

RESEARCH RESULTS

Read 180 & System 44: Lincoln Unified School District

STUDY PROFILE

DISTRICT:

Lincoln Unified School District, Stockton, CA

GRADES:

6–8

STUDY DESIGN:

Promising (ESSA)¹

EVALUATION PERIOD:

2017–2018 school year

STUDY CONDUCTED BY:

Forge Research Group

OUTCOME MEASURE:

- *Read 180* Universal Software Use
- *System 44* Software Use
- *Reading Inventory*
- *Phonics Inventory*
- Smarter Balanced Assessment (SBA) English Language Arts/Literacy Summative Assessment

IMPLEMENTATION:

90-Minute Model

DISTRICT CHARACTERISTICS

The Lincoln Unified School District (LUSD) in Stockton is one of 1228 school districts in California. The LUSD served 9420 K–12th grade students in the 2017–2018 school year, of which, 8 elementary schools served 5630 PreK–8th grade students and 1 middle school served 658 7th–8th grade students². The LUSD serves a diverse population of students with a range of ethnic backgrounds: African American (12%), Asian (13%), Caucasian (22%), Hispanic (48%), Native American (2%), and students with Multiple ethnic backgrounds (3%). In the 2017–2018 school year, 63% of students in the district were eligible to receive free or reduced-price lunch through the National School Lunch Program, 15% were classified as English learners (EL), and 11% were classified as Students with Disabilities (SWD).

IMPLEMENTATION OVERVIEW

IMPLEMENTATION MODEL

LUSD students in grades 6 to 8 were identified as struggling with reading comprehension based on a pattern of below-grade-level Measures of Academic Progress (MAP) scores, DIBELS, Smarter Balanced Assessment English Language Arts/Literacy scores and *Reading Inventory* Lexile scores. Students who scored less than 600 Lexiles (L) on the *Reading Inventory* completed the *Phonics Inventory*; those students who scored in the “Beginning” or “Developing” range worked in *System 44* until moving to *Read 180* Universal after scoring in the “Advancing” range (called a mixed model implementation hereafter). Those students who scored in the recommended Lexile (L) range on the *Reading Inventory* (between 600–880L in 6th grade, 600–

950L in 7th or 600–990L in 8th grade) began *Read 180* Universal instruction.

Students in Grades 6, 7, and 8 received 90-minute *System 44* and/or *Read 180* Universal instruction approximately three times a week. In this Double Period Instruction Model, students completed 20 minutes of whole-group instruction followed by 20 minutes of each of three station rotations (rotated between the personalized online student application in either *System 44* or *Read 180* Universal, differentiated small group learning, and independent reading), and concluding with 10 minutes of whole-group wrap-up.

LUSD teachers completed a one-day “Getting Started” training day to learn how to use the *System 44* and *Read 180* Universal program technology, differentiation features, and program assessments in the 2016–2017 school year (the first year of implementation). Teachers also attended 36 days of coaching in the 2016–2017 school year and 12 days of coaching in the 2017–2018 school year to learn about effective planning, progress monitoring, and to receive further instruction on using differentiation and assessments.

PARTICIPANTS

All schools serving 6th–8th grade students in the LUSD utilized *Read 180* Universal as a Tier 2 reading intervention and *System 44* as a Tier 3 reading intervention during the 2017–2018 school year in integrated classrooms with differentiated instruction. All students who completed at least 15 *Read 180* Universal sessions totaling at least 150 minutes and no *System 44* sessions ($n = 251$) or who completed at least 10 sessions each in both *System 44* and *Read 180* Universal totaling at least 150 minutes ($n = 38$) were included in the analysis; 41 students with

¹Correlational study with statistical control for selection bias

²Lincoln Unified School District 2018 Report Card. <https://www.ed-data.org>

less use were excluded from this analysis. Students in this analysis attended Brookside School ($n = 20$), Claudia Landeen School ($n = 27$), Colonial Heights School ($n = 26$), Don Riggio School ($n = 41$), John R Williams School ($n = 20$), Lincoln Elementary School ($n = 19$), Mable Barron School ($n = 26$), Tully C Knoles School ($n = 32$), and Sierra Middle School ($n = 78$). Student ethnic backgrounds included African American (19%), Asian (8%), Caucasian (13%), Hispanic (55%), and Native American (2%) and students with multiple ethnic backgrounds (3%). Of these students, 60% were male and 40% were female, 84% were eligible to receive free or reduced-price lunch through the National School Lunch Program, 34% were classified as English learners (EL), and 31% were classified as Students with Disabilities (SWD).

MEASURES

Software Usage Data

Student software usage data was collected as students used the online student application during *System 44* and *Read 180* Universal instruction. Software usage data included number of completed segments, number of completed sessions, average time spent in each session, and number of sessions averaged per week.

Smarter Balanced Assessment (SBA) ELA Summative Assessment

The Smarter Balanced Assessment (SBA) was designed to measure end-of-year achievement in English Language Arts/Literacy (ELA) and to accurately capture growth in ELA proficiency from previous years. The SBA measures ELA achievement in reading, writing, listening, and research using a computer adaptive system to deliver between 42 and 48 questions. Assessment results include a scale score between 2000 and 3000 and an Achievement Level Descriptor (ALD) indicating overall performance level of Standard Not Met, Standard Nearly Met, Standard Met (indicating grade-level ELA proficiency), and Standard Exceeded. LUSD students complete the SBA each spring in grades 3-8 and also in grade 11. SBA scores are a part of the California Assessment of Student Performance and Progress (CAASPP).

Reading Inventory

Reading Inventory measures reading comprehension proficiency for students in grades K-12. The *Reading Inventory* uses adaptive technology to determine a student's reading comprehension level on the Lexile Framework for Reading; the higher the Lexile score, the more challenging reading material the student can comprehend. Test item difficulty ranges from items appropriate for developing readers to items requiring a reading proficiency indicating preparedness for college level texts, allowing measurement of skill growth regardless of the students' initial ability. Assessment results include a Lexile scale score that indicates reading ability at a level of text complexity and a performance level of below basic, basic, proficient, or advanced, indicating achieved reading comprehension compared to grade-level expectations. LUSD students receiving *System 44* and *Read 180* Universal instruction completed the *Reading Inventory* in the fall of 2017 (August through October) before beginning instruction, again in the winter (November through January), and again in the spring of 2018 (April or May) following instruction.

Phonics Inventory

Phonics Inventory measures proficiency in the foundational reading skills of phonological decoding and sight word reading for students in grades 3-12. The *Phonics Inventory* is used to identify whether students with low reading comprehension achievement also lack the skills needed to decode new words (leading to placement in *System 44*) or are best served by an intervention to develop reading comprehension strategies, text analysis skills, and background knowledge (leading to placement in *Read 180* Universal). Assessment results include a fluency score and decoder status of pre-decoder, beginning, developing, or advancing. LUSD students with *Reading Inventory* scores at 400L or below completed the *Phonics Inventory* before beginning instruction in

System 44, and every couple of months following instruction until promotion to *Read 180* Universal.

California English Language Development Test / English Language Proficiency Assessments for California

LUSD students whose home language is not English and students who are classified as English learners complete an English language proficiency exam each spring. For the 2016-2017 school year, students completed The California English Language Development Test (CELDT). The CELDT was designed to identify students who need to improve their skills in listening, speaking, reading, and writing in English. Students are assessed on the five domains of Reading, Writing, Listening, Speaking, and Comprehension. Assessment results include a scale score for each domain as well as an overall scale score with a range from 248-741 in 6th - 8th grades. For the 2017-2018 school year, the Summative English Language Proficiency Assessments for California (ELPAC) replaced the CELDT to measure an English learner's progress in learning English and to identify the student's English Language Proficiency Level. Assessment results include a scale score for each category of Oral Language (Listening, Speaking) and Written Language (Reading, Writing), an overall scale score with a range from 1150 to 1900, and an overall performance level from 1 to 4 (beginning English to well-developed English skills). The ELPAC, based on new California English Development Standards, does not produce scores that are comparable to CELDT scores.

RESULTS

An independent evaluator from Forge Research Group analyzed student academic achievement using data provided by Lincoln Unified School District and Houghton Mifflin Harcourt. *Read 180* Universal and *System 44* students' ELA performance was examined pre- and post- usage using multiple independent outcome measures.

USAGE

As LUSD uses frequent assessment data to place students into the appropriate Tier of reading intervention when needed and exit students after reaching the appropriate level of proficiency, LUSD students may participate in an intervention for only one or both semesters of a school year and then move into another intervention or to standard instruction. Students who received *Read 180* Universal instruction for the entire school year completed an average of 6.9 segments ($SD = 4.81$) over an average of 77.1 total sessions ($SD = 25.45$), with 2.8 ($SD = 0.58$) sessions averaged a week in the *Read 180* Universal online student application. Each session lasted an average of 15.08 ($SD = 3.72$) minutes. These metrics are consistent with the implementation model. Students who completed at least 10 sessions each of both *System 44* and *Read 180* Universal instruction during at least 150 session minutes (in the mixed model implementation) during the 2017-2018 school year completed an average of 4.3 *Read 180* Universal segments ($SD = 3.64$) over an average of 42.5 total sessions ($SD = 20.64$), with 2.7 ($SD = 0.52$) sessions averaged a week averaging 15.4 minutes ($SD = 3.71$) per session in the *Read 180* Universal online student application. Students in this mixed model implementation also completed an average of 26.6 *System 44* topics ($SD = 15.51$) over an average of 39.0 total sessions ($SD = 25.74$), averaging 11.1 minutes ($SD = 2.27$) per session in the *System 44* online student application.

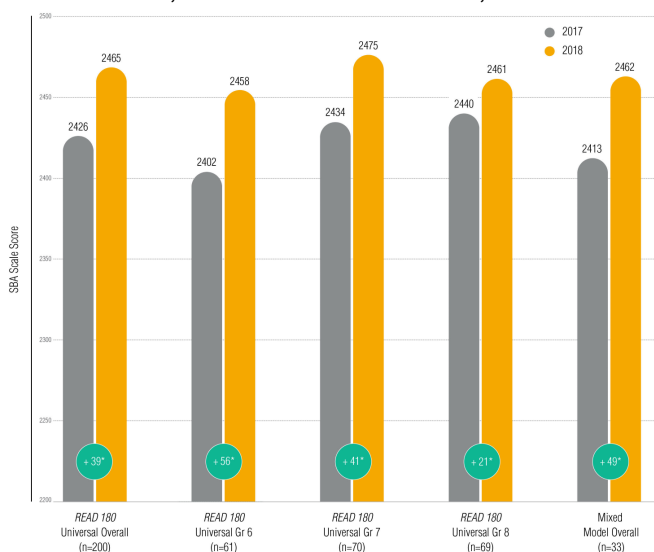
PERFORMANCE

An independent evaluator from Forge Research Group analyzed student academic achievement using test score data provided by the Lincoln Unified School District and program usage data provided by Houghton Mifflin Harcourt. *Read 180* Universal and *System 44 + Read 180* Universal mixed model students' English Language Arts (ELA) performance was examined pre- and post-implementation using multiple independent measures of reading. This analysis included scores on the statewide end-of-year summative assessment (SBA), the *Reading Inventory*, and the *Phonics Inventory*. *Read 180* Universal students and mixed model students demonstrated statistically significant gains in ELA proficiency during the 2017–2018 school year on each of these reading measures.

Smarter Balanced Assessment (SBA) English Language Arts (ELA)

LUSD students took the SBA ELA summative assessment in spring 2017, prior to receiving *Read 180* Universal or mixed model implementation, and again in spring 2018, after instruction. *Read 180* Universal students demonstrated a statistically significant overall gain in SBA ELA scale score, averaging a 39-point increase from 2426 in 2017 to 2465 in 2018 with effect size Cohen's $d=0.74$ (see Figure 1). Further, the increase in the average SBA ELA scale score was statistically significant for 6th (56-point gain), 7th (41-point gain) and 8th (21-point gain) grade students. Mixed model students also demonstrated a statistically significant overall gain in SBA ELA scale score, averaging a 49-point increase from 2413 in 2017 to 2462 in 2018. Notably, mixed model students decreased the scale score gap from 13 points to 3 points, ending the year at a similar SBA scale score as compared to the *Read 180* Universal students.

FIGURE 1
CHANGE IN SMARTER BALANCED ASSESSMENT (SBA) ELA SCALE SCORE OVERALL, BY PROGRAM AND BY GRADE, 2017-218



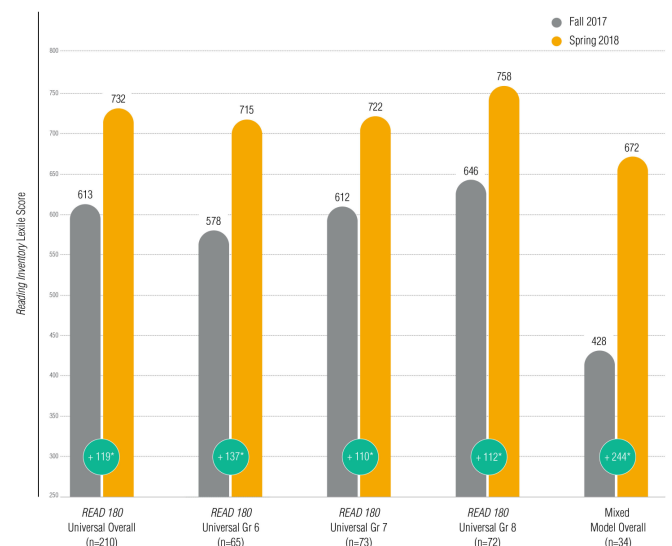
Note: *statistically significant change; R180U = *Read 180* Universal; Gr = Grade. The increase in average SBA ELA scale score was statistically significant for *Read 180* Universal students overall ($t = 10.41$, $p = 0.00$) and for the sixth ($t = 8.10$, $p = 0.00$), seventh ($t = 7.54$, $p = 0.00$), and eighth ($t = 3.24$, $p = 0.00$) grades. The increase in average SBA ELA scale score was statistically significant for mixed model (*System 44 + Read 180* Universal) students overall ($t = 5.40$, $p = 0.00$).

Notably, students showed accelerated growth in SBA ELA percentile compared to their initially same-scoring peers³ – on average, students scored better than 18% of their peers in 2017 but better than 21% of their peers in 2018, a statistically significant increase.

Reading Inventory

Read 180 Universal and mixed model students completed the *Reading Inventory* as a pre- and post-implementation test; The *Reading Inventory* is sensitive enough to capture below-grade-level ELA ability and growth that is not usually captured by state summative assessments. *Read 180* Universal students who completed the *Reading Inventory* in both the fall of 2017 and the spring of 2018 demonstrated a statistically significant overall gain in Lexile (L) Scores, averaging a 119L increase from 613L in fall to 732L in spring with effect size Cohen's $d=1.09$ (see Figure 2). Further, the increase in average *Reading Inventory* scores was statistically significant for 6th (137L gain), 7th (110L gain), and 8th (112L gain) grade students. Mixed model students also demonstrated a statistically significant overall gain in Lexile (L) Scores, averaging a 244L increase from 428L in fall to 672L in spring. Notably, mixed model students started the school year at a lower grade-level ability of reading comprehension but decreased the Lexile score gap from 185L to 60L, ending the year in the same grade-level Lexile range as the *Read 180* Universal students.

FIGURE 2
CHANGE IN READING INVENTORY IN LEXILES OVERALL, BY PROGRAM AND BY GRADE, FALL 2017 TO SPRING 2018



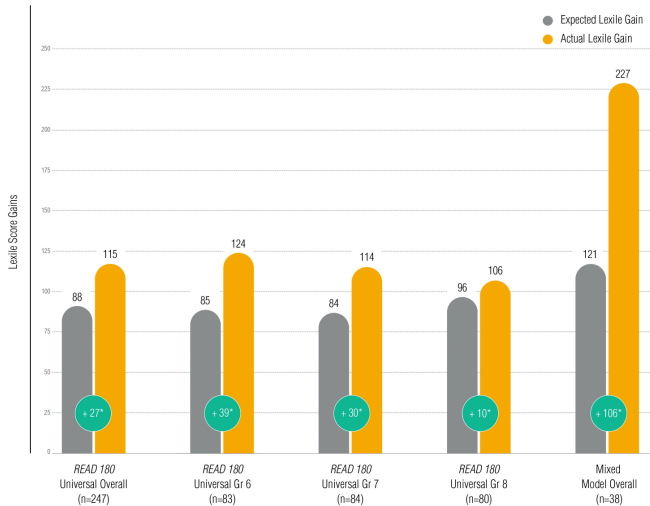
Note: *statistically significant change; R180U = *Read 180* Universal; Gr = Grade. The increase in average RI Lexile Score was statistically significant for *Read 180* Universal students overall ($t = 13.25$, $p = 0.00$) and for the sixth ($t = 6.40$, $p = 0.00$), seventh ($t = 8.99$, $p = 0.00$), and eighth ($t = 8.87$, $p = 0.00$) grades. The increase in average RI Lexile score was statistically significant for mixed model (*System 44 + Read 180* Universal) students overall ($t = 8.80$, $p = 0.00$).

In addition to demonstrating statistically significant Lexile gains, *Read 180* Universal and mixed model students demonstrated accelerated Lexile score gains compared to the average annual growth demonstrated by an initially same-scoring national sample⁴. Notably, on average, students gained approximately 1.4 times as many Lexile scores as would be expected from beginning to exiting instruction with effect size Cohen's $d=.31$ (see Figure 3), demonstrating accelerated growth towards grade-level performance.

³Percentile calculations compare LUSD students to all Oregon students who tested during the same SBA ELA test administration; California percentile data is not available.

⁴HMH *Reading Inventory*; Estimated Average Annual Growth; analysis of 373,880 students' fall to spring Lexile score gains.

FIGURE 3
READ 180 UNIVERSAL STUDENTS' LEXILE SCORE GAINS
COMPARED TO THE EXPECTED LEXILE GAIN BASED ON A
NATIONAL SAMPLE, FALL 2017 TO SPRING 2018

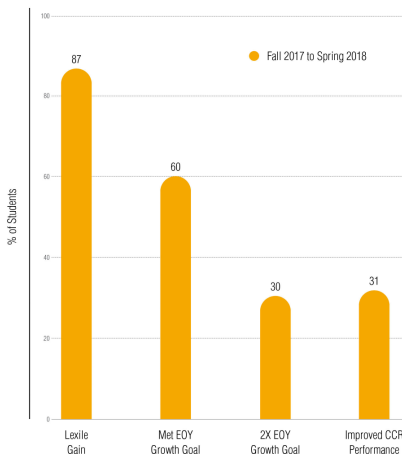


Note: * statistically significant change; R180U = *Read 180 Universal*; Gr = Grade. The average RI Lexile score gain was statistically significantly greater than the expected Lexile score gain for *Read 180 Universal* students overall ($t = 3.21$, $p = 0.00$) and for the sixth ($t = 2.42$, $p = 0.02$) and seventh ($t = 2.82$, $p = 0.01$) grades. The increase in average RI Lexile score was statistically significant for mixed model (*System 44 + Read 180 Universal*) students overall ($t = 4.31$, $p = 0.00$).

Summary Growth Metrics (see Figures 4 and 5) show the significant extent of reading comprehension growth during the 2017–2018 school year. With just one year of use, the majority of *Read 180 Universal* students achieved a Lexile gain on the *Reading Inventory* (87%) and met end-of-year growth expectations (60%) based on Estimated Average Annual Growth⁴ adjusted for the number of days in the program. Additionally, 30% of *Read 180 Universal* students more than doubled end-of-year growth expectations, and 31% of students increased at least one level on the *Reading Inventory* College & Career Performance Levels.

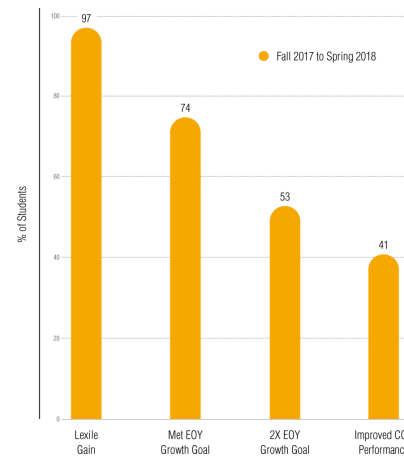
Demonstrating accelerated growth, nearly all mixed model students achieved a Lexile gain on the *Reading Inventory* (97%) and a large majority met end-of-year growth expectations (74%) based on Estimated Average Annual Growth adjusted for the number of days in the program. Additionally, 53% of mixed model students more than doubled end-of-year growth expectations, and 41% of students increased at least one level on the *Reading Inventory* College & Career Performance Levels.

FIGURE 4
READ 180 UNIVERSAL STUDENTS (N = 247)
SUMMARY GROWTH METRICS



Note: EOY = End-of-year; 2X = two times; CCR = College and Career Readiness.

FIGURE 5
MIXED MODEL STUDENTS (N = 38)
SUMMARY GROWTH METRICS

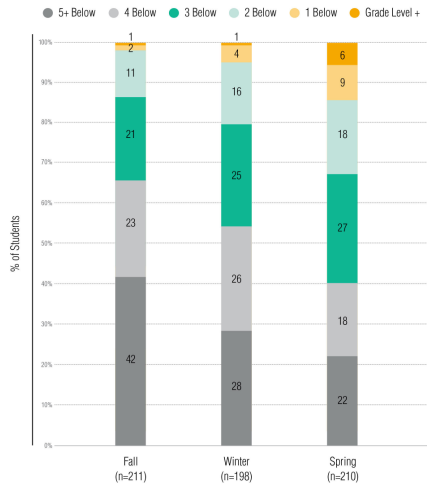


Note: EOY = End-of-year; 2X = two times; CCR = College and Career Readiness.

Importantly, *Read 180 Universal* students increased in grade-level reading ability (based on the text complexity grade correlated with the Lexile range aligned to college and career readiness) during the 2017–2018 school year (see Figure 6). The percentage of 6th, 7th, and 8th grade students who demonstrated at least grade-level reading comprehension increased six-fold from 1% to 6% and the percentage who demonstrated reading comprehension ability five or more grades below grade level decreased from 42% to 22%. With just one year of instruction, 27% of the students increased two or more grade levels in reading comprehension.

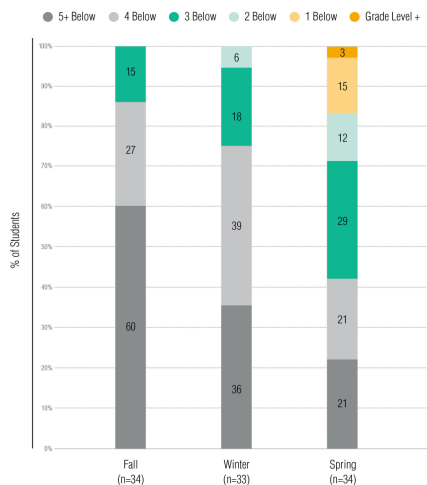
Likewise, mixed model students increased in grade-level reading ability during the 2017–2018 school year (see Figure 7). The percentage of 6th, 7th, and 8th grade students who demonstrated at least grade-level reading comprehension increased from 0% to 3% and the percentage who demonstrated reading comprehension ability five or more grades below grade level decreased from 60% to 21%. With just one year of instruction, 15% of the students increased two or more grade levels in reading comprehension. On average, mixed model students began the year demonstrating reading comprehension skills five grades below grade-level and averaged reading comprehension skills three grades below grade-level by the end of the year. Of note, increasing a grade level at the lower elementary school reading comprehension level requires close to twice as many Lexile score gains as does an increase in grade level ability at the middle school level. As such, the increase of one grade level in reading comprehension represents more absolute growth for the students with the lowest initial grade-level reading ability than for students with the highest initial grade-level reading ability.

FIGURE 6
READ 180 UNIVERSAL STUDENTS' CHANGE IN GRADE-LEVEL READING ABILITY IN EQUIVALENT LEXILE SCORES, 2017-2018



Note: The *Read 180 Universal* students' increase in Grade Level Reading Ability was statistically significant from fall to spring ($t = 12.29$, $p = 0.00$), fall to winter ($t = 7.48$, $p = 0.03$), and winter to spring ($t = 7.76$, $p = 0.00$).

FIGURE 7
MIXED MODEL STUDENTS' CHANGE IN GRADE-LEVEL READING ABILITY IN EQUIVALENT LEXILE SCORES, 2017-2018



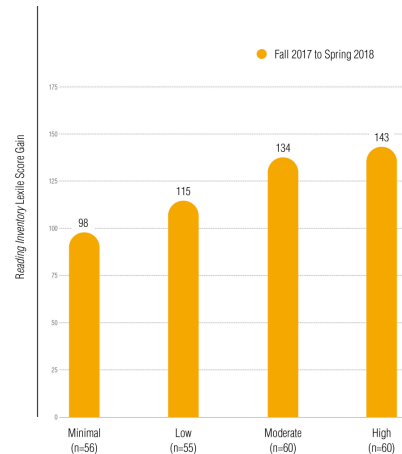
Note: The mixed model students' increase in Grade Level Reading Ability was statistically significant from fall to spring ($t = 6.67$, $p = 0.00$), fall to winter ($t = 4.15$, $p = 0.03$), and winter to spring ($t = 5.18$, $p = 0.00$).

Notably, growth on the *Reading Inventory* from fall 2017 to spring 2018 was highest for the most striving readers. *Read 180 Universal* Instruction students who initially scored in the Below Basic performance level on the *Reading Inventory* gained an average of 133L (large effect size of Cohen's $d = .86$) during the 2017-2018 school year, demonstrating accelerated growth in approaching grade-level proficiency compared to students who initially scored in the Basic performance level, who gained an average of 57L (medium-large effect size of Cohen's $d = .75$). All mixed model students initially scored in the Below Basic performance level, but gained an average of 244L during the 2017-2018 school year (large effect size of Cohen's $d = 1.61$).

Further, increased use of the *Read 180 Universal* online software was a statistically significant predictor of reading Lexile score growth, both before and after correcting for selection bias (see Appendix Table 6 for details). On average, *Read 180 Universal* students who completed more segments of the *Read 180 Universal* online software also achieved higher gains in *Reading Inventory* Lexile score⁵. Students who

completed 10 or more segments of the online software achieved an average of 1.5 times more Lexile score gain (143L) compared to students who completed 1 to 3 segments (98L), with effect size Cohen's $d = .87$ for low implementation, effect size Cohen's $d = 1.06$ for moderate implementation, effect size Cohen's $d = 1.06$ for high implementation, and effect size Cohen's $d = 1.17$ for very high implementation (see Figure 8). Similarly, for mixed model students, as the number of *System 44* topics completed increased, so did student Lexile score gain on *The Reading Inventory*. This positive correlation was also statistically significant.

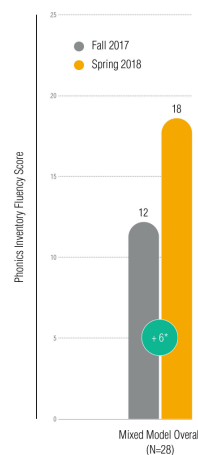
FIGURE 8
READ 180 UNIVERSAL STUDENTS' AVERAGE GAIN ON READING INVENTORY (RI) IN LEXILES BY IMPLEMENTATION LEVEL, FALL 2017 TO SPRING 2018



Note: RI Lexile Score gains increased between completing minimal (1-3 segments), low (4-6 segments) moderate (7-9 segments), and high (10 or more segments) levels of implementation. Number of *Read 180 Universal* segments completed was a significant predictor of HMH RI Lexile Score after accounting for initial RI Lexile Score ($B = 3.85$, $F = 10.55$, $p = 0.01$, Adjusted $R^2 = .25$).

Mixed model students also demonstrated statistically significant gains in *Phonics Inventory* fluency scores (see Figure 9), increasing from an average of 12 on first assessment to 18 on the final assessment. The percent of students achieving an "Advanced" decoder status increased from 0% to 33%, while the percent of students scoring at a "Developing" decoder status decreased from 50% to 21% from 2017 to 2018 (see Figure 10).

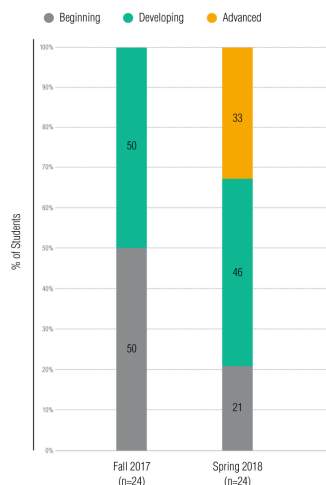
FIGURE 9
MIXED MODEL STUDENTS' CHANGE IN PHONICS INVENTORY FLUENCY SCORE, FALL 2017 TO SPRING 2018



Note: *statistically significant change. The increase in the *Phonics Inventory* Fluency score was statistically significant ($t = 4.40$, $p = 0.00$). The increase in the *Phonics Inventory* Decoder Status was statistically significant ($t = 4.1$, $p = 0.00$).

⁵As a previous *Reading Inventory* gains analysis has shown that students who decrease more than 100L on *The Reading Inventory* from fall to spring demonstrate poor test motivation and produce unreliable longitudinal achievement scores, those students were excluded from this implementation analysis. The RI scores of 3% ($n = 8$) of TTSD students decreased more than 100L, in line with previous findings that 2% to 5% of students will drop >100L even with implementation best practices.

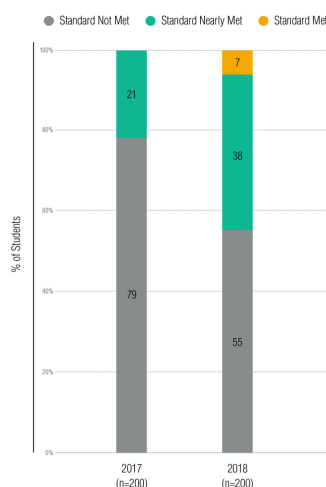
FIGURE 10
MIXED MODEL STUDENTS' CHANGE IN PHONICS INVENTORY
DECODER STATUS, FALL 2017 TO SPRING 2018



Note: *statistically significant change. The increase in the Phonics Inventory Fluency score was statistically significant ($t = 4.40$, $p = 0.00$). The increase in the Phonics Inventory Decoder Status was statistically significant ($t = 4.1$, $p = 0.00$).

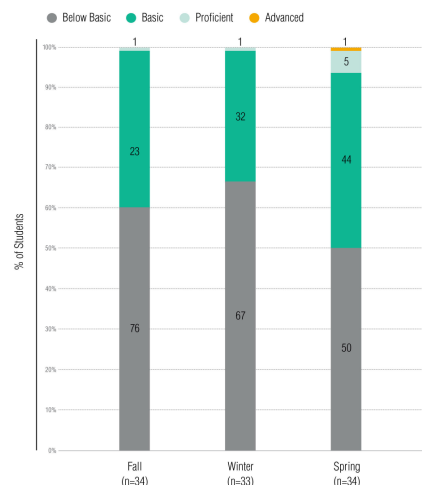
In addition to SBA scale score and *Reading Inventory* Lexile gains, *Read 180 Universal* students also achieved increased performance levels on reading measures with effect size Cohen's $d = .49$ for SBA ELA performance levels and effect size Cohen's $d = .66$ for the *Reading Inventory* (see Figures 11 and 12). The percent of students achieving a "Standard Met" SBA ELA Achievement Level Descriptor (ALD) increased from 0% to 7%, while the percent of students scoring at a "Standard Not Met" ALD decreased from 79% to 55% from 2017 to 2018. The percent of students achieving at least a Proficient *Reading Inventory* performance level increased six-fold from 1% to 6% and the percent of students scoring at a Below Basic performance level decreased from 76% to 50% from 2017 to 2018. The increase in students' performance levels on both the SBA ELA assessment and the *Reading Inventory* was statistically significant.

FIGURE 11
READ 180 UNIVERSAL STUDENTS' CHANGE IN SMARTER
BALANCED ASSESSMENT (SBA) ENGLISH LANGUAGE ARTS (ELA)
ACHIEVEMENT LEVELS, 2017-2018



Note: The increase in SBA ELA Achievement Level Descriptor was statistically significant ($t = 6.96$, $p = 0.00$).

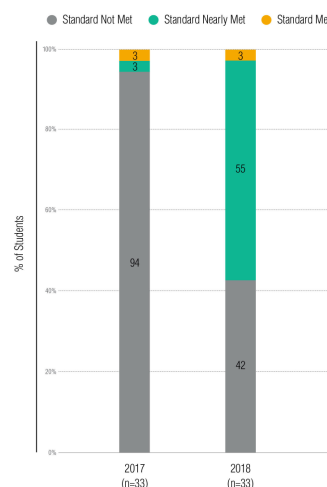
FIGURE 12
READ 180 UNIVERSAL STUDENTS' CHANGE IN READING INVENTORY
(RI) PERFORMANCE LEVELS, FALL 2017 TO SPRING 2018



Note: The increase in RI Performance Level was statistically significant ($t = 9.02$, $p = 0.00$).

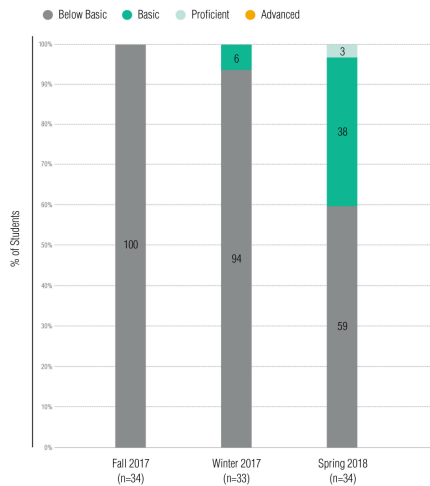
Mixed model students also achieved increased performance levels on reading measures (see Figures 13 and 14). The percent of students achieving at a "Standard Nearly Met" SBA ELA Achievement Level Descriptor (ALD) increased from 3% to 55% while the percent of students scoring at a "Standard Not Met" ALD decreased from nearly everyone at 94% to less than half 42% from 2017 to 2018. The percent of students achieving at least a Proficient *Reading Inventory* performance level increased from 0% to 3% and the percent of students scoring at a Below Basic performance level decreased from 100% to 59% from 2017 to 2018. The increase in students' performance levels on both the SBA ELA assessment and the *Reading Inventory* was statistically significant.

FIGURE 13
MIXED MODEL STUDENTS' CHANGE IN SMARTER BALANCED
ASSESSMENT (SBA) ELA ACHIEVEMENT LEVELS,
2017-2018



Note: The increase in SBA ELA Achievement Level Descriptor was statistically significant ($t = 4.78$, $p = 0.00$).

FIGURE 14
MIXED MODEL STUDENTS' CHANGE IN SMARTER BALANCED ASSESSMENT (SBA) ELA ACHIEVEMENT LEVELS, 2017-2018



Note: The increase in HMH RI Performance Level was statistically significant ($t = 4.59$, $p = 0.00$).

After one year of *Read 180* Universal instruction or mixed model implementation, many students increased an Achievement Level Descriptor on the state summative assessment (33% and 50%, respectively), and/or increased a performance level on the *Reading Inventory* (31% and 41%, respectively).

TABLE 1
SUMMARY CHANGES IN PERFORMANCE LEVELS

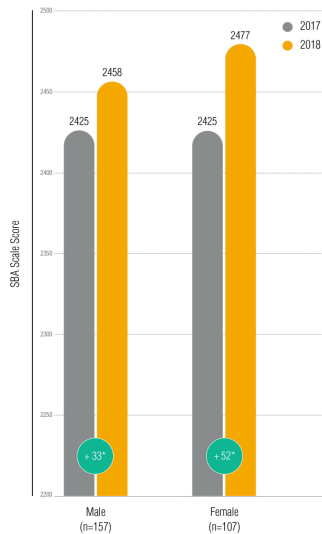
Performance Level	READ 180 Universal Students		Mixed Model Students	
	SBA	Reading Inventory	SBA	Reading Inventory
Students Moved Up	33%	31%	50%	41%
Students Stayed in Level	61%	68%	47%	59%
Students Moved Down	6%	1%	3%	0%

Note: SBA = Smarter Balanced Assessment Summative English Language Arts/Literacy.

Notably, disaggregation of the data indicated that use of both *Read 180* Universal alone or in a mixed model implementation with *System 44* was associated with significant gains in both SBA ELA scale scores and *Reading Inventory* Lexile gains for all categories of students (results are presented together here but see Appendix for a separation by instruction group).

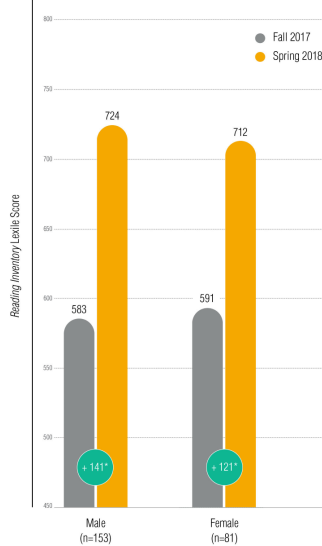
When results were disaggregated by gender, both males and females achieved statistically significant SBA ELA scale score gains (see Figure 15) and *Reading Inventory* gains (see Figure 16) from pre- to post-instruction.

FIGURE 15
CHANGE IN SMARTER BALANCED ASSESSMENT (SBA) ELA SCALE SCORE BY GENDER, 2017-2018



Note: * statistically significant change. The increase in average SBA ELA scale score was statistically significant for male ($t = 7.84$, $p = 0.00$) and female ($t = 10.43$, $p = 0.00$) students.

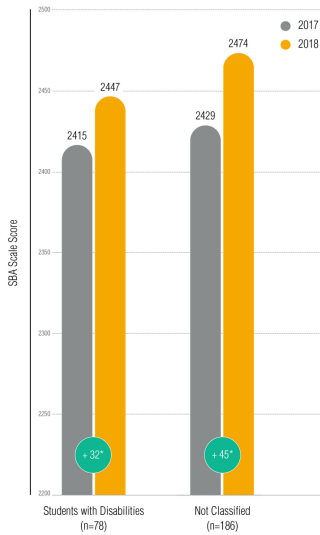
FIGURE 16
CHANGE IN READING INVENTORY (RI) IN LEXILES BY GENDER, FALL 2017 TO SPRING 2018



Note: * statistically significant change. The increase in average RI Lexile Score was statistically significant for male ($t = 11.50$, $p = 0.00$) and female ($t = 9.49$, $p = 0.00$) students.

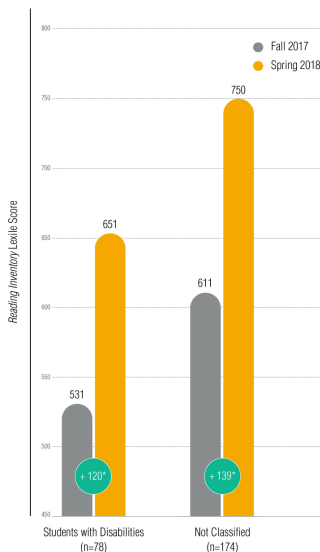
When results were disaggregated by education classification, students with disabilities achieved statistically significant SBA ELA scale score gains (see Figure 17) and statistically significant *Reading Inventory* gains (see Figure 18). In addition to gaining an average of 120L on the *Reading Inventory*, 51% of the SWD met yearly growth expectations.

FIGURE 17
CHANGE IN SMARTER BALANCED ASSESSMENT (SBA) ELA SCALE
SCORE BY STUDENTS WITH DISABILITIES CLASSIFICATION,
2017-2018



Note: statistically significant change. The increase in average SBA ELA scale score was statistically significant for Students with Disabilities ($t = 5.08$, $p = 0.00$) and was statistically significant for Not Classified ($t = 11.72$, $p = 0.00$) students.

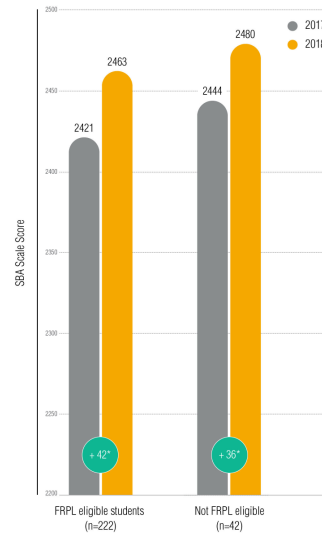
FIGURE 18
CHANGE IN READING INVENTORY IN LEXILES BY STUDENTS WITH
DISABILITIES CLASSIFICATION, FALL 2017 TO SPRING 2018



Note: statistically significant change. The increase in average RI Lexile Score was statistically significant for Students with Disabilities ($t = 7.11$, $p = 0.00$) and Not Classified ($t = 13.13$, $p = 0.00$) students.

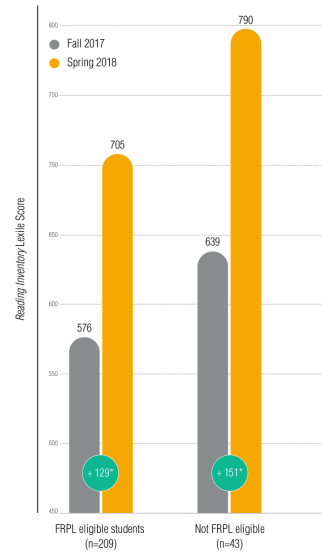
When results were disaggregated by eligibility to receive free or reduced-price lunch (FRPL) through the National School Lunch Program, FRPL-eligible students achieved statistically significant SBA ELA scale score gains (see Figure 19) and statistically significant *Reading Inventory* gains (see Figure 20). In addition to gaining an average of 129L on the *Reading Inventory*, 62% of the FRPL-eligible students met yearly growth expectations.

FIGURE 19
CHANGE IN SMARTER BALANCED ASSESSMENT (SBA) ELA SCALE
SCORE BY FREE OR REDUCED-PRICE LUNCH ELIGIBILITY,
2017-2018



Note: statistically significant change. The increase in average SBA ELA scale score was statistically significant for FRPL Eligible Students ($t = 11.51$, $p = 0.00$) and Students Not FRPL Eligible ($t = 4.77$, $p = 0.00$).

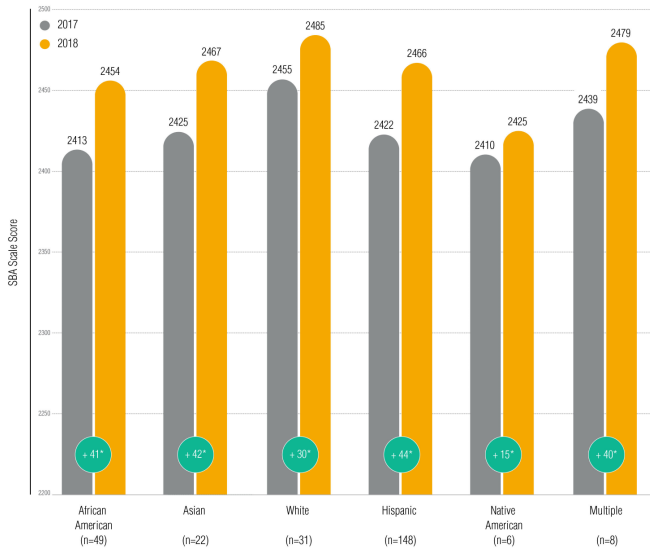
FIGURE 20
CHANGE IN READING INVENTORY IN LEXILES BY FREE OR
REDUCED-PRICE LUNCH ELIGIBILITY, FALL 2017 TO SPRING 2018



Note: statistically significant change. The increase in average RI Lexile Score was statistically significant for FRPL Eligible Students ($t = 13.45$, $p = 0.00$) and Students Not FRPL Eligible ($t = 6.23$, $p = 0.00$).

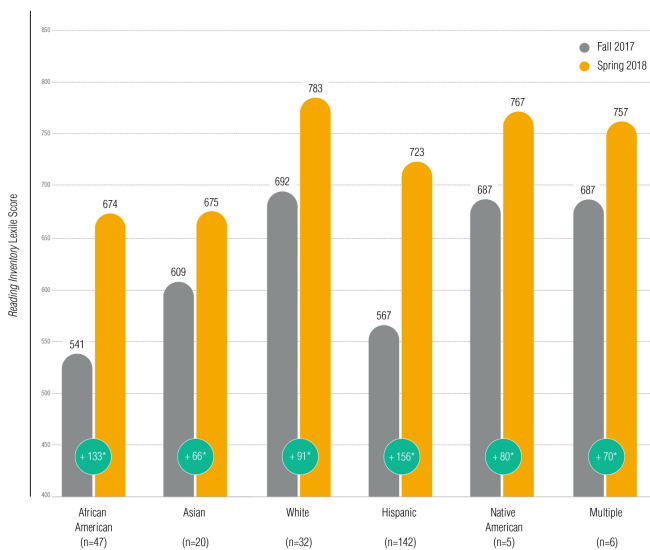
When results were disaggregated by ethnicity, African American, Asian, Caucasian, and Hispanic students achieved statistically significant SBA ELA scale score gains (see Figure 21) and *Reading Inventory* gains (see Figure 22) during the 2017-2018 school year. Although the sample was too small to capture the true significance of gains statistically, Native American students gained an average of 80L on the *Reading Inventory* and 67% met yearly growth goals.

FIGURE 21
CHANGE IN SMARTER BALANCED ASSESSMENT (SBA) ELA SCALE SCORE BY ETHNICITY, 2017-2018



Note: * statistically significant change. The increase in average SBA ELA scale score was statistically significant for African American ($t = 5.91$, $p = 0.00$), Asian ($t = 4.07$, $p = 0.00$), Caucasian ($t = 2.93$, $p = 0.01$) and Hispanic ($t = 9.87$, $p = 0.00$) students.

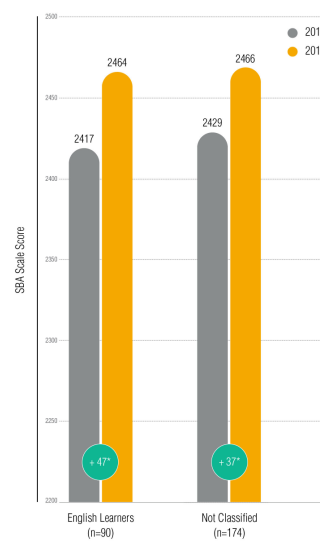
FIGURE 22
CHANGE IN READING INVENTORY IN LEXILES BY ETHNICITY, FALL 2017 TO SPRING 2018



Note: * statistically significant change. The increase in average HMH RI Lexile Score was statistically significant for African American ($t = 6.61$, $p = 0.00$), Asian ($t = 2.99$, $p = 0.01$), Caucasian ($t = 2.84$, $p = 0.01$), and Hispanic ($t = 13.45$, $p = 0.00$) students and students with Multiple ethnic backgrounds ($t = 3.00$, $p = 0.03$).

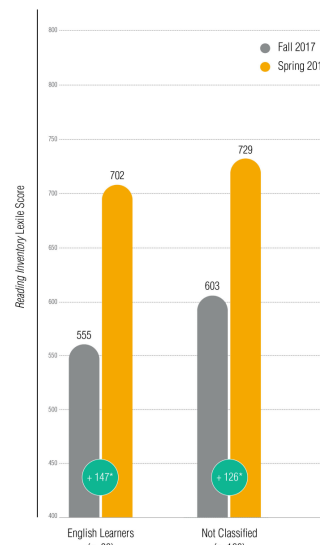
When results were disaggregated by English learner (EL) classification, EL students achieved statistically significant SBA ELA scale score gains (see Figure 23) and significant *Reading Inventory* gains (see Figure 24). In addition to an average gain of 146L on the *Reading Inventory*, 63% of ELL students met yearly growth goals.

FIGURE 23
CHANGE IN SMARTER BALANCED ASSESSMENT (SBA) ELA SCALE SCORE BY ENGLISH LEARNER CLASSIFICATION, 2017-2018



Note: *statistically significant change. The increase in average SBA ELA scale score was statistically significant for English Learners ($t = 7.93$, $p = 0.00$) and Not Classified as English Learners ($t = 9.65$, $p = 0.00$) students.

FIGURE 24
CHANGE IN READING INVENTORY IN LEXILES BY ENGLISH LEARNER CLASSIFICATION, FALL 2017 TO SPRING 2018



Note: *statistically significant change. The increase in average RI Lexile Score was statistically significant for English Learners ($t = 9.73$, $p = 0.00$) and Not Classified ($t = 11.29$, $p = 0.00$) students.

LUSD students classified as ELs as well as some students who exited the EL program in the previous four years ($n = 96$) completed the CELDT in spring 2017 and the ELPAC in spring 2018 to measure English language proficiency. The CELDT assessment results include an overall scale score with a range from 248 to 741 while the ELPAC results include an overall scale score with a range from 1150 to 1900. To examine year-to-year changes in scores that are on different scales, the CELDT and ELPAC scores were placed on a common scale using the percent of maximum possible (POMP) calculation⁶. *Read 180* Universal and EL students in a mixed model implementation averaged a statistically significant 6-point decrease in relative magnitude of scores when comparing 2017 CELDT scores to 2018 ELPAC scores. As these assessments measure different skills and define proficiency in different ways, it is unclear whether a change in relative magnitude of

⁶ The POMP is calculated as (observed score - minimum) divided by (maximum - minimum) and the result is multiplied by 100. The resulting scores are a ratio that retain the relative magnitude of difference between scores in the original data and maintains the covariance structure of the original data.

scores from 2017 to 2018 reflects a true change in English language arts skills or is a consequence of a more difficult exam, a new exam format, or another unmeasured variable.

CONCLUSION

Multiple independent measures support the idea that students who received *System 44* and/or *Read 180* Universal instruction in a mixed model classroom made significant improvements in English/Language Arts and Literacy achievement. After one year of instruction, 6th, 7th, and 8th grade students in the Lincoln Unified School District demonstrated statistically significant increases in Smarter Balanced Assessment (SBA) ELA scale scores, *Reading Inventory* Lexile scores, and *Phonics Inventory* fluency scores. In addition to statistically significant year-to-year gains, students achieved accelerated growth in SBA ELA scale scores compared to initially same-scoring peers and gained approximately 1.4 times as many Lexile scores as would be expected based on the average yearly growth of an initially same-scoring national sample. Overall, the percentage of students demonstrating grade-level or above reading comprehension increased from 1% to 6% after one year of instruction, and the percentage of students demonstrating reading comprehension 5 or more grades below grade-level decreased from 45% to 22%. Additionally, 27% of *Read 180* Universal instruction students and 15% of mixed model students increased at least two grade levels in reading comprehension.

Students also increased in assessment performance levels: 33% of *Read 180* Universal instruction students and 50% of mixed model students moved up an Achievement Level Descriptor on the SBA and 31% of *Read 180* Universal instruction students and 41% of mixed model students moved up a performance level on the *Reading Inventory*. Notably, on average, Tier 3 intervention students who received a combination of *System 44* and *Read 180* Universal instruction began the school year with significantly lower SBA ELA scale scores, *HMH Reading Inventory* Lexile scores, and grade-level reading comprehension ability than the Tier 2 intervention classmates who received *Read 180* Universal instruction, but demonstrated accelerated learning and averaged gains great enough to end the year at similar achievement levels.

Disaggregation of the data by gender, SWD status, FRPL eligibility, ethnicity, and ELL classification indicated that use of both *Read 180* Universal alone or in a mixed model implementation with *System 44* was associated with significant gains in both SBA ELA scale scores and *Reading Inventory* Lexile gains for all categories of students. Students worked through varying amounts of the self-paced, personalized online instruction components – increased completion of *System 44* topics was significantly correlated with reading Lexile gains and increased completion of *Read 180* Universal segments was a significant predictor of reading Lexile gains during the 2017-2018 school year. This study demonstrates that using *System 44* and *Read 180* Universal to provide differentiated instruction in a mixed model classroom is an effective method of increasing literacy for students struggling to achieve grade-level ELA proficiency.

APPENDIX

TABLE 2.
READ 180 UNIVERSAL STUDENTS' RESULTS OF T-TEST AND DESCRIPTIVE STATISTICS FOR SMARTER BALANCED ASSESSMENT (SBA) ENGLISH LANGUAGE ARTS (ELA) PERFORMANCE, 2017-2018

	Before Read 180 Universal		After Read 180 Universal		<i>n</i>	95% CI for Mean Difference	<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>					
2017-2018									
Overall	2426.25	57.97	2464.90	57.55	200	31.33, 45.97	10.41	199	.000
Grade									
Sixth	2401.97	61.23	2458.36	56.22	61	42.46, 70.33	8.10	60	.000
Seventh	2433.56	52.60	2474.90	61.92	70	30.40, 52.28	7.54	69	.000
Eighth	2440.29	54.19	2460.52	53.40	69	7.79, 32.68	3.24	68	.002
Gender									
Female	2427.47	55.04	2478.88	56.65	91	40.74, 62.07	9.58	90	.000
Male	2426.91	60.14	2458.46	59.03	137	22.56, 40.54	6.94	136	.000
Ethnicity									
African American/Black	2415.75	47.42	2455.14	50.85	44	24.23, 54.54	5.24	43	.000
Native American	2413.80	61.69	2434.40	85.37	5	-58.01, 99.21	0.73	4	.507
Asian	2425.00	55.25	2465.38	76.17	21	18.07, 62.69	3.78	20	.001
Hispanic	2424.24	60.16	2466.43	58.43	123	32.67, 51.71	8.77	122	.000
White/Caucasian	2457.54	62.15	2485.54	54.55	28	4.85, 51.15	2.48	27	.020
Multiracial	2443.86	41.20	2492.86	32.17	7	-6.59, 104.59	2.16	6	.074
Free or Reduced-Price Lunch Eligible									
Yes	2422.97	55.22	2464.29	56.95	192	33.62, 49.03	10.58	191	.000
No	2449.36	67.82	2478.97	67.52	36	13.49, 45.73	3.72	35	.001
Students With Disabilities									
Yes	2413.88	65.34	2448.75	55.97	67	21.22, 48.50	5.10	66	.000
Not Classified	2432.65	53.98	2474.04	58.55	161	33.28, 49.50	10.08	160	.000
English Learner									
Yes	2421.04	49.95	2465.40	59.89	73	31.28, 57.43	6.76	72	.000
Not Classified EL	2430.01	61.42	2467.18	58.51	155	28.95, 45.40	8.93	154	.000

Table Note: M = Mean; SD = Standard Deviation; n = sample size; 95% CI = 95% Confidence Interval; df = degrees of freedom; p = significance; SBA ELA = Smarter Balanced Assessment English/Language Arts & Literacy; FRPL = Free or Reduced-Price Lunch; EL = English Learner.

TABLE 3.
READ 180 UNIVERSAL STUDENTS' RESULTS OF T-TEST AND DESCRIPTIVE STATISTICS FOR READING INVENTORY (RI)
PERFORMANCE, FALL 2017 TO SPRING 2018

	Fall RI Lexile		Spring RI Lexile		n	95% CI for Mean Difference	t	df	p
	M	SD	M	SD					
2017-2018									
Overall	612.88	185.38	732.17	178.08	210	101.55, 137.03	13.25	209	.000
Grade									
Sixth	578.12	182.00	715.38	163.24	65	94.39, 180.14	6.40	64	.000
Seventh	611.62	190.76	722.04	180.32	73	85.94, 134.91	8.99	72	.000
Eighth	645.54	179.48	757.60	187.99	72	86.86, 137.25	8.87	71	.000
Gender									
Female	615.52	163.51	721.26	155.97	84	80.32, 131.18	8.27	83	.000
Male	608.53	197.01	730.22	195.60	134	97.90, 145.49	10.12	133	.000
Ethnicity									
African American/Black	554.33	176.60	685.71	183.78	42	86.99, 175.77	5.98	41	.000
Native American	744.25	18.03	845.25	65.20	4	-19.86, 221.86	2.66	3	.076
Asian	615.47	153.31	670.63	152.04	19	12.44, 97.87	2.71	18	.014
Hispanic	596.48	190.35	731.94	170.53	117	112.56, 158.36	11.72	116	.000
White/Caucasian	712.77	170.66	777.83	234.29	30	7.26, 122.88	2.30	29	.029
Multiracial	687.00	106.64	756.83	108.98	6	9.95, 129.71	3.00	5	.030
Free or Reduced-Price Lunch Eligible									
Yes	599.77	185.48	715.70	180.27	181	96.75, 135.11	11.93	180	.000
No	667.24	170.88	780.95	177.28	37	68.78, 158.62	5.13	36	.000
Students With Disabilities									
Yes	554.43	183.13	661.34	219.37	67	71.51, 142.31	6.03	66	.000
Not Classified	636.42	179.97	755.80	153.22	151	99.32, 139.44	11.76	150	.000
English Learner									
Yes	592.24	168.41	713.44	156.60	68	92.52, 149.89	8.43	67	.000
Not Classified EL	619.83	191.21	732.81	191.27	150	90.92, 135.06	10.12	149	.000

Table Note: RI = Reading Inventory; M = Mean; SD = Standard Deviation; n = sample size; 95% CI = 95% Confidence Interval; df = degrees of freedom; p = significance; SBA ELA = Smarter Balanced Assessment English/Language Arts & Literacy; FRPL = Free or Reduced-Price Lunch; EL = English Learner.

TABLE 4.
MIXED MODEL STUDENTS' RESULTS OF T-TEST AND DESCRIPTIVE STATISTICS FOR SMARTER BALANCED ASSESSMENT
(SBA) ENGLISH LANGUAGE ARTS (ELA) PERFORMANCE, 2017-18

	Before Instruction		After Instruction			95% CI for			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>n</i>	Mean Difference	<i>t</i>	df	<i>p</i>
2017-2018									
Overall	2412.52	58.98	2461.67	52.50	33	30.61, 67.69	5.40	32	.000
Gender									
Female	2411.81	41.60	2466.69	41.82	16	25.80, 83.95	4.02	15	.001
Male	2409.50	67.92	2452.80	60.01	20	19.76, 66.84	3.85	19	.001
Ethnicity									
African American/Black	2392.00	43.55	2447.60	48.46	5	9.56, 101.64	3.35	4	.028
Hispanic	2412.80	62.61	2464.00	51.95	25	27.61, 74.79	4.48	24	.000
Free or Reduced-Price Lunch Eligible									
Yes	2410.43	57.99	2453.33	54.90	30	23.38, 62.42	4.49	29	.000
No	2411.00	56.77	2487.17	25.59	6	31.40, 120.93	4.37	5	.007
Students With Disabilities									
Yes	2420.73	73.35	2433.73	52.52	11	-20.25, 46.25	0.87	10	.404
Not Classified	2406.04	49.24	2470.08	49.47	25	45.29, 82.79	7.05	24	.000
English Learner									
Yes	2401.82	54.29	2459.53	51.64	17	28.65, 88.76	4.21	16	.001
Not Classified EL	2418.32	59.65	2458.47	54.63	19	17.42, 62.89	3.71	18	.002

Table Note: M = Mean; SD = Standard Deviation; n = sample size; 95% CI = 95% Confidence Interval; df = degrees of freedom; p = significance; SBA ELA = Smarter Balanced Assessment English/Language Arts & Literacy; FRPL = Free or Reduced-Price Lunch; EL = English Learner. Groups with fewer than 4 students were not included.

TABLE 5.
MIXED MODEL STUDENTS' RESULTS OF T-TEST AND DESCRIPTIVE STATISTICS FOR *READING INVENTORY* (RI)
PERFORMANCE, FALL 2017 TO SPRING 2018

	Fall RI Lexile		Spring RI Lexile		<i>n</i>	95% CI for Mean Difference	<i>t</i>	df	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>					
2017-2018									
Overall	427.71	126.16	672.41	174.53	34	188.10, 301.32	8.80	33	.000
Gender									
Female	456.87	112.34	658.47	161.13	15	120.37, 282.83	5.32	14	.000
Male	404.68	134.53	683.42	188.05	19	197.00, 360.47	7.17	18	.000
Ethnicity									
African American/Black	426.00	143.44	580.20	87.10	5	12.37, 296.02	3.02	4	.039
Hispanic	428.68	132.90	681.84	168.40	25	187.78, 318.54	7.99	24	.000
Free or Reduced-Price Lunch Eligible									
Yes	419.03	132.28	635.71	169.35	28	154.16, 279.20	7.11	27	.000
No	468.17	90.44	843.67	58.75	6	279.12, 471.88	10.02	5	.000
Students With Disabilities									
Yes	390.27	163.77	585.36	205.59	11	93.55, 296.63	4.28	10	.002
Not Classified	445.61	103.19	714.04	144.50	23	197.01, 339.86	7.79	22	.000
English Learner									
Yes	413.56	141.14	658.11	165.38	18	158.31, 330.80	5.98	17	.000
Not Classified EL	443.63	109.23	688.50	188.40	16	162.63, 327.12	6.35	15	.000

Table Note: RI = *Reading Inventory*; M = Mean; SD = Standard Deviation; n = sample size; 95% CI = 95% Confidence Interval; df = degrees of freedom; p = significance; FRPL = Free or Reduced-Price Lunch; EL = English Learner. Groups with fewer than 4 students were not included.

TABLE 6.
RESULTS OF REGRESSION ANALYSIS PREDICTORS OF LEXILE SCORE GAIN FROM FIRST TO LAST *READING INVENTORY*, 2017-2018

Predictor	N	M	SD	t	Naïve Analysis		Corrected for Selection Bias	
					95% CI	p	95% CI	p
<i>Reading Inventory</i> Pre-Test	266	595.88	193.68	-0.45	-0.37, -0.22	.00	-0.39, -0.22	.00
R180U Segments Completed	266	6.98	4.67	0.14	0.82, 6.88	.01	1.18, 6.65	.01

Table Note: N = sample size; M = Mean; SD = Standard Deviation; SB = Standardized Beta; 95% CI = 95% Confidence Interval; p = significance; R180U = *Read 180* Universal online application. Final model also includes these covariates: school, age, race, gender, grade, English Learner classification, Students with Disabilities classification, and eligibility for the National Free or Reduced-Price Lunch program.

Check out more research at hnhco.com/read180research

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