

# Improved Reading Skills by Students who used the Fast ForWord<sup>®</sup> to Reading 4 and Fast ForWord to Reading 5 Products

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## ABSTRACT

**Purpose:** This study investigated the effectiveness of the Fast ForWord to Reading 4 and Fast ForWord to Reading 5 products using two different implementations. Improvements in reading skills were compared following either a 30-Minute or 50-Minute daily protocol. The software products were implemented within the curriculum in a middle school setting. **Study Design:** The design of each product's study was a two-group study conducted within a single school. A nationally-normed test was used to evaluate effectiveness. **Participants:** Study participants were 114 sixth- through eighth-grade students attending Umatilla Middle school in Lake County, Florida. Students were assigned to one of two groups; one group used the 30-Minute Protocol while the other group used the 50-Minute Protocol. **Materials & Implementation:** Following staff training on the Fast ForWord to Reading products, all study participants started to use the product in March of the 2006 – 2007 school year. Before and after Fast ForWord participation, student reading skills were evaluated with Reading Progress Indicator. **Results:** Students using the 30-Minute and 50-Minute daily protocols reached similar high levels of product completion. On average, students made statistically significant improvements in reading skills, regardless of the daily protocol that was used.

**Keywords:** Florida, middle school, suburban district, experimental study, Fast ForWord to Reading 4, Fast ForWord to Reading 5, Reading Progress Indicator.

## INTRODUCTION

Numerous research studies have shown that cognitive and linguistic 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 enhanced learning capacity and cognition. The software focused on creating an optimal learning environment for building the memory, attention, processing and sequencing skills found to be critical for reading success (Merzenich et al., 1996; Tallal et al., 1996). The research-proven Fast ForWord software show that an optimal learning environment that focused on building targeted reading and cognitive skills resulted in dramatic improvements in the language and reading skills of school children, with published results for children struggling with language acquisition (Merzenich et al, 1996; Tallal et al., 1996; Tallal, 2000) or experiencing academic reading failure (Miller et al., 1999; Tallal, 2004).

The school was 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 commercially available computer-based products (Fast ForWord to Reading 4 and ForWord to Reading 5) were used to evaluate the effectiveness of the different daily requirements at improving the reading skills of middle school students.

## METHODS

### Participants

The Lake County School District serves more than 38,000 students in 57 schools. Umatilla Middle School, one of Lake County's nine middle schools, chose to use the Fast ForWord to Reading 4 and 5 products during the second semester of the 2006 – 2007 school year and took part in this study. Umatilla Middle School serves approximately 775 sixth- through eighth-grade students and is a Title I school.

One hundred and fourteen students (one sixth grader, 112 seventh graders, and one eighth grader) participated in this study. Seventy-eight students used the Fast ForWord to Reading 4 product and 36 students used the Fast ForWord to Reading 5 product. Study participants were assigned to use the 30-Minute Protocol or the 50-Minute Protocol based on classroom.

All students had their phonological awareness, decoding, vocabulary, and comprehension skills evaluated with Reading Progress Indicator before and after students used either the Fast ForWord to Reading 4 or Fast ForWord to Reading 5 product. School personnel monitored the students while they took the assessment and Scientific Learning Corporation analyzed the scores.

### Implementation

Educators at Umatilla Middle School 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 to Reading 4 and Fast ForWord to Reading 5 products are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. The products include five or six exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension. While there are differences between the products, all help develop certain critical skills as detailed in the following exercise descriptions.

*Hoof Beat*<sup>1</sup>: The participant is presented with a question and four possible answers. The participant must choose the most appropriate answer. The questions relate to semantics, phonology, morphology, orthography, and syntax. The exercise encourages flexibility during reading and automatic access to the various dimensions of vocabulary and is designed to build vocabulary by showing the participant how words function.

*Jitterbug Jukebox*<sup>1</sup>: The participant hears a word spoken aloud and letters appear on the keys of a jukebox. The participant must spell the word by clicking on the jukebox keys. Jitterbug Jukebox helps participants improve spelling and sensitivity to letter-sound correspondences. This exercise includes many of the 500 most commonly used words in written English including

most word families found in 3rd and 4th grade content standards.

*Goat Quotes*<sup>1</sup>: In Goat Quotes four newspapers paraphrase a headline at the top of a news kiosk. The participant must select the correct paraphrase. The exercise is designed to sample the basic syntactic (i.e., grammatical) structures of spoken English generally mastered in the early elementary grades. The exercise develops logical thinking and working memory skills as well careful reading.

*Book Monkeys: Book Two*<sup>1</sup>: Participant reads a passage, chart, or schedule and then answers questions related to the material. This exercise develops a participants' ability to read for literal meaning, cause-and-effect relationships, and inferential comprehension. It also develops a participant's working memory as well as vocabulary skills, which are crucial for flexible, fluent reading.

*Stinky Bill's Billboard*<sup>1</sup>: Participants must select the word that accurately completes a sentence. In this exercise, participants improve sentence comprehension while practicing the decoding of words in realistic contexts. This exercise also helps build vocabulary and awareness of word structure.

*Lulu's Laundry Line*<sup>1</sup>: Short passages are presented with occasional gaps where punctuation is missing. The participant must read the words and understand the passage in order to determine the correct punctuation. The exercise develops punctuation skills as well as automaticity for decoding and sentence comprehension.

*Wood Works*<sup>2</sup>: In Wood Works, the participant sorts written words into sound bins labeled with phonetic (dictionary) symbols. Later the participant sorts spoken words into spelling bins labeled with spelling patterns. In this way, participants build accuracy and fluency in spelling, decoding, and phonemic analysis.

*Lana's Lanes*<sup>2</sup>: In Lana's Lanes participants build skills in accurate text comprehension and the use of comprehension strategies by reading fiction or nonfiction passages, completing a graphic organizer or summary of each passage, and answering comprehension questions with and without the aid of the graphic organizers/summaries.

*Quack Splash*<sup>2</sup>: In Quack Splash participants build multiple-paragraph passages and demonstrate comprehension of the passages by correctly identifying

<sup>1</sup> Exercise from the Fast ForWord to Reading 4 product

<sup>2</sup> Exercise from the Fast ForWord to Reading 5 product

missing words, phrases, or sentences; by correctly sequencing sentences and paragraphs; and by answering comprehension questions about the completed passages.

*Gator Jam*<sup>2</sup>: In Gator Jam, participants complete analogies where one of the 4 terms of the analogy is missing. Later, participants reread the completed analogies, and sort them based on the type of analogical relationship illustrated. In this way, Gator Jam helps participants to build skills in critical thinking and abstract reasoning while improving vocabulary.

*Toad Loader*<sup>2</sup>: In Toad Loader, participants select sentence segments to correctly build a sentence that describes an illustration. The sentence structures vary in the use of inflections and other grammatical forms. In this way, participants build accuracy and fluency in recognizing and constructing sentence structures.

### Assessments

All study participants from Umatilla Middle School took Reading Progress Indicator before and after Fast ForWord use. Scores were analyzed by Scientific Learning Corporation.

**Reading Progress Indicator:** Reading Progress Indicator is a computer-based assessment designed to rapidly measure the effects of the Fast ForWord products. There are four levels of the assessment, each designed for a specific grade range. Each test level measures phonological awareness, decoding, vocabulary and comprehension. Scores are reported as grade equivalents and percentiles.

### Analysis

Normal Curve Equivalents (NCE's) were used for the analyses. NCE's have a mean equal to 50 and a standard deviation approximately equal to 21. Data were analyzed using a repeated measures multivariate analysis of variance (MANOVA). 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 level). During the spring semester of the 2006 – 2007 school year, students either used the 30- or 50-Minute protocol. These protocols call for students to use the product for 30 or 50 minutes per day, five days a week for six to 16 weeks.

All 114 study participants from Umatilla Middle School had pre- and post-tests: 78 of the students used the Fast ForWord to Reading 4 product (33 used the 30-Minute Protocol and 45 used the 50-Minute Protocol) and 36 of the students used the Fast ForWord to Reading 5 product (13 used the 30-Minute Protocol and 23 used the 50-Minute Protocol). Prior to the study, teachers reported the students to be of similar academic abilities.

The two groups of students reached comparable high completion levels on the product, but as predicted, the 30-Minute Protocol group required more days to complete the content. Of the Fast ForWord to Reading 4 participants, the 30-Minute Protocol group completed 86% content in 28 days and the 50-Minute Protocol group completed 90% of the same content in 21 days. Of the Fast ForWord to Reading 5 participants, the 30-Minute Protocol group completed 56% content in 35 days and the 50-Minute Protocol group completed 66% of the same content in 34 days. Detailed usage information for the study participants is shown in Table 1.

Figures 1 and 3 show the average daily progress through the 30-Minute Protocols on the Fast ForWord to Reading 4 and 5 products, respectively. Figures 2 and 4 show the average daily progress through the 50-Minute Protocols on the Fast ForWord to Reading 4 and 5 products, respectively. 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.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord to Reading 4: <b>30-Minute Group</b>	33	28	53	86%	100%	85%
Fast ForWord to Reading 4: <b>50-Minute Group</b>	45	21	40	90%	98%	82%
Fast ForWord to Reading 5: <b>30-Minute Group</b>	13	35	59	56%	100%	90%
Fast ForWord to Reading 5: <b>50-Minute Group</b>	23	34	59	66%	98%	88%

Table 1. Usage data showing the number of students who used the different Fast ForWord 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.

**Learning Curves:  
30-Minute Protocol: Fast ForWord to Reading 4**

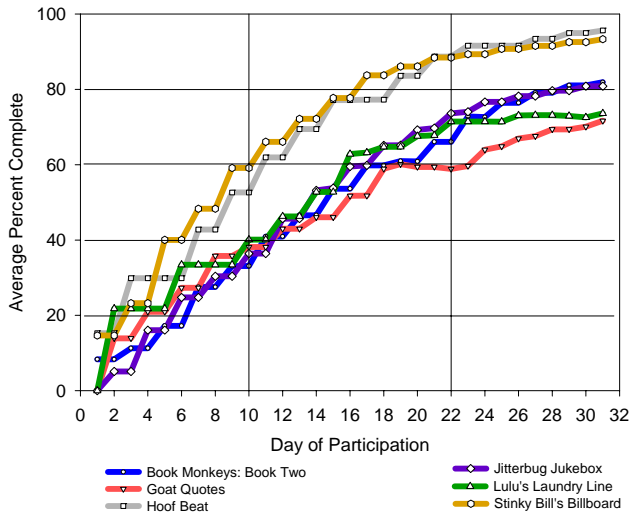


Figure 1. Average daily progress through the Fast ForWord to Reading 4 exercises on the 30-Minute Protocol. Results from 33 students are shown.

**Learning Curves:  
50-Minute Protocol: Fast ForWord to Reading 4**

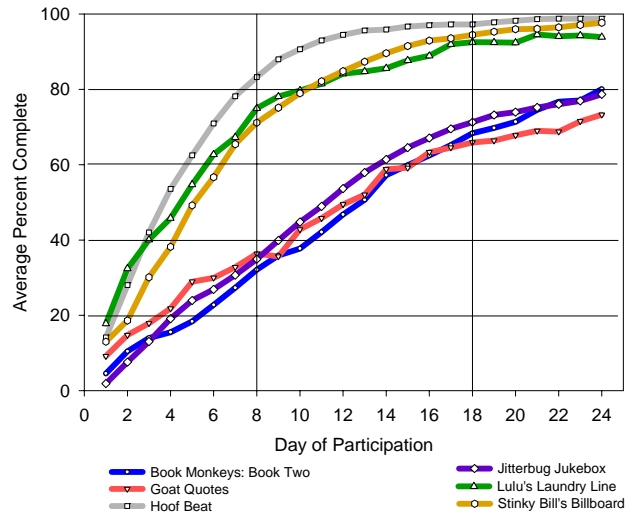


Figure 2. Average daily progress through the Fast ForWord to Reading 4 exercises on the 50-Minute Protocol. Results from 45 students are shown.

**Learning Curves:  
30-Minute Protocol: Fast ForWord to Reading 5**

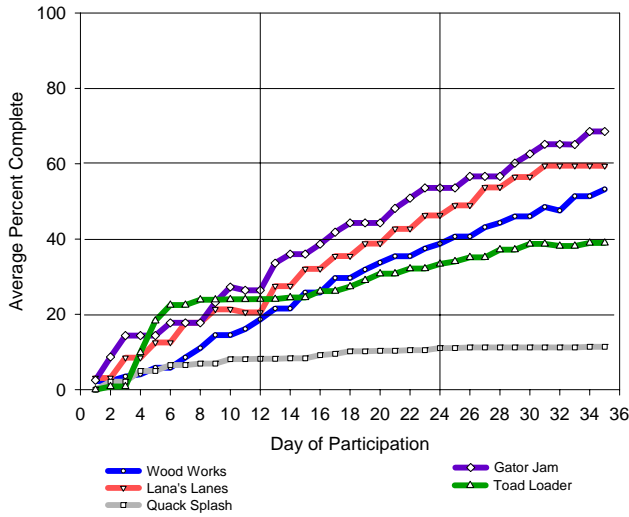


Figure 3. Average daily progress through the Fast ForWord to Reading 5 exercises on the 30-Minute Protocol. Results from 13 students are shown.

**Learning Curves:  
50-Minute Protocol: Fast ForWord to Reading 5**

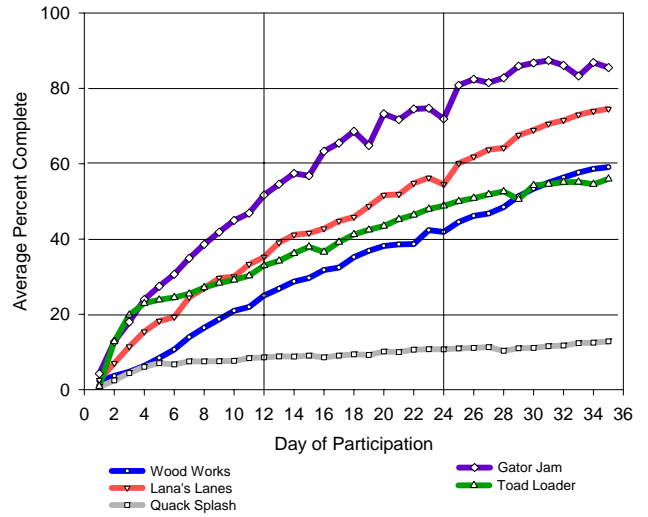


Figure 4. Average daily progress through the Fast ForWord to Reading 5 exercises on the 50-Minute Protocol. Results from 23 students are shown.

**Assessment Results**

**Reading Progress Indicator:** Reading Progress Indicator was used to evaluate the reading skills of the 114 students in this study, both before and after the students participated on their Fast ForWord to Reading product. Scores were analyzed using Normal Curve Equivalents (NCE's).

The analyses below divide the students into product groups: Umatilla Middle School students who used the Fast ForWord to Reading 4 product, and those who used the Fast ForWord to Reading 5 product. Statistically, there was no difference between the pre-test scores of the 30-Minute Protocol group and the 50-Minute Protocol group on Reading Progress Indicator in either product group (p=0.30 for Fast ForWord to Reading 4 and p=0.22 for Fast ForWord to Reading 5), showing that the protocol groups had similar reading abilities prior to using the Fast ForWord products.

**Fast ForWord to Reading 4**

A multivariate analysis of variance (MANOVA) showed no significant interaction of group by time,

showing that the two protocol groups achieved statistically similar gains on Reading Progress Indicator (see Table 2). Table 3 shows detailed results of the performance of these Fast ForWord participants, split by protocol group.

Since there was no statistical difference between the performance of the groups, scores from both protocol groups were analyzed together. Looking at the results of the two groups combined, on average, Fast ForWord participants made statistically significant gains in their reading skills, moving higher into the average range. See Figure 5 for a graphical representation of these scores.

	MANOVA	
	df	F
time	76	7.9*
time x group	76	0.6

Table 2. A MANOVA showed that students who used the different Fast ForWord to Reading 4 protocols achieved similar gains. \* p < 0.05

Fast ForWord to Reading 4	Test	n	Before		After		t-statistic
			Mean	SE	Mean	SE	
<b>30-Minute Group</b>	Reading Progress Indicator	33	48.7	2.1	55.0	2.3	2.5*
<b>50-Minute Group</b>	Reading Progress Indicator	45	52.0	2.2	55.5	2.4	1.5

Table 3. On average, students improved in reading skills after Fast ForWord use, with the 30-Minute Protocol group achieving statistically significant gains on Reading Progress Indicator. \* p < 0.05

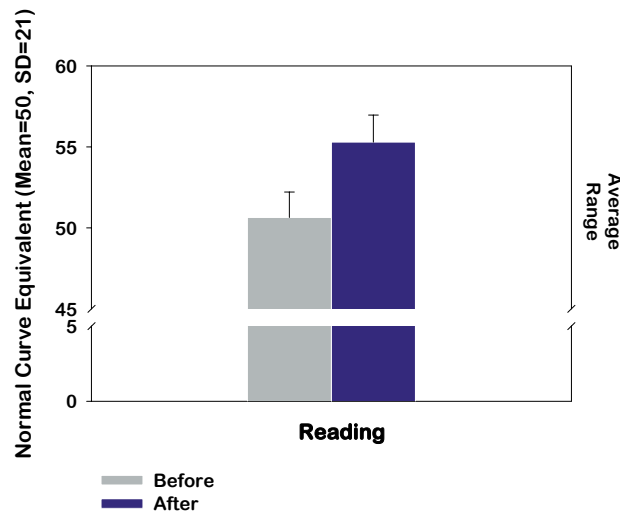


Figure 5. Fast ForWord participants made statistically significant improvements in reading skills after using the Fast ForWord to Reading 4 product. Results from all 78 Fast ForWord to Reading 4 participants are shown.

**Fast ForWord to Reading 5**

Like the Fast ForWord to Reading 4 analysis, a MANOVA showed no significant interaction of group by time in the Fast ForWord to Reading 5 group, showing that the two protocol groups achieved statistically similar gains on Reading Progress Indicator (see Table 4). Table 5 shows detailed results of the performance of these Fast ForWord participants, split by protocol group.

Since there was no statistical difference between the performance of the groups, scores from both protocol groups were analyzed together. Looking at the results

of the two groups combined, on average, Fast ForWord participants made statistically significant gains in their reading skills, moving even higher into the above average range. See Figure 6 for a graphical representation of these scores.

	MANOVA	
	df	F
time	34	8.9*
time x group	34	0.4

Table 4. A MANOVA showed that students who used the different Fast ForWord to Reading 5 protocols achieved similar gains. \*  $p < 0.05$

Fast ForWord to Reading 5	Test	n	Before		After		t-statistic
			Mean	SE	Mean	SE	
<b>30-Minute Group</b>	Reading Progress Indicator	13	67.3	3.4	78.2	3.3	2.7*
<b>50-Minute Group</b>	Reading Progress Indicator	23	73.7	3.3	80.8	3.5	1.8

Table 5. On average, students improved in reading skills after Fast ForWord use, with the 30-Minute Protocol group achieving statistically significant gains on Reading Progress Indicator. \*  $p < 0.05$

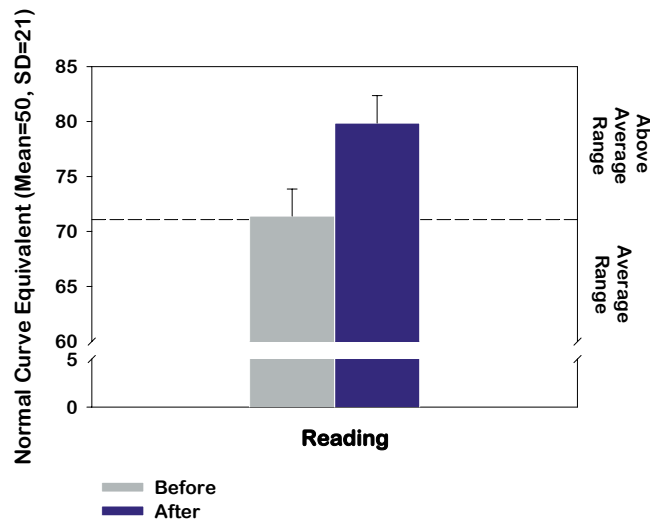


Figure 5. Fast ForWord participants made statistically significant improvements in reading skills after using the Fast ForWord to Reading 5 product. Results from all 36 Fast ForWord to Reading 5 participants are shown.

## DISCUSSION

During the 2006 – 2007 school year, a group of 114 students from Umatilla Middle School used the Fast ForWord to Reading 4 or Fast ForWord to Reading 5 product. Overall, students made statistically significant improvements in reading skills, including phonological awareness, decoding, vocabulary and comprehension skills. Students used one of two daily protocols: either 30 minutes of participation a day or 50 minutes of participation a day. Statistical analyses reveal that the different protocol groups made statistically similar gains, suggesting that the two protocols provide equivalent benefits. These findings demonstrate that, regardless of which daily protocol is used, an optimal learning environment coupled with a focus on cognitive and early reading skills can help students attain a higher level of reading achievement.

## CONCLUSION

Strong cognitive and linguistic skills provide a critical foundation for building reading and writing skills. The Fast ForWord to Reading 4 and Fast ForWord to Reading 5 products build this foundation through development of auditory memory, attention, and sequencing, and by exercising early reading skills including phonics, vocabulary, fluency and comprehension. This study demonstrates that students in the Lake County School District who used either of two different protocols of the Fast ForWord to Reading products significantly improved their reading skills. These results suggest that using a 30-Minute or 50-Minute daily protocol of the Fast ForWord to Reading products can strengthen students' foundational skills and allow them to benefit more from the classroom curriculum.

## Notes:

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