EVIDENCE OF EFFECTIVENESS

Foundations Learning System™

Cross-Training for Reading

EVIDENCE OF EFFECTIVENESS CASE STUDIES

The Foundations Learning System™ is helping educators address the national crisis in reading by bringing recent findings in cognitive science on learning theory to reading instruction. The Foundations System is an innovative, scientifically-based approach to assessment and instruction for students in Grades 2 and beyond. It is effective in helping struggling learners who are "stuck" because of deficits in foundational reading skills get on the path to fluency and comprehension. These students' academic careers are on hold and they continue to fall further behind because traditional instruction fails to take into account how they learn. We need to help them NOW. And by applying methods from modern learning science, we can.

> *The Foundations Learning System™ is an innovative, scientifically based approach to assessment and instruction.*

This booklet highlights some of the case studies[1] that show the positive impact of the Foundations System on persistently struggling readers in a range of grades with a variety of demographic subgroups. Depending on the measures chosen by the participating districts, the studies evaluated either fluency and/or comprehension at the elementary and secondary grades. Data from four school districts demonstrated significant improvement in fluency and comprehension with struggling readers when other approaches had failed. Two of these studies employed randomized control trials, one evaluated the importance of fidelity of implementation using a control group and one compared student growth within an experimental design. The final study compiled data across six districts to examine improvements in the foundational skills of decoding and automaticity, essential precursors to fluency and comprehension. These studies, taken together, offer compelling, converging evidence for potential gains from this innovative approach to reading intervention.

EXTERNAL RESEARCH SUPPORTS UNDERLYING LEARNING PRINCIPLES

The developers of the Foundations Learning System™, Drs. Carolyn Brown and Jerry Zimmermann collaborated with two cognitive scientists, Drs. Bob McMurray and Eliot Hazeltine, and reading researcher, Dr. Deborah Reed, at the University of Iowa to examine the underlying principles of learning in the context of the acquisition, application and automatic use of word recognition skills. From that collaboration, a series of studies have been funded by the National Science Foundation and the US Department of Education.

The first study assessed the impact of variability for teaching grapheme-phonemic correspondence (GPC) rules. This study tested 220 first graders to determine if learning principles from cognitive science apply to children's acquisition of GPC mappings. The study showed conclusively that, contrary to standard practices, children form more robust and generalizable mappings for vowels when learning with words containing variable, rather than similar, consonants (Apfelbaum et al., 2013). The study verifies an important underlying principle of the Foundations Learning System™ about the impact of controlled variability and has direct implications for reading curricula and teaching practice. The team also developed and validated an innovative diagnostic to evaluate decoding knowledge and automatic word recognition in basic reading skills. The DOE -funded research identified and validated the measure of automaticity of word recognition, a precursor to fluency (Roembke, T, Hazeltine, E., Reed, D., and McMurray, 2018).

[1] *At the time of these studies the Foundations Learning System™ was known as Access Code.*

Case Study

The Foundations Learning System™ was implemented in Lakeview Elementary School in Solon, IA with struggling readers in the spring of 2010. The teachers and administration were reluctant to assign targeted children to a control group, and as a result this constituted virtually all of the struggling readers (across multiple grades) at Lakeview Elementary

Participants were 70 students (24 female / 46 male) ranging from Grades 2 - 7. Lakeview is a suburban/rural school in which all participating students were Caucasian except for one African American student. About 40% of the students were classified as having a disability of some type. All of the students who participated in the Foundations System had been identified by their teachers and the district reading interventionist as struggling readers on the basis of district assessments and results from the Iowa Test of Basic Skills Reading Comprehension Subtest (ITBSR) where they were identified as below average. The intervention was conducted from February 12, 2010 to July 15, 2010.

In order to evaluate student growth, school personnel administered the DIBELS (6th Edition) Oral Reading Fluency test each week to the participating students. Figure 1 shows that students averaged 61.1 correct words/minute before using the Foundations System and averaged 81.8 correct words /minute when the Foundations System ended 16 weeks later. Similar improvements were seen across grades.

Hierarchical regression analysis found significant positive impact of time for both the number of correct words/minute ($p < .0001$) and accuracy ($p < .0001$).

An examination of regression slopes for each child showed that:

- The number of correct words/minute increased .97 per week with positive slopes demonstrated for 58 of the 72 students ($p < .0001$).

- Accuracy increased by an average of .16% week with 47 of the 72 participants showing positive gains ($p < .0001$).

FIGURE 1
Solon Community School District (IA)
2010

While without a control group we cannot be sure how much these children would have improved without the Foundations Learning System™, it is clear that substantial improvement was seen. For a more detailed analysis of this pilot implementation, including the results of additional measures, please contact us at info@foundations-learning.com.
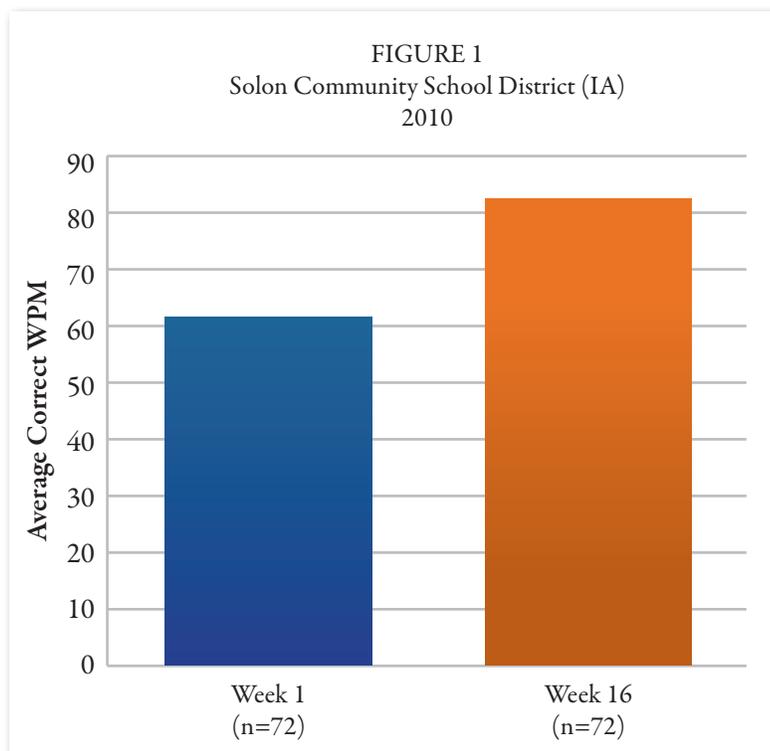
PROFILE

Evaluation Period: 2010

Grades: 2 – 5

Measure: DIBELS (6th edition) Nonsense Word Fluency Subtest, Reading CITBSR
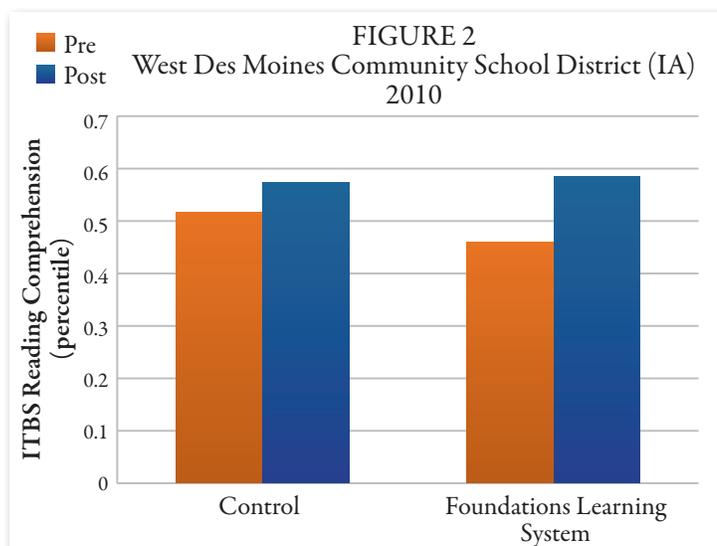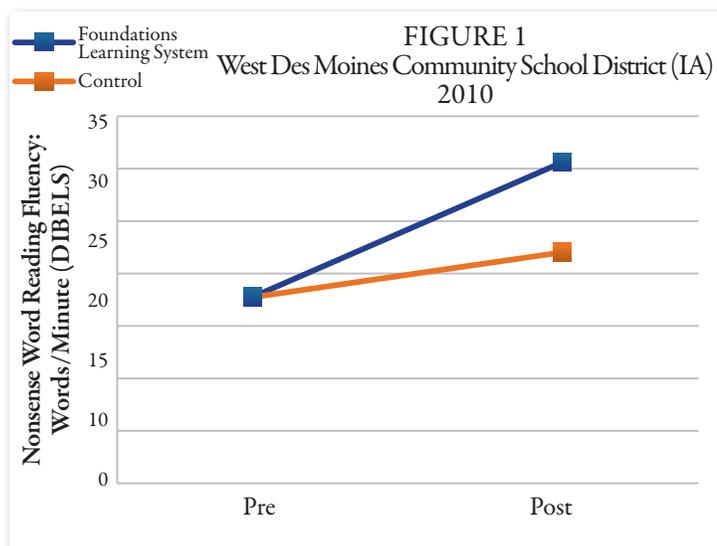
Participants: N=22

In the spring of 2010, researchers completed a small randomized trial of the Foundations Learning System™ at Hillside Elementary in the West Des Moines (IA) Community School District. This study included 22 students (15 male / 7 female) who were matched on grade and randomly assigned to receive the Foundations Learning System™ or Business as Usual (Control). Participants ranged from 2nd to 5th grade, and were randomly assigned within grade to either the Foundations System or the Control groups to ensure an equal number of participants in each grade.

The Foundations System group was 64% female, 45% Caucasian, 18% African-American, and 36% Hispanic. The Control group was 73% female, 45% Caucasian, 9% African-American, and 45% Hispanic. Seven of the students were English Language Learners. Half of the participants were eligible for free-or-reduced-price-lunch. None of the students had been diagnosed as having any cognitive, language or behavioral disability at the start of the experiment; however, by the end of the experiment, three of the students in the Foundations System condition had become eligible for Special Education.

The students were pre-and post-tested using the DIBELS Nonsense Word Fluency test (number of words correctly read/minute) and the Reading Comprehension Subtest on the ITBSR. Figures 1 and 2 show the results.

Analysis of Variance showed a significant advantage for the Foundations System group over the Control group for Nonsense Word Fluency (Figure 1). The results on the ITBSR showed a significant difference for the Foundations System group who increased from the 45th percentile to the 58th percentile, while there was no such difference in the Control group. A more detailed analysis of this study is available. To receive it, please contact us at info@foundations-learning.com.

FIGURE 1
West Des Moines Community School District (IA)
2010

FIGURE 2
West Des Moines Community School District (IA)
2010

Case Study

A randomized trial of the Foundations Learning System™ was completed in the Bridgeport Public Schools (Bridgeport, CT) in the spring of 2011. The goal was to examine the use of the System to help older struggling readers using a larger experimental study. This study included 52 ninth grade students at Central High School (24 Foundations System, 28 Control) who were randomly assigned to receive the System or Business as Usual.

The study was comprised of 30 females (17 in the Foundations System, 13 in Control) and 22 males (7 Foundations System, 15 Control). The Foundations System group was 8.3% Caucasian, 62.5% African-American, and 29% Hispanic, while the Control group was 0% Caucasian, 61% African-American, and 36% Hispanic. All of the students were eligible for free-or-reduced-price lunch; none of the students were English Language Learners; and none of the students had any identified learning, cognitive or language disability. The intervention was conducted from April - June, 2011. The 24 Foundations System students completed an average of 19 of the 24 instructional units.

The AIMSweb MAZE was used as a distal outcome measure of reading comprehension and was administered by the reading specialist. In this task, the student reads 150-400 word passages in which words are left blank and must be filled in by the student (selecting from three distractors). The score is based on the number of correct items the student can select in three minutes. Both scores are offered in terms of a grade level of performance.

The analysis used mixed ANOVAs with test type (pre-/post-) as within subject effects and the Foundations System as a between subjects effect. The figure shows the results. While both groups started at a similar grade level (7.25 for the Foundations System group and 7.21 for the Control group), the Foundations System group gained more than half a grade level (MAC=7.8) while the Control group made no gains (MC=7.29).

Bridgeport Public Schools (CT) Grade 9 Students 2011

This pilot demonstrated that the Foundations System is deployable for high school students and appears to facilitate a significant increase in comprehension – despite its targeting more word-level decoding skills in a short term intervention.
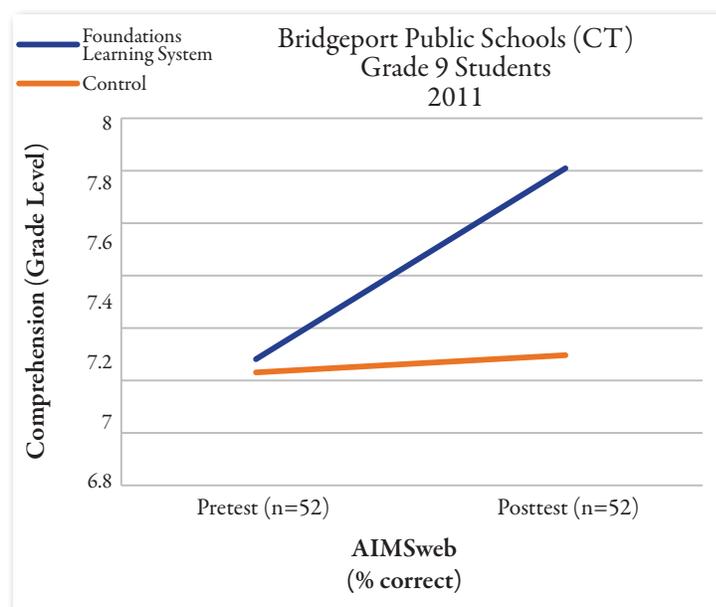
PROFILE

Evaluation Period: 2016 - 2017

Grades: 6 - 10

Measure: Lexile Gains

Participants: N=221

Leander ISD, a school district in Texas, screened a large group of students for possible entry into the Foundations Learning System™ in the fall of 2016. Of those screened, 495 were identified as likely to benefit from completing the Foundations System, either because of low scores in the screener, or because teachers recommended the student receive the intervention despite adequate screener scores. The majority of these students completed Lexile assessments at least twice throughout the year – at the beginning of the year, before any intervention, and at the end of the year, post-intervention[1]. These scores provide a means of assessing improvement in response to the Foundations System; critically, these assessments were administered independently of how many units of the Foundations System a student completed, allowing us to investigate how the number of completed units impacts reading ability.

Of the 495 screened students, 83 completed more than half of the Foundations System; an additional 412 completed less than half of those (138 did not begin the intervention). The students who completed more of the Foundations System had slightly lower Lexile scores at the beginning of the year (those that completed more than half: mean = 446.4; those that did not: mean = 542.7).
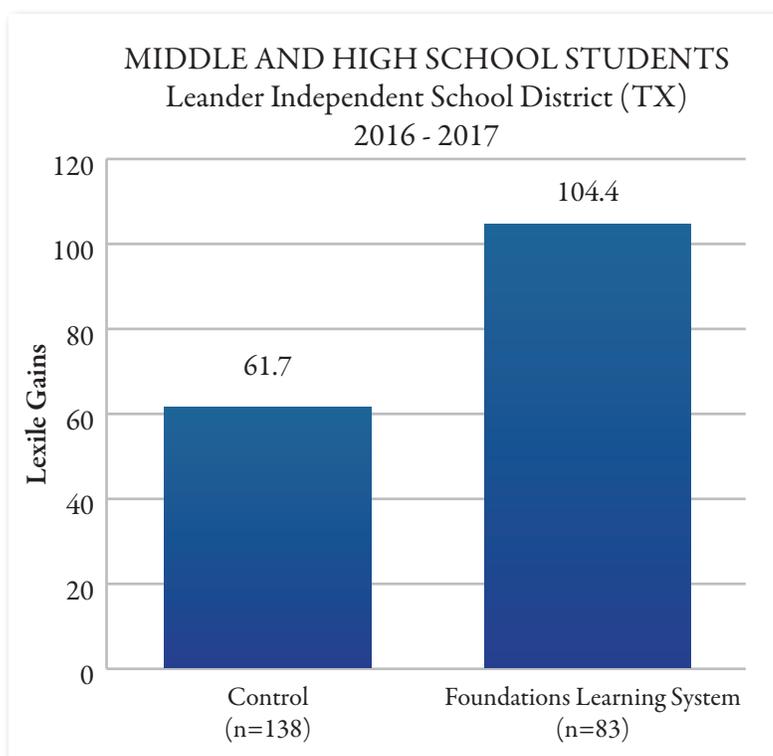
Those that completed more than half of the intervention showed substantially greater improvement in Lexile scores than those who did not begin using it; students who completed more than half showed a mean improvement of 104.4 Lexiles, substantially greater than the 61.7 Lexile improvement of those who did not begin. These findings suggest that the Foundations Learning System™ is effective in improving reading skills when implemented with fidelity that ensures student progression through the curriculum.

MIDDLE AND HIGH SCHOOL STUDENTS
Leander Independent School District (TX)
2016 - 2017

[1] Many students also completed a mid-year Lexile assessment; this score is not considered unless 1) the student did not complete an end-of-year Lexile assessment; or 2) their mid-year score was better than their end-of-year score. In this latter case, the mid-year score was used to assess Lexile gains.

PROFILE

Evaluation Period: 2018 - 2019

Grades: 6–10

Measure: Foundations Learning System™ Diagnostic

Participants: N=93

A group of 93 6th – 10th grade students representing six school systems from four states (Iowa, Michigan, South Dakota, and Texas) used the Foundations Learning System™ during the 2018 – 2019 school year. The students were selected primarily based on their performance on the Foundations Screener, which indicated that they were at risk in terms of proficiency of automaticity of word recognition.

The group consisted of 48 males and 45 females. Thirty students were in 6th grade, 21 in 7th, 18 in 8th, 23 in 9th, and there was single 10th grade student. The range in usage of the System was from 14 to 35 weeks. Results were very encouraging. Using the Foundations Diagnostic as the measure, the average gain in decoding was nearly 80 scale score points and the average gain in automaticity of word recognition was just over 63 scale score points.

Students who completed more of the instructional program performed much better. The "Advanced Progress" students (n=15) completed at least two-thirds of the intervention curriculum. Their mean gains in decoding and automaticity were 154 and 105 scale score points, respectively. This exceeded the gains for the "Middle Group" (n=63, completing 40% of the curriculum) of 74 (decoding) and 61 (automaticity). The "Limited Progress" group (n=15, completing about 17% of the curriculum) only gained 28 points in decoding and 27 in automaticity. Seventy-three percent of the Advanced Progress group achieved proficiency in automaticity, and 80% achieved proficiency in decoding, while the percentages of the other two groups achieving proficiency in both areas were substantially smaller.
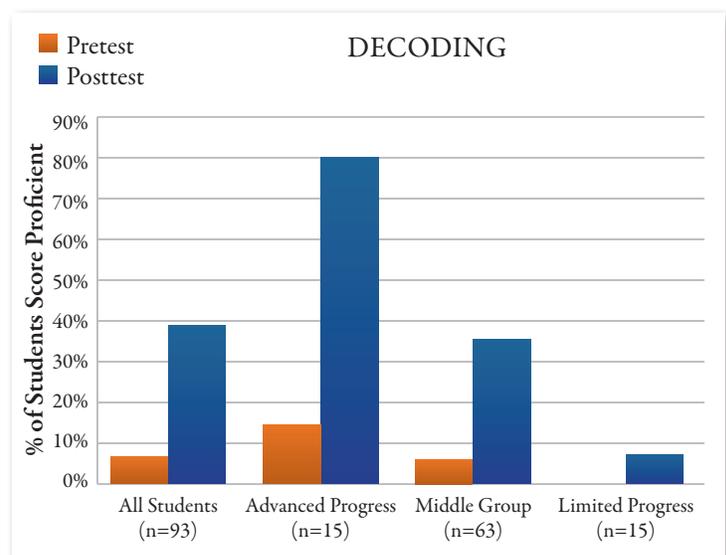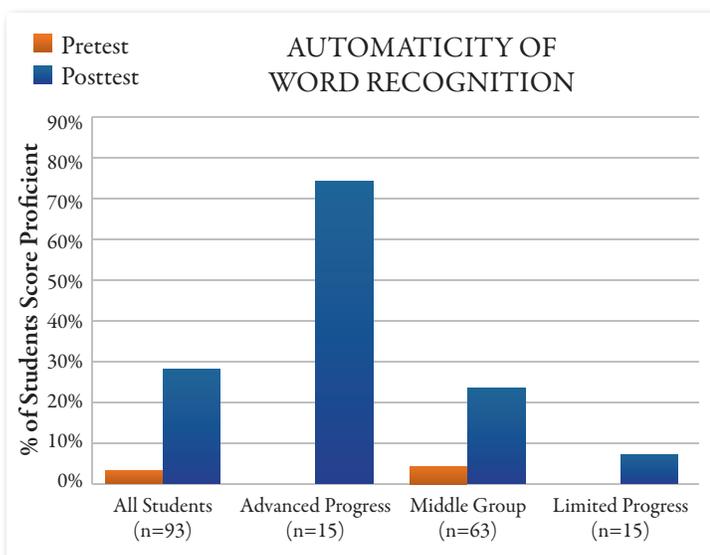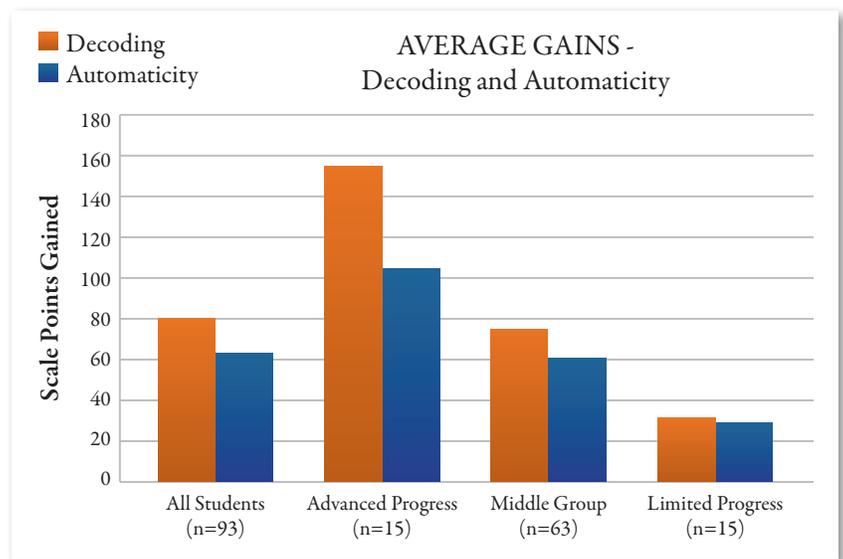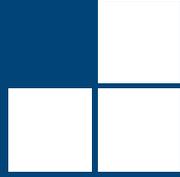

AVERAGE GAINS - Decoding and Automaticity

AUTOMATICITY OF WORD RECOGNITION

DECODING

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