

# Improved Reading Skills by High School Students in the Vanguard School of Lake Wales who used Fast ForWord® Products

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## ABSTRACT

**Purpose:** This study investigated the effects of the Fast ForWord products on the reading skills of high school students who used the products within the curriculum in a school setting. **Study Design:** The design of this study was a single school case study using a nationally normed assessment. **Participants:** Study participants were students attending a private school for students with special learning needs in Lake Wales, Florida. **Materials & Implementation:** Following staff training on the Fast ForWord products, a group of students used the products during the 2006-2007 school year and had their reading abilities assessed with subtests from the Woodcock-Johnson III Tests of Achievement before and after Fast ForWord participation. **Results:** Students, on average, made significant gains in their reading skills after Fast ForWord product use. The average improvement across the WJ III subtests administered was approximately two grade levels with a gain of more than 2.5 grade levels on the Word Attack and Passage Comprehension subtests.

**Keywords:** Florida, private school, high school, suburban district, observational study, special education, Fast ForWord Middle & High School, Fast ForWord to Literacy Advanced, Fast ForWord to Reading 3, Woodcock-Johnson III Tests of Achievement (WJ III).

## 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 Vanguard School of Lake Wales was interested in evaluating the effectiveness of an optimal learning environment with a focus on early reading and cognitive skills as a way to improve the reading achievement of students in a school setting. In this study, commercially available computer-based products (Fast ForWord Middle & High School, Fast

ForWord to Literacy Advanced, and Fast ForWord to Reading 3) were used to evaluate the effectiveness of this approach for improving the reading achievement of high school students.

## METHODS

### Participants

The Vanguard School of Lake Wales in Lake Wales, Florida, is an accredited, internationally recognized school for students with special learning needs. Small class sizes and educational programs focus on individual student needs and help students to catch up and prepare for college.

Students attending the Vanguard School of Lake Wales used the Fast ForWord products during the 2006-2007 school year as part of their educational curriculum. Results from 26 of these students are reported in this study. Study participants were ages 13 through 19 years with a mean age 16.7. Subtests from the Woodcock-Johnson III Tests of Achievement were used to assess student reading ability before and after Fast ForWord participation. School personnel administered the assessment and reported scores for 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 Fast ForWord products.

## Materials

The Fast ForWord products are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. The products used by the Vanguard School of Lake Wales, Fast ForWord Middle & High School, Fast ForWord to Literacy Advanced, and Fast ForWord to Reading 3, include five to 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 these products, all help develop certain critical skills as detailed in the following exercise descriptions.

*Sweeps<sup>1</sup> and Sky Rider<sup>2</sup>*: 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 exercises improve working memory, sound processing speed, and sequencing skills.

*Streams<sup>1</sup>*: Students hear a single syllable that is repeated several times, and then interrupted by a different syllable. Students must respond when they hear the change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

*IDs<sup>1</sup>, Meteor Ball<sup>2</sup>, and Lunar Leap<sup>2</sup>*: 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. *Meteor Ball* also develops sound-letter correspondence skills. *Lunar Leap* also develops grapheme recognition.

*Matches<sup>1</sup> and Laser Match<sup>2</sup>*: 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 goal is to find each square's match and clear the grid. The *Phonic Match* exercise develops auditory word recognition and phoneme discrimination, improves working memory, and increases sound processing speed. The *Laser Match* exercise develops skill with sound-letter correspondences as well as working memory.

*Cards<sup>1</sup>*: Students see two pictures representing words that differ only by the initial or final consonant (e.g., "face" versus "vase", or "tack" versus "tag"). When students hear one of the words, they must click the picture that matches the word. This exercise increases sound processing speed, improves auditory recognition of phonemes and words, and helps students gain an understanding of word meaning.

*Stories<sup>1</sup> and Galaxy Theater<sup>2</sup>*: Students listen to stories, then answer multiple-choice questions about them, match pictures to sentences, and follow commands of increasing complexity. As participants integrate information across the sentences of a paragraph, and across the paragraphs of a story, they build listening comprehension skills. These exercises simultaneously develop basic language skills such as auditory word recognition, auditory memory, and basic vocabulary, along with more complex language skills such as attending to word and sentence structure. These exercises provide a comprehensive "cross-training" of oral language skills, to create a solid foundation for reading.

*Scrap Cat<sup>3</sup>*: Students are asked to sort a series of visually-presented words into the correct semantic, phonological, syntactic, or morphological categories. For this exercise only, students can click a button to hear any word and see it defined. This exercise develops decoding, vocabulary, and word recognition skills.

*Chicken Dog<sup>3</sup>*: Students hear a spoken word and see it partially spelled. They must complete the word by filling in the missing letter or letter group. Five options are always provided, with foils representing common visual and phonological errors. This exercise develops basic spelling patterns, letter-sound correspondences, and decoding.

<sup>1</sup> Exercise from the Fast ForWord Middle & High School product.

<sup>2</sup> Exercise from the Fast ForWord to Literacy Advanced product.

<sup>3</sup> Exercise from the Fast ForWord to Reading 3 product.

*Canine Crew*<sup>3</sup>: Students are asked to match pairs of words within a grid. Grid size increases as the student develops mastery, and the matching criterion shifts from rhyming words to synonyms, antonyms, and, finally, homophones. This exercise develops vocabulary, decoding, and automatic word recognition.

*Twisted Pictures*<sup>3</sup>: Students are presented with a series of pictures and visually-presented sentences. They are asked to select the most accurate description of each picture from the four accompanying sentences. The descriptive sentences incorporate a wide range of syntactic structures. As the student progresses, the sentences get longer and more difficult vocabulary is included. This exercise builds sentence comprehension by developing syntax, working memory, logical reasoning, and vocabulary.

*Book Monkeys*<sup>3</sup>: Students read narrative and expository passages and answer comprehension questions about each passage. The student selects the best answer from among four alternatives. The multiple-choice questions demand that the student use memory to retrieve specific details, generate inferences, and grasp causal relationships. This task develops paragraph comprehension, cause-and-effect reasoning, working memory, flexible reading, and vocabulary.

*Hog Hat Zone*<sup>3</sup>: In Hog Hat Zone, short passages from classic children's literature are presented, with occasional gaps in the text where words are missing. Students are asked to fill in each gap with the correct word from among four alternatives. The missing words are grammatically important items such as pronouns, auxiliary verbs, and words with suffixes and prefixes. This task develops paragraph comprehension, complex morphology, flexible reading, and vocabulary.

### Assessments

Student reading skills were assessed with the Letter-Word Identification, Word Attack, and Passage Comprehension subtests of the Woodcock-Johnson III Tests of Achievement (WJ III) before and after Fast ForWord participation.

**Woodcock-Johnson III Tests of Achievement (WJ III):** The WJ III is a wide-range, comprehensive set of individually administered

tests for measuring cognitive abilities, scholastic aptitudes, and achievement.

The Letter-Word Identification subtest measures the subject's reading identification skills for isolated letters and words.

Word Attack measures the subject's skill in applying phonic and structural analysis skills to the pronunciation of unfamiliar printed words.

Passage Comprehension measures the subject's skill in reading a short passage and identifying a missing key word.

### Analysis

Scores were reported in terms of grade equivalents and were analyzed using a repeated measures analysis of variance (ANOVA). 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, the Vanguard School of Lake Wales chose to use the 48- and 50-Minute protocols for the Fast ForWord products. These protocols called for students to use the product for 48 or 50 minutes a day, five days per week for eight to twelve weeks. Detailed product use is shown in Table 1.

All students started with the Fast ForWord Middle & High School product and most continued use with the Fast ForWord to Literacy Advanced product. A few students also used the Fast ForWord to Reading 3 product. Figure 1 shows the average daily progress through the Fast ForWord Middle & High School product exercises. This graph represents the learning curve of the students as they progress through the product. The other products used in this study, Fast ForWord to Literacy Advanced and Fast ForWord to Reading 3, have similar learning curves. 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 products 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 Middle & High School | 26                 | 27                | 62                      | 81%              | 91%                 | 77%              |
| Fast ForWord to Literacy Advanced | 24                 | 32                | 77                      | 73%              | 84%                 | 64%              |
| Fast ForWord to Reading 3         | 7                  | 14                | 28                      | 53%              | 86%                 | 78%              |
| Total                             | 26                 | 62                | 139                     | -                | -                   | -                |

Table 1. Usage data showing the number of students who used each Fast ForWord product, along with group averages for the number of days participated, the number of calendar days between start and finish, the percentage of product completed, the participation level, and the attendance level. Total values reflect the average total number of days that students used products. Note: Students often use multiple products.

Learning Curve: Fast ForWord Middle & High School

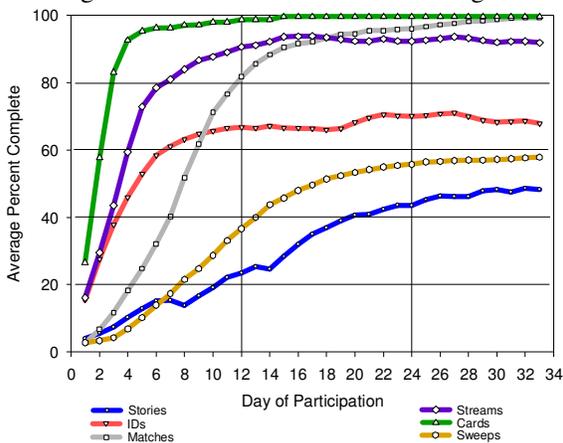


Figure 1. Average daily progress through the Fast ForWord Middle & High School product exercises. Results from 26 students are shown.

At pre-test, the group of students was reading well below their grade level. After approximately four and one-half months of Fast ForWord participation, students significantly improved in reading abilities, with average scores improving more than two and one-half grade levels in Word Attack and Passage Comprehension (Table 2, Figure 2).

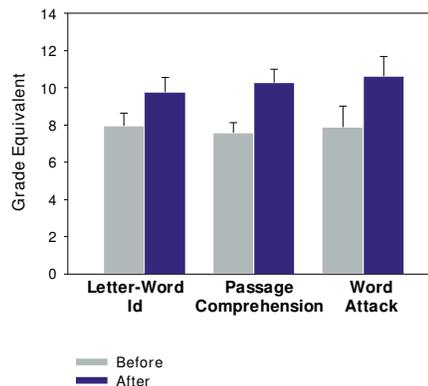


Figure 2. Students who used the Fast ForWord products gained, on average, more than two grade levels in their reading skills. Results from 26 students are shown.

Assessment Results

Woodcock-Johnson III Tests of Achievement (WJ III):

Data were reported in terms of grade equivalents for 27 students. One student could not be reliably matched to his Fast ForWord participation data and was not included in the analysis.

|                       | n  | Before |      | After |      | ANOVA F |       |             |
|-----------------------|----|--------|------|-------|------|---------|-------|-------------|
|                       |    | Mean   | SE   | Mean  | SE   | Test    | Time  | Test x Time |
| Letter-Word Id        | 26 | 7.96   | 0.68 | 9.77  | 0.76 |         |       |             |
| Passage Comprehension | 26 | 7.56   | 0.55 | 10.2  | 0.71 |         |       |             |
| Word Attack           | 26 | 7.90   | 1.1  | 10.6  | 1.0  |         |       |             |
|                       |    |        |      |       |      | 0.46    | 62.3* | 1.6         |

Table 2. On average, students improved significantly in reading ability after Fast ForWord use. \*p<0.05.

DISCUSSION

During the 2006-2007 school year, high school students with special learning needs in the Vanguard School of Lake Wales used the Fast ForWord products and participated in the study reported here. Overall, students made significant and substantial gains after Fast ForWord participation. In four and one-half months of product use, students who were reading well below their grade level improved various reading

skills by more than two grade levels. These gains are exceptional and brought the reading skills of many of the students up to, or above, their grade level. These findings demonstrate that, within the Vanguard School of Lake Wales, an optimal learning environment coupled with a focus on cognitive and early reading skills can help students attain a higher level of language and reading achievement.

## CONCLUSION

Language and reading skills are critical for all students, impacting their ability to benefit from instruction, follow directions and participate in class discussions. Strong linguistic skills also provide a critical foundation for building reading and writing skills. After Fast ForWord use, students in the Vanguard School of Lake Wales made significant gains in their reading ability. This suggests that using the Fast ForWord products strengthened the students' foundational skills and better positioned them to benefit from the classroom curriculum.

### Notes:

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