# Improved Reading Skills by Students in the Van Independent School District 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 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 nationally normed assessments. **Participants:** Study participants were elementary school students who were attending an intermediate school in the Van Independent School District of Van, Texas. **Materials & Implementation:** Following staff training on the Fast ForWord products, a group of students used the products during the 2004-2005 and 2005-2006 school years. Student reading ability was evaluated with the STAR Reading assessment before and after Fast ForWord participation. **Results:** On average, students made significant improvements, with reading skills improving from the 18$^{th}$ to the 38$^{th}$ percentile. In the six and one-half months between test administrations, students, on average, gained one year in reading grade equivalent and were reading at grade level after Fast ForWord product use.


**Keywords: Texas, elementary school, rural district, observational study, at-risk, Title I, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 3, STAR Reading.**

## 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 Van Independent School District 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 Language, Fast ForWord Language to Reading, and Fast ForWord to Reading 3) were used to evaluate the effectiveness of this approach for improving the reading achievement of elementary school students, many of whom were at-risk for academic failure.

## METHODS

### Participants

Located in Van Zandt County in northeastern Texas, the city of Van is approximately 80 miles east of Dallas.

The Van Independent School District is a four school district with a student population of approximately 2,000 students in pre-Kindergarten through twelfth grade. One of the District's schools, Van Intermediate, chose to use the Fast ForWord products during the 2004-2005 and 2005-2006 school years. Van Intermediate is a Title I school that serves grades 3-5 and has approximately 450 enrolled students. About 84% of the students are Caucasian; 12% are Hispanic. Fifty-six percent of the students are eligible for free or reduced price lunches.

A group of 116 third through fifth grade students used the Fast ForWord products during the 2004-2005 and/or 2005-2006 school years and participated in the study reported here. Their average grade level was 3.4. Eighty percent of the students were Caucasian and 16% were Hispanic. Approximately 15% had English as a second language and 23% were receiving services for special education. Thirteen percent were dyslexic and 81% were considered at-risk for academic failure.

Student reading skills were evaluated with the STAR Reading assessment 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 Van Independent School District, Fast ForWord Language, Fast ForWord Language to Reading, and Fast ForWord to Reading 3, include five to seven exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension. While there are variations across products related to the specific skills targeted and the approaches taken, there are several critical skills developed in all of the products, as detailed in the following exercise descriptions.

*Circus Sequence*[1] *and Trog Walkers*[2]*:* 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.

*Old MacDonald's Flying Farm*[1]*:* Students hear a single syllable that is repeated several times, and then interrupted by a different syllable. Students must respond when they hear a change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

*Phoneme Identification*[1]*, Polar Cop*[2]*, and Treasure in the Tomb*[2]*:* 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.

*Phonic Match*[1] *and Bug Out*[2]*:* 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 *Bug Out!* exercise develops skill with sound-letter correspondences as well as working memory.

*Phonic Words*[1]*:* 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.

*Language Comprehension Builder*[1]*:* Students listen to a sentence that depicts action and complex relational themes. Students must match a picture representation with the sentence they just heard. This exercise develops oral language and listening comprehension, improves understanding of syntax and morphology, and improves rate of auditory processing.

*Block Commander*[1]*:* In Block Commander, a three-dimensional board is filled with familiar shapes that students select and manipulate. The students are asked to follow increasingly complex commands. This exercise increases listening comprehension, improves syntax, develops working memory, improves sound processing speed, and increases the ability to follow directions.

*Start-Up Stories*[2]: Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

*Scrap Cat*[3]*:* In Scrap Cat, a series of words is visually presented and participants are asked to sort each word into the correct semantic, phonological, syntactic, or morphological category. For this exercise only, the

[1] Exercise from the Fast ForWord Language product.
[2] Exercise from the Fast ForWord Language to Reading product.
[3] Exercise from the Fast ForWord to Reading 3 product.

participant can click a button to hear any word and see it defined. This exercise trains decoding, vocabulary, and word recognition skills.

*Canine Crew*[3]*:* In Canine Crew multiple words are presented together in a grid and participants are asked to find pairs that match on the basis of the current criterion. This criterion shifts from words that rhyme, to synonyms, to antonyms, to homophones, as the participant progresses. This exercise trains vocabulary, decoding, and automatic word recognition.

*Chicken Dog*[3]*:* Participants hear a 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, including options that represent common visual and phonological errors. This exercise trains basic spelling patterns, letter-sound correspondences, and decoding.

*Twisted Pictures*[3]*:* Participants are presented with a variety of pictures and asked to select the sentence that most accurately describes each picture from among four alternatives. The descriptive sentences incorporate a wide range of syntactic structures. As the participant 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*[3]*:* Participants read narrative and expository passages and answer comprehension questions about each passage. The multiple-choice questions demand that the participant use memory for literal detail, generation of inferences, or grasp of causal relationships to select the best answer from among four alternatives. This task develops paragraph comprehension, inferential and cause-and-effect reasoning, working memory, flexible reading, and vocabulary.

*Hog Hat Zone*[3]*:* In Hog Hat Zone, short passages from classic children's literature are presented, with occasional gaps in the text where words are missing. Participants are asked to fill in each gap with the correct word from among four alternatives. The missing words are morphologically 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**

Students were assessed with the STAR Reading assessment before and after Fast ForWord participation.

**STAR Reading:** The STAR Reading assessment is a criterion- and norm-referenced test of reading ability. It consists of computer adaptive multiple choice questions and is appropriate for grades 1 through 12.

**Analysis**

Scores were reported in terms of normal curve equivalents (NCEs) and grade equivalents.
NCEs were analyzed using paired 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 level). During the 2004-2005 and 2005-2006 school years, the Van Independent School District chose to use the 90- and 100-minute protocols for the Fast ForWord products. These protocols called for students to use the products for 90 or 100 minutes a day, five days per week for four to six weeks. Due to the type of implementation, adherence to protocol was not available.

Many students in this study used one or more Fast ForWord products prior to their pre-test. Table 1 shows detailed product use information for participants who started products between the pre- and post-test, as well as detailed product use for all products used including those that were started, but not necessarily completed, prior to the start of the study.

The majority of study participants started with the Fast ForWord Language product. Figure 1 shows the average daily progress through the Fast ForWord Language 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 Language to Reading 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 product fewer than the number of days shown, percent complete is maintained at the level achieved on their final day of product use.

| | Products Started Between Pre- and Post-Test | | | | Total Product Use | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of Students | Days Participated | Number of Calendar Days | Percent Complete | Number of Students | Days Participated | Number of Calendar Days | Percent Complete |
| Fast ForWord Language | 57 | 21 | 37 | 56% | 88 | 29 | 70 | 59% |
| Fast ForWord Language to Reading | 56 | 30 | 84 | 57% | 71 | 32 | 108 | 59% |
| Fast ForWord to Reading 3 | 45 | 30 | 102 | 42% | 57 | 29 | 100 | 39% |
| Total Across Products | 116 | 36 | 99 | - | 116 | 56 | 168 | - |

*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 and the percentage of product completed. Product use for products started between the pre- and post-test is shown on the left, total product use by the students in the study is shown on the right and includes products started, but not necessarily completed, by the students prior to the start of the pre- and post-testing. Note: students often use multiple products.*

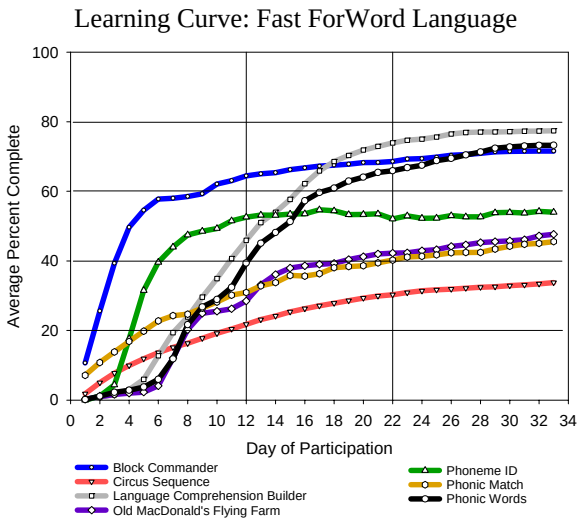


*Figure 1. Average daily progress through the Fast ForWord Language product exercises. Results from 88 students are shown.*

| | n | Before | | After | | t-statistic |
|---|---|---|---|---|---|---|
| | | Mean | SE | Mean | SE | |
| STAR Reading | 116 | 31.4 | 1.20 | 43.7 | 1.18 | 15.2* |

*Table 2. Students who used the Fast ForWord products made significant gains in reading ability. *p<0.05.*

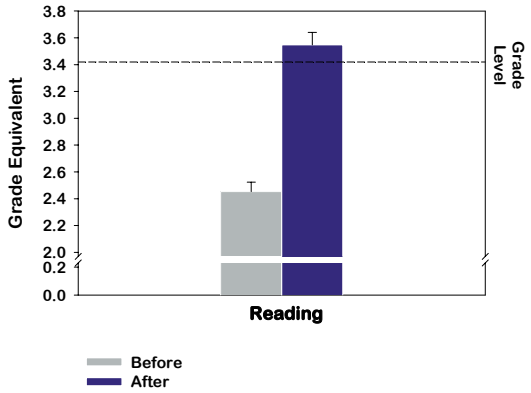


*Figure 2. On average, students improved more than one year in reading grade level after Fast ForWord participation. Results from 116 students are shown.*

**Assessment Results**

STAR Reading: NCEs on the STAR are grade and month-corrected such that a student achieving typical growth should maintain a constant score. One hundred and sixteen students had NCE scores from the STAR available for analysis. Before using Fast ForWord products, the average NCE on the STAR Reading assessment was 31.3, a score in the low average range. Students, overall, made significant gains in reading skills following Fast ForWord participation and improved 12 points, moving well into the average range (Table 2). In percentiles, this is an increase from the 18th to the 38th percentile. Figure 2 shows this improvement in terms of grade equivalents. Students had an average grade equivalent of 2.5 at pre-test, one year behind their average grade level of 3.4. In the six and one-half months between test administrations and after using Fast ForWord products, the grade equivalent for the participants rose to 3.5, reaching their actual grade level.

## DISCUSSION

A group of elementary students attending an intermediate school in the Van Independent School District used Fast ForWord products during the 2004-2005 and 2005-2006 school years. Student reading ability was evaluated with the STAR Reading assessment before and after Fast ForWord product use. On average, students significantly improved their reading skills from the low average range at the start of the study to the average range after Fast ForWord participation (an improvement from the 18th to the 38th

percentile). In terms of grade equivalents, students made one year's gain and were reading at grade level at post-test. These improvements are especially substantial given that 81% of the students are considered at-risk for academic failure and were reading one year behind grade level before Fast ForWord product use. These findings demonstrate that, within the Van Independent School District, 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

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 Van Independent School District made significant gains in their reading skills. 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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