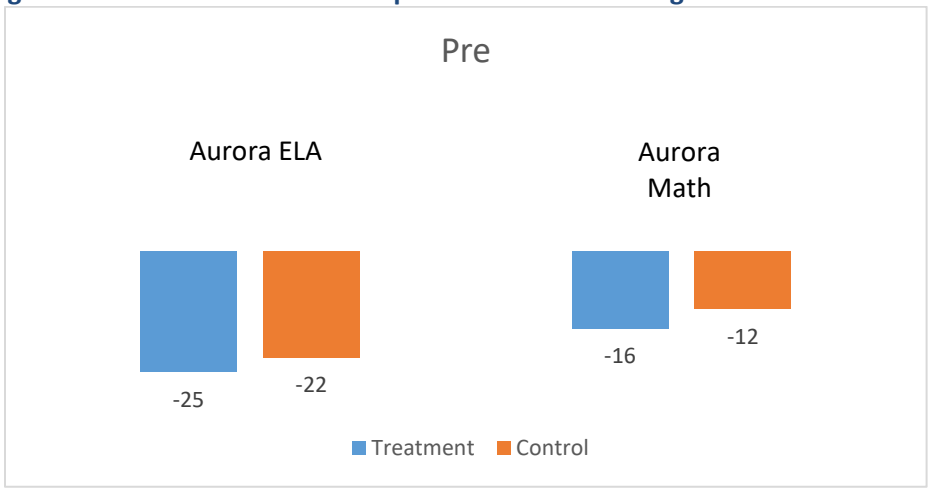
Table 12: APS 6th Grade Cohort Year 3 CMAS Outcomes: EL vs. Non-EL (Within Treatment and Control Group Comparison)

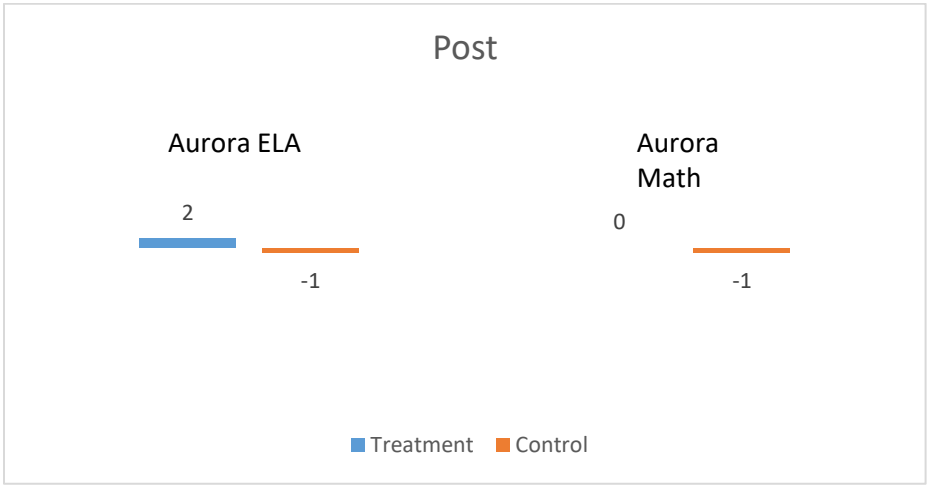
Subject Area	Group	EL *n*	Non-EL *n*	Pretest (2016-17)				Posttest (2018-19)				Change Pre to Post		
				Coefficient	Effect Size	Percentile Rank	Improvement Index	Coefficient	Effect Size	Percentile Rank	Improvement Index	Direction	Improvement Index Difference	% Change
English language arts	Treatment	334	366	-19.78*	-0.69	25	-25	1.34	0.04	52	2	+	27	-108.0%
	Control	341	365	-18.45*	-0.58	28	-22	-0.46	-0.01	49	-1	+	21	-95.5%
Mathematics	Treatment	335	366	-11.45*	-0.41	34	-16	-0.29	-0.01	50	0	+	16	-100.0%
	Control	347	366	-8.44*	-0.3	38	-12	-0.78	-0.03	49	-1	+	11	-91.7%

*Statistically significant at $p < 0.05$

Note: Within subject area (English language arts or mathematics), cells in green under "% Change" indicate a larger treatment group achievement gap decrease based on the difference in the pretest and posttest improvement index, while red cells indicate a larger control group decrease. A positive improvement index for these analyses would indicate that EL students outperformed the non-EL students, while a negative improvement would indicate that non-EL students outperformed EL students.

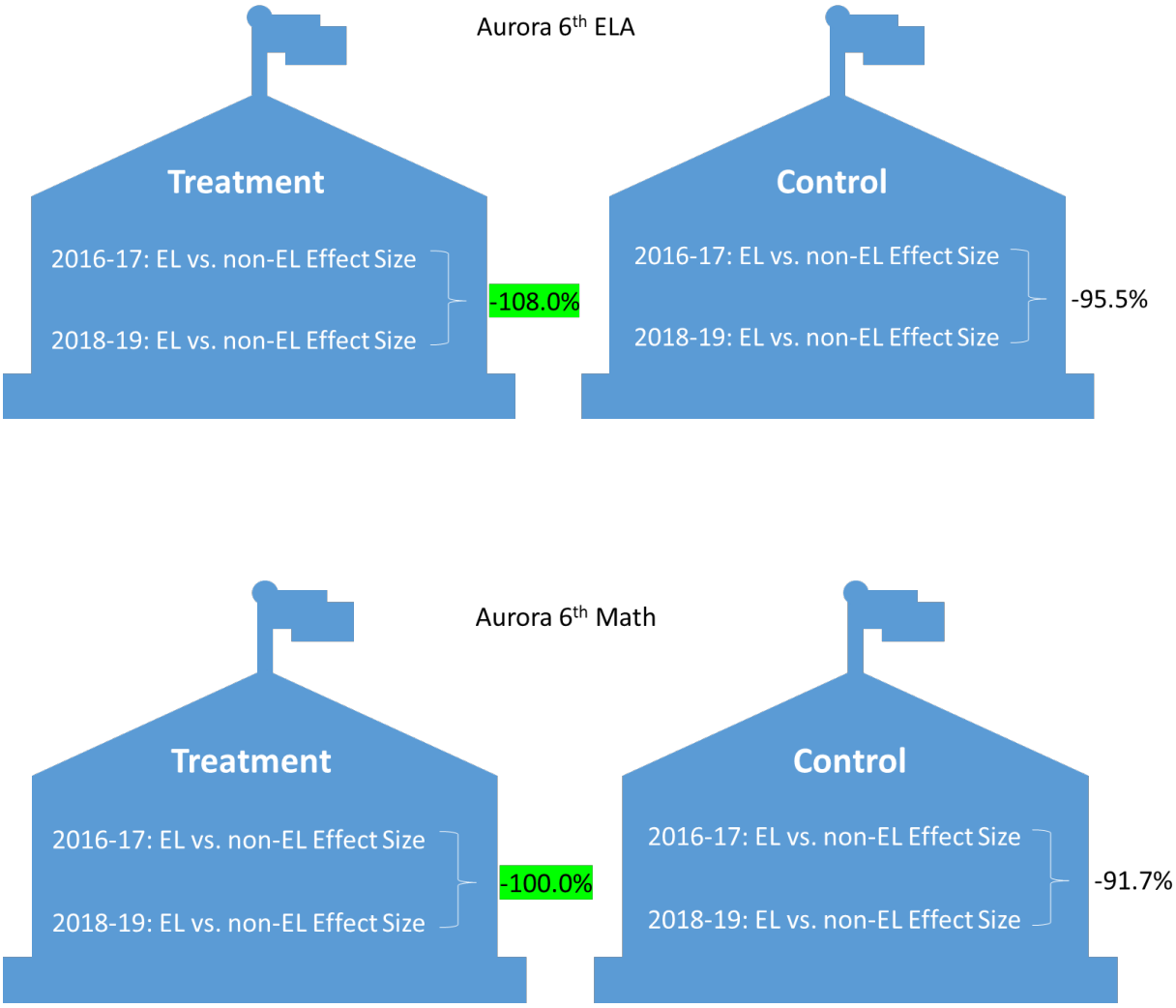
Figure 5 APS: 6th Grade Cohort Improvement Index Changes Pre to Post





Note: Values indicate the percentile point difference between the EL and Non-EL groups: A positive improvement index indicates the number of percentile points higher EL students scored compared to the average non-EL student, while a negative improvement index indicates the number of percentile points lower EL students scored compared to the average non-EL student

Figure 6: APS 6th Grade Cohort Outcomes



Note: Within subject area (English language arts or mathematics), percentages in green indicate a larger treatment group achievement gap decrease based on the % change in the pretest and posttest improvement indices, while percentage in red indicate a larger control group decrease.

Summary of Student Outcomes

For the 3rd grade cohorts, across both subject areas, both the treatment and control groups demonstrated a reduction in the EL/non-EL achievement gap from spring 2017 to spring 2019. The treatment groups in both subject areas produced larger reductions in the EL/non-EL gap compared to the control groups. The EL/non-EL achievement gap reductions for the treatment group ranged from 110% (English language arts) to 190% (mathematics). However, there were no statistically significant outcomes.

For the 6th grade cohorts, treatment and control groups in both subject areas reduced the EL/non-EL achievement gap from spring 2017 to spring 2019. Additionally, for both subject areas, the treatment group demonstrated greater reductions in the EL/non-EL gap compared to the control group. The treatment group EL/non-EL achievement gap reductions ranged from 100% (mathematics) to 108% (English language arts). However, again there were no statistically significant outcomes.

Therefore, based on Year 3 outcome data, it appears that to date, *LASER Focused* has had a positive impact on reducing the EL/non-EL achievement gap for both the 3rd and 6th grade cohort treatment groups in both subject areas in APS. However, the outcomes for the 3rd grade cohort are more difficult to interpret as APS had different pretest measures available, whereas the 6th grade cohort had the same pre and posttest measures (i.e., CMAS). Future studies will again test for baseline equivalence with the analytic samples available at the time.

Next Steps

LASER Focused has completed its last year of program implementation. The focus over the past year has been on supporting teachers implementing STC Unit Logs and *LASER Focused* pedagogies in the classroom, on continuing to provide Family Nights at the Denver Museum of Nature & Science, and on finalizing data collection within schools via observations, surveys, and interviews. We also planned to conduct two EL student/parent focus groups in DPS and APS schools in Spring 2020. However, school and community closures associated with COVID-19 have delayed that data collection. Student/parent focus groups will take place during the coming year if they can be completed safely.

Because we are assessing student achievement using available results from state testing, rather than placing the burden of additional testing on schools, teachers, and students, our student data analysis lags behind other program evaluation. This also means that although this evaluation focuses on student outcomes in math, reading, and science, annual reports only include data based on assessments available for the treatment cohort in that academic year. We anticipate our final summative report to be available in Fall 2021. This report will cover results from Project Year 4, after three years of *LASER Focused* program implementation within schools. However, because COVID-19 closed schools in spring 2020 and state tests were not administered, we will be researching alternate methods for summative assessment of student achievement in the coming year. See the Appendix (*LASER Focused* Timeline) for more information.

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Appendix: *LASER Focused* Timeline

Task	Year 1 (2016-17)			Year 2 (2017-18)			Year 3 (2018-19)			Year 4 (2019-20)			Year 5 (2020-21)			
	FA 2016	SP 2017	SU 2017	FA 2017	SP 2018	SU 2018	FA 2018	SP 2019	SU 2019	FA 2019	SP 2020	SU 2020	FA 2020	SP 2021	SU 2021	FA 2021
Professional Development and Teacher Support (SSEC):																
Introductory PD (2.5 days)			■													
Intermediate PD (2.5 days)						■										
Condensed PD (half-day)									■							
Classroom Implementation				■	■		■	■		■	■					
Family Connections at DMNS				Three Family Connections nights at the museum during each implementation year												
Analysis, Evaluation, and Reporting (CREP):																
Teacher and principal surveys		■			■			■			■					
PD assessment surveys			■			■										
Classroom observations				■	■		■	■		■	■					
STC Unit Logs				Teachers complete an STC Unit Log each time they finish teaching an STC Unit												
Phone interviews											■					
Student/parent focus groups											■					
Test score acquisition							■			■			■			
Data analysis								■			■			■		
District reports released									2017-2018			2018-2019				Final

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