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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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.1,2 We have previously shown that inquiry-based science instruction can improve achievement in these subjects for some student subgroups, including ELs.3 LASER Focused builds upon the original LASER Model’s4 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?

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) curriculum5 kits. For student achievement, we used a quasi-experimental design tracking end-of-grade scores for students in an elementary cohort (3rd-5th grade) and a middle school cohort (6th-8th 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.

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).

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 5th and 8th 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.6

ACKNOWLEDGEMENTS
Student data analysis was led by Dr. Todd Zoblotsky, LASER Focused co-PI. Special thanks to SSEC Regional Coordinator Tami McDonald, EL SME Teresa Phillips, CREP co-PI Dan Strahl, CREP Graduate Assistant Allison Schimmel-Bristow, and to the Denver and Aurora Public School Districts.

REFERENCES:

Figure 1: Achievement gap comparison design

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

Figure 3: Changes in teacher perceptions by district