

# Improved Reading Fluency Skills by Students who used the Fast ForWord<sup>®</sup> Language to Reading Product

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## ABSTRACT

**Purpose:** This study investigated the effectiveness of the Fast ForWord Language to Reading software using two different implementations. Improvements in reading skills were compared following either a 30-Minute or 50-Minute daily protocol. The software product was implemented within the curriculum in two different elementary schools. **Study Design:** The design of this study was a two-group study conducted within two schools. A nationally-normed test was used to evaluate effectiveness. **Participants:** Study participants were 101 first- through third-grade students attending Hutchins Elementary School in the El Campo Independent School District of El Campo, Texas and Florence Elementary School in the Boone County School District of Florence, Kentucky. Students from each school were randomly assigned to one of two groups. One group was chosen to use the 30-Minute Protocol while the other group was chosen to use the 50-Minute Protocol. **Materials & Implementation:** Following staff training on the Fast ForWord Language to Reading product, both groups of students started to use the product in January of the 2006 – 2007 school year. Before and after Fast ForWord participation, students' reading skills were evaluated with the Test of Word Reading Efficiency (TOWRE). **Results:** Students using the 30-Minute and 50-Minute daily protocols reached similar high levels of product completion over an average of 45 and 50 days of product usage, respectively. On average, students made statistically significant improvements after Fast ForWord participation, with both protocol groups making gains in the reading fluency skills of sight word efficiency and phonemic decoding efficiency.

**Keywords:** Kentucky, Texas, public elementary school, rural district, suburban district, experimental study, Fast ForWord Language to Reading, Test of Word Reading Efficiency (TOWRE).

## INTRODUCTION

Numerous research studies have shown that cognitive and oral language skills are under-developed in struggling readers, limiting their academic progress (Lyon, 1996). University-based research studies reported the development of a computer software product that focused on learning and cognitive skills, and provided an optimal learning environment for building the memory, attention, processing and sequencing skills critical for reading success (Merzenich et al., 1996; Tallal et al., 1996). This prototype of the Fast ForWord Language software showed that an optimal learning environment and focus on early reading and cognitive skills resulted in dramatic improvements in the auditory processing and language skills of school children who had specific language impairments (Merzenich et al, 1996; Tallal et al., 1996) or were experiencing academic reading failure (Miller et al., 1999).

The El Campo Independent School District and Boone County School District were interested in evaluating the effectiveness of involving students in an optimal learning environment with a focus on early reading and cognitive skills for 30 minutes each day. They wanted to determine whether a 30-minute daily

involvement was as effective at improving the reading abilities of students as a 50-minute daily involvement. To perform this study, two different protocols of a commercially available computer-based product (Fast ForWord Language to Reading) were used to evaluate the effectiveness of the different daily requirements at improving the reading fluency skills of early elementary school students.

## METHODS

### Participants

The El Campo Independent School District serves more than 3,500 students in five schools. Hutchins Elementary, one of El Campo's three elementary schools, chose to use the Fast ForWord Language to Reading product during the second semester of the 2006 – 2007 school year and took part in this study. Hutchins Elementary serves approximately 500 second- and third-grade students and is a Title I school.

The Boone County schools serve more than 17,000 students in 20 schools. The schools are located in the fast-growing, family-oriented area of Northern Kentucky. Florence Elementary, one of Boone County's 12 elementary schools, also decided to use

the Fast ForWord Language to Reading product during the 2006 – 2007 school year and took part in this study. Florence Elementary is a K-5, Title I school serving approximately 585 students.

One hundred and one students participated in this study: one first grader, 90 second graders and 10 third graders. Approximately half of the study participants (one first grader, 41 second graders, and five third graders) were assigned to the 30-Minute Fast ForWord Language to Reading Protocol by the lab monitor and the remaining students (49 second graders and five third graders) used the 50-Minute Fast ForWord Language to Reading Protocol. The first grader did not regularly attend the elementary school, but attended an after-school program in which Fast ForWord was offered.

Students from Hutchins Elementary School were randomly assigned by the lab monitor to their protocol group and students from Florence Elementary School were randomly assigned by classroom, where one class used one protocol and the other class used the other.

All study participants previously used the Fast ForWord Language product and had their reading fluency skills evaluated with the Test of Word Reading Efficiency (TOWRE) before and after students used the Fast ForWord Language to Reading product. School personnel administered the assessments and returned the assessments to Scientific Learning Corporation for scoring and analysis.

### **Implementation**

Educators were trained in current and established neuroscience findings on how phonemic awareness and the acoustic properties of speech impact rapid development of language and reading skills; the scientific background validating the efficacy of the products; methods for assessment of potential candidates for participation; the selection of appropriate measures for testing and evaluation; effective implementation techniques; approaches for using Progress Tracker reports to monitor student performance; and techniques for measuring the gains students have achieved after they have finished using the Fast ForWord product.

### **Materials**

The Fast ForWord Language to Reading product is a computer-based product that combines an optimal learning environment with a focus on early reading and cognitive skills. The product includes five exercises designed to build skills critical for reading

and learning, such as auditory processing, memory, attention, and language comprehension.

*Trog Walkers:* Students hear a series of short, non-verbal tones. Each tone represents a different fragment of the frequency spectrum used in spoken language. Students are asked to differentiate between these tones. The exercise improves working memory, sound processing speed, and sequencing skills.

*Polar Cop and Treasure in the Tomb:* Students hear a target phoneme, and then must identify the identical phoneme when it is presented later. These exercises improve auditory discrimination skills, increase sound processing speed, improve working memory, and help students identify a specific phoneme. *Polar Cop* also develops sound-letter correspondence skills. *Treasure in the Tomb* also develops grapheme recognition.

*Bug Out:* Students choose a square on a grid and hear a sound or word. Each sound or word has a match somewhere within the grid. The *Bug Out!* exercise develops skill with sound-letter correspondences as well as working memory.

*Start-Up Stories:* Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

### **Assessments**

School personnel evaluated all study participants with the Test of Word Reading Efficiency (TOWRE) before and after Fast ForWord use. Tests were returned to Scientific Learning Corporation for scoring and analysis.

**Test of Word Reading Efficiency (TOWRE):** The TOWRE is a nationally normed measure of word reading accuracy and fluency. It monitors growth of the ability to “sound out” words and the ability to accurately recognize familiar words as whole units (“sight words”). The TOWRE contains two subtests:

The Sight Word Efficiency subtest assesses the number of real printed words accurately identified within 45 seconds. Phonemic Decoding Efficiency measures the number of pronounceable printed nonwords accurately decoded in 45 seconds.

The Institute for the Development of Educational Achievement, in accordance with the Reading First legislation, determined that the TOWRE subtests are appropriate outcome assessments for accurately measuring improvement in the reading fluency skills of children in early elementary school.

### **Analysis**

Standard scores were used for the analyses. Standard scores have a mean equal to 100 and a standard deviation equal to 15. Data were analyzed using a

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Language to Reading: <b>30-Minute Group</b>	47	45	100	49%	99%	68%
Fast ForWord Language to Reading: <b>50-Minute Group</b>	54	50	101	71%	90%	68%

Table 1. Usage data showing the number of students who used the different Fast ForWord Language to Reading protocols along with group averages for the number of days participated, the number of calendar days between start and finish, the percentage of product completed, participation level, and attendance level.

repeated measures multivariate analysis of variance (MANOVA) and t-tests. All analyses used a p-value of less than 0.05 as the criterion for identifying statistical significance.

## RESULTS

### Participation Level

Research conducted by Scientific Learning shows a relationship between product use and the benefits of the product. Product use is composed of content completed, days of use, and adherence to the chosen protocol (participation and attendance levels). During the 2006 – 2007 school year, Hutchins Elementary and Florence Elementary chose to use the 30- and 50-Minute Fast ForWord Language to Reading Protocols. These protocols call for students to use the product for 30 or 50 minutes per day, 5 days a week for six to 16 weeks.

Forty-seven students used the 30-Minute Fast ForWord Language to Reading Protocol, and 54 students served as a comparison group by using

the 50-Minute Fast ForWord Language to Reading Protocol. Prior to the study, teachers reported the students to be of similar academic abilities.

On average, the 30-Minute Protocol group completed only 49% of the content in 45 days and the 50-Minute Protocol group completed 71% of the content in 50 days. Due to minor technical difficulties with the 30-Minute Protocol, students did not complete as much content as was intended. Detailed usage information for the two study groups is shown in Table 1.

Figure 1 shows the average daily progress through the Fast ForWord Language to Reading exercises for the students who used the 30-Minute Protocol and Figure 2 shows progress for the 50-Minute Protocol group. The final day shown is determined by the maximum number of days that at least two-thirds of the students participated. For students who used the product fewer than the number of days shown, percent complete is maintained at the level achieved on their final day of product use.

### Learning Curves:

#### 30-Minute Protocol: Fast ForWord Language to Reading

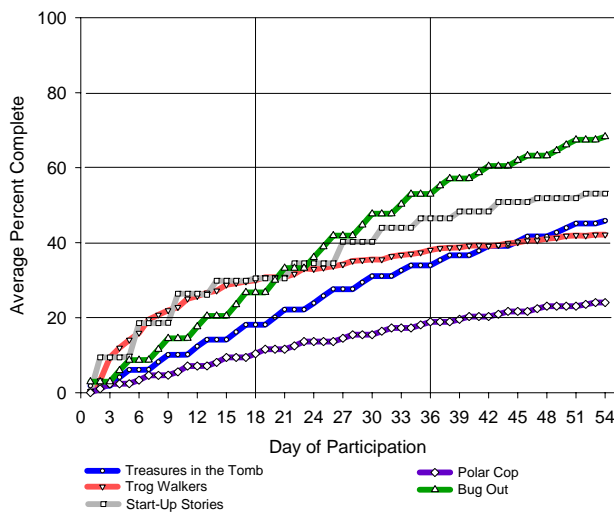


Figure 1. Average daily progress through the Fast ForWord Language to Reading exercises on the 30-Minute Protocol. Results from 47 participants are shown.

### Learning Curves:

#### 50-Minute Protocol: Fast ForWord Language to Reading

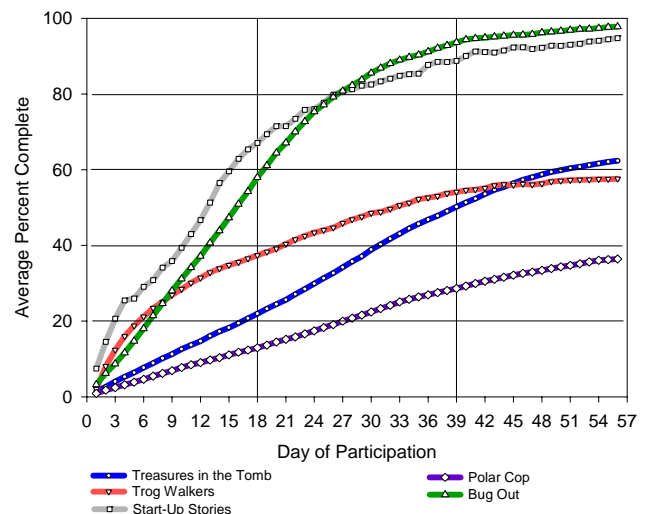


Figure 2. Average daily progress through the Fast ForWord Language to Reading exercises on the 50-Minute Protocol. Results from 54 participants are shown.

### Assessment Results

**Test of Word Reading Efficiency (TOWRE):** The TOWRE was used to evaluate the reading fluency skills of the 97 students in this study, both before and after the students participated on the Fast ForWord Language to Reading product. TOWRE scores were analyzed using standard scores. Three students took a pre-test but did not have a post-test and one student did not take either test. These four students were therefore not included in the analysis.

Statistically, there was no difference between the pre-test scores of the 30-Minute Protocol group and the 50-Minute Protocol on either of the TOWRE subtests ( $p=0.72$  for Sight Word Efficiency and  $p=0.06$  for Phonemic Decoding Efficiency), showing that statistically, before Fast ForWord participation, the two protocol groups performed at similar levels on the subtests.

A multivariate analysis of variance (MANOVA) showed no significant difference of time by group, showing that both protocol groups achieved

statistically similar gains over time. See Table 2 to refer to the MANOVA results. There was a significant difference in how the two groups performed on the subtests, however.

Combining the results of the two groups, on average, Fast ForWord participants made significant gains in both subtests that were administered. Both fluency skills, Sight Word Efficiency and Phonemic Decoding Efficiency, moved higher into the average range. See Figure 3 for a graphical representation of these results.

	MANOVA	
	df	F
subtest	95	21.5*
subtest x group	95	14.8*
time	95	6.3*
time x group	95	0.1
subtest x time	95	0.3
subtest x time x group	95	2.9

Table 2. A MANOVA showed that students from both protocol groups made similar gains over time on the TOWRE. \*  $p < 0.05$

	Subtest	n	Before		After		t-statistic
			Mean	SE	Mean	SE	
Fast ForWord Language to Reading: <b>30-Minute Group</b>	Sight Word Efficiency	44	103.7	1.8	104.6	1.8	0.8
	Phonemic Decoding Efficiency	44	97.7	1.8	100.1	1.7	2.1*
Fast ForWord Language to Reading: <b>50-Minute Group</b>	Sight Word Efficiency	53	102.3	2.0	104.4	1.8	2.1*
	Phonemic Decoding Efficiency	53	102.2	2.0	103.5	1.7	1.2

Table 3. On average, students improved in reading fluency skills after Fast ForWord use. Results in table are split by protocol group. \*  $p < 0.05$

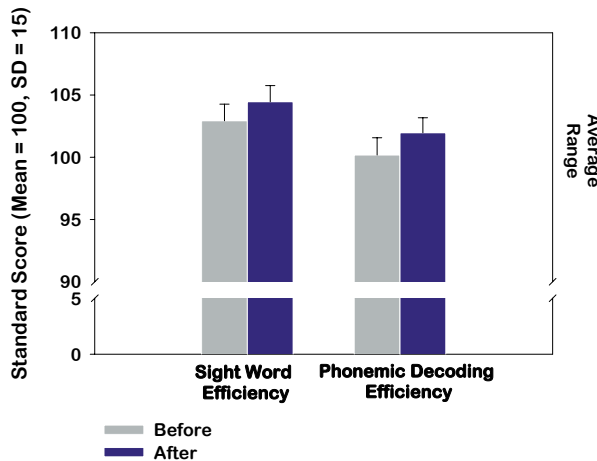


Figure 3. Fast ForWord participants made statistically significant improvements in reading fluency skills after using the Fast ForWord Language to Reading product. Results from all 97 study participants are shown.

## DISCUSSION

During the 2006 – 2007 school year, Hutchins Elementary School and Florence Elementary School tested the effectiveness of the 30-Minute Protocol of the Fast ForWord Language to Reading product. Half of the students were assigned to use the protocol that calls for 30 minutes of participation a day while the other half used the protocol that calls for 50 minutes of participation a day. Due to technical difficulties, the 30-Minute Protocol Group did not complete most of the product's content, perhaps contributing to less of an impact on results. Overall, the Fast ForWord participants made statistically significant improvements in both reading fluency skills that were tested and there was not a significant difference in the performance of the two groups over time. These findings demonstrate that, within these two public elementary schools, an optimal learning environment coupled with a focus on cognitive and early reading skills can help students attain a higher level of reading achievement, regardless of the daily protocol that is used.

## CONCLUSION

Strong cognitive and linguistic skills provide a critical foundation for building reading and writing skills. The Fast ForWord Language to Reading product builds this foundation through development of auditory memory, attention, processing, and sequencing skills. This study demonstrates that students in the El Campo Independent School District and Boone County School District who used either of two different protocols of the Fast ForWord Language to Reading product improved their reading fluency skills. These results suggest that using a 30-Minute or 50-Minute daily protocol of the Fast ForWord product can strengthen students' foundational skills and allow them to benefit more from the classroom curriculum.

### Notes:

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