



# LASER Focused on English Learners: PD plus an inquiry-based science curriculum improves K-8 teachers' perceived ability to support ELs and reduces the achievement gap in math and reading

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## ABSTRACT

*LASER Focused* seeks to improve teachers' abilities to support students who are ELs and close the achievement gap between ELs and non-ELs in grades K-8 within three subjects: Science, math, and reading. We followed an elementary and middle school cohort in two Colorado school districts with high EL enrollment. Here, we report outcomes from the 2018-19 academic year, after two of three planned program years, including teacher perceptual surveys and math and reading outcomes for students at the end of their 4<sup>th</sup> and 7<sup>th</sup> grade years.

## METHODOLOGY

K-8 science teachers in 16 schools within two Colorado school districts with high EL enrollment received two years of PD to implement EL teaching strategies and the hands-on, inquiry-based, self-contained Science and Technology Concepts (STC) curriculum<sup>5</sup> kits. For student achievement, we used a quasi-experimental design tracking end-of-grade scores for students in an elementary cohort (3<sup>rd</sup>-5<sup>th</sup> grade) and a middle school cohort (6<sup>th</sup>-8<sup>th</sup> grade) in treatment vs. matched comparison schools. The achievement gap between EL and non-ELs in math and reading at baseline (2016-17) was compared to the gap after two years (2018-19) in treatment vs. comparison schools for each district and each cohort. For this comparison, baseline equivalence between EL and non-EL students in the two groups is necessary (Fig.1). **A greater decrease in the achievement gap in treatment schools (green check-boxes in Fig.2) would support a benefit of the intervention.** Teacher perceptions were collected using an anonymous Likert-type survey at baseline and each year thereafter.

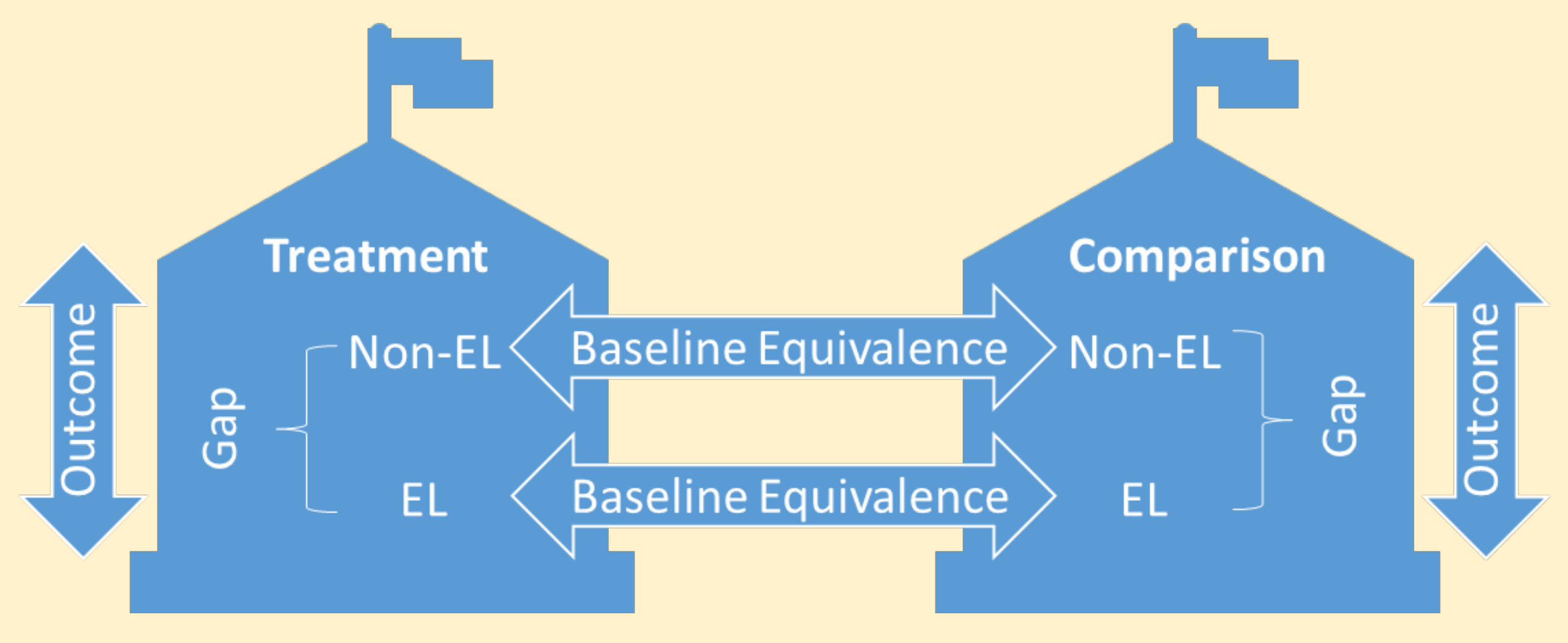
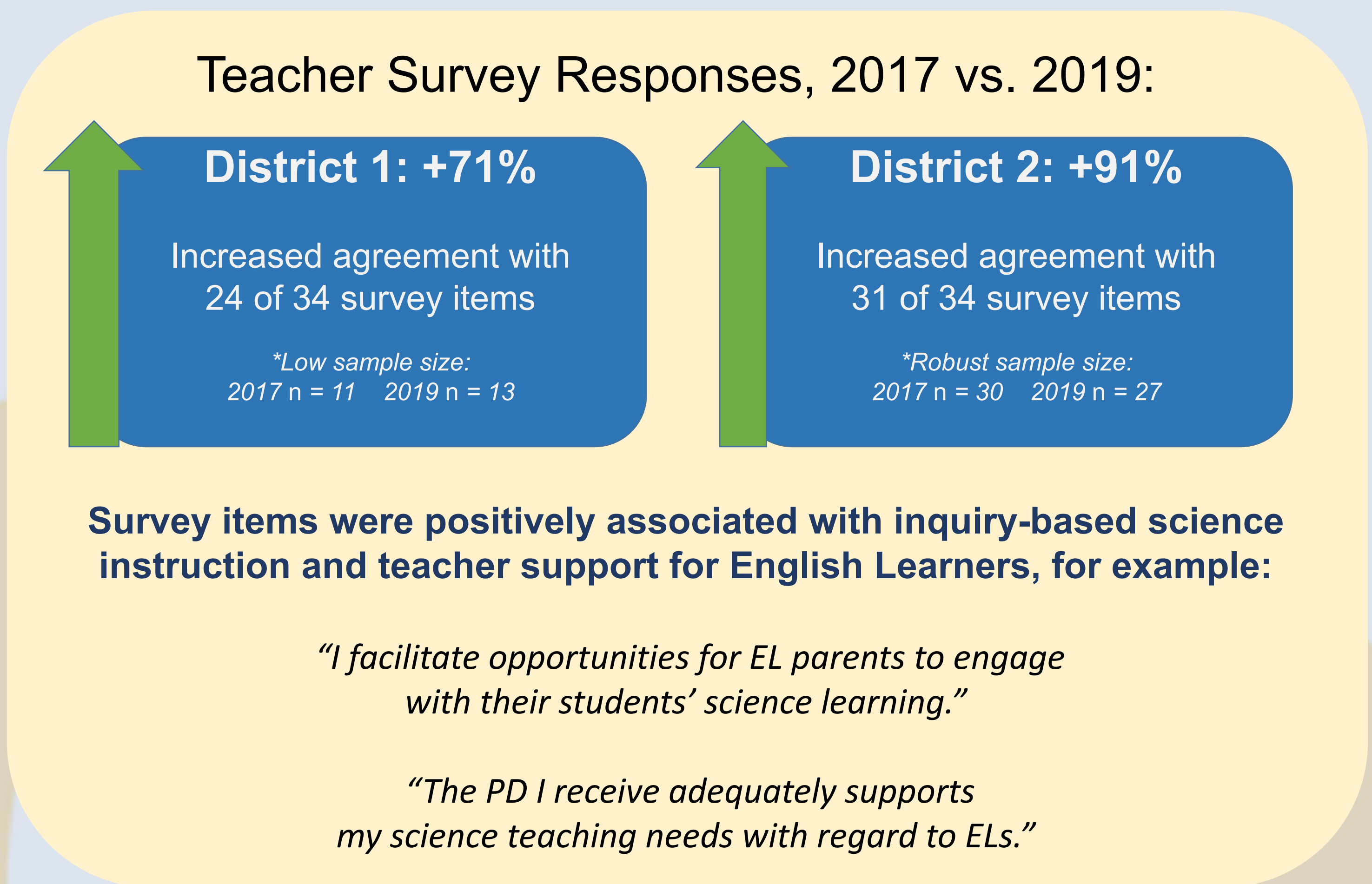


Figure 1: Achievement gap comparison design

## INTRODUCTION

In the last decade, EL scores on the NAEP lagged 25-36 points (elementary) and 39-46 points (middle school) behind non-ELs in science, math, and reading.<sup>1,2</sup> We have previously shown that inquiry-based science instruction can improve achievement in these subjects for some student subgroups, including ELs.<sup>3</sup> *LASER Focused* builds upon the original LASER Model's<sup>4</sup> teacher PD by providing an additional focus on preparing teachers to instruct and assess ELs using an inquiry-based, hands-on science curriculum developed by the Smithsonian Science Education Center (SSEC).

## RESEARCH QUESTIONS

- After two years of implementation:
- Has *LASER Focused* decreased the EL/non-EL achievement gap in math and reading for elementary and middle school students in two school districts?
  - Do teachers feel *LASER Focused* has improved their ability to support ELs in the classroom?

## RESULTS

After two years, the achievement gap decreased more for the treatment group than the comparison group for both districts, both subjects, and both cohorts, with the exception of the elementary cohort in mathematics for District 1 (Fig.2). In addition, teachers in both districts reported increased perceptions of their ability to support ELs in the classroom after two years than they reported prior to participation (Fig.3).

	District 1		District 2	
	Subject	Achievement Gap Decrease	Subject	Achievement Gap Decrease
Elementary Cohort*	<input checked="" type="checkbox"/> Math	-139%	<input checked="" type="checkbox"/> Math	-190%
	<input checked="" type="checkbox"/> Reading	-71%	<input checked="" type="checkbox"/> Reading	-110%
Middle School Cohort	<input checked="" type="checkbox"/> Math*	-123%	<input checked="" type="checkbox"/> Math	-100%
	<input checked="" type="checkbox"/> Reading**	-123%	<input checked="" type="checkbox"/> Reading	-108%

Achievement Gap Decrease represents the difference between the Improvement Index for treatment students at pre- and post-test. The greatest decrease in the EL/non-EL achievement gap was for the elementary cohort in District 2.  
\*Caution: Baseline equivalence not established for the Non-EL group  
\*\*Caution: Baseline equivalence not established for the EL group  
\*Districts used different pre-and post-test measures

Figure 2: Outcomes by district, subject area, and cohort

Figure 3: Changes in teacher perceptions by district

## DISCUSSION/CONCLUSIONS

See the important statistical caveats noted in Fig. 2. For this analysis, we compared the magnitude of the Improvement Index (pre/post EL/Non-EL achievement gap) for students in treatment vs. comparison schools. Final results for all subject areas, including science achievement, will be available after the last project year (when students complete 5<sup>th</sup> and 8<sup>th</sup> grade) and will include testing for statistical significance. For both student and teacher outcomes, results for District 2 were the most striking. This may be because District 1 had prior exposure to LASER PD (without an EL component) and STC, and thus may have had a higher baseline due to a similar intervention. Teachers have access to continuing SSEC support through a series of EL pedagogical strategy videos available online.<sup>6</sup>

## ACKNOWLEDGEMENTS

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