

# Reading Skills Improved by Students at Centerville Elementary School who used Fast ForWord<sup>®</sup> to Reading 3

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## ABSTRACT

**Purpose:** This study investigated the effects of the Fast ForWord to Reading 3 product on the reading achievement of third graders, when used within the curriculum in a school setting. **Study Design:** The design of the study was a single-school case study using a nationally normed test. Analysis of variance (ANOVA) procedures were used to evaluate changes in student test performance. **Participants:** Study participants were 25 third-grade students who were attending Centerville Elementary School, in the Hempfield School District, Lancaster County, Pennsylvania. **Materials & Implementation:** Following staff training on the Fast ForWord products, 25 Centerville Elementary School students used Fast ForWord to Reading 3 for an average of 29 days over a period of 46 calendar days. To evaluate performance, student skills were measured with the Stanford Achievement Test Series, Ninth Edition (SAT-9) before and after use of the Fast ForWord to Reading 3 product. **Results:** The ANOVA indicated that there was a significant improvement in Scale Scores for both the Vocabulary and Reading Comprehension subtests of the SAT-9.

**Keywords:** Pennsylvania, elementary school, suburban district, observational study, Title I, special education, Fast ForWord to Reading 3, Stanford Achievement Test Series, Ninth Edition (SAT-9).

## INTRODUCTION

Early laboratory tests of a prototype of a computer-based product combined an optimal learning environment with a focus on early reading and cognitive skills. The results were dramatic improvements in the auditory processing and language skills of elementary school children who had specific language impairments (Merzenich et al., 1996; Tallal et al., 1996) or were at-risk for academic failure (Miller et al., 1999). The Centerville Elementary School was interested in evaluating the effectiveness of this approach for improving their curriculum and instruction for third grade students with reading difficulties. In this study, a commercially available computer-based product (Fast ForWord to Reading 3) was used to evaluate the effectiveness of this approach for improving the reading skills of students with special needs in a school setting.

## METHODS

### Participants

During the spring of 2001, 28 students at Centerville Elementary School, in Lancaster County, Pennsylvania, used the Fast ForWord to Reading 3 product. Centerville Elementary staff selected these students from among third graders who were considered “nonproficient readers.” A team including the school principal, classroom teachers, reading staff, and special education staff selected students they felt were most likely to benefit, giving first consideration to students receiving supplementary special education services. Of the students selected to participate in this study, 25 completed pre-testing and post-testing on at

least one measure (24 completed both the Vocabulary and Reading Comprehension measures, and one completed the Vocabulary measure only). The final sample consisted of 12 girls and 13 boys, with an average age of 9 years, 2 months ( $SD=3$  months). Of these participants, 22 (88.0%) were White, 2 (8.0%) were Hispanic, and 1 (4.0%) was African-American. Overall, these students were rated close to average in academic achievement by their teachers (mean=2.72,  $SD=0.74$ , on a scale ranging from 1 “poor” to 5 “superior”). However, some form of supplementary special education service was being provided to 20 (80.0%) of the students (see Table 1 for a breakdown by service).

Services Received	Treatment Group
Speech and Language Support	5
Learning Support Resource Room	6
Title One Reading	11
Remedial Reading	1

Table 1. Profile of special education services received by 20 of the 25 students in this study.

### Implementation

Educators at Centerville Elementary School were trained in current and established findings on the neuroscience of 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

Fast ForWord products; methods for assessment of product candidates; the selection of appropriate measures for testing and evaluation; effective implementation techniques; approaches for monitoring student performance; and techniques for measuring the gains students have achieved after they have finished using the product.

### **Materials**

All of the study participants used Fast ForWord to Reading 3. This computer-based product combines an optimal learning environment with a focus on reading and cognitive skills. The product includes six exercises designed to build skills critical for reading and learning, such as memory, decoding, vocabulary, and comprehension.

*Scrap Cat:* Students sort a series of written words into the correct semantic, phonological, syntactic, or morphological categories. In this exercise, the participant can click a button to hear any word and see it defined. This exercise develops decoding, vocabulary, and word recognition skills.

*Chicken Dog:* 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 skills.

*Canine Crew:* Students use sound or meaning relationships to match pairs of words within a grid. Grid size increases as the participant 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 skills.

*Twisted Pictures:* Students carefully read sets of sentences and select the one that most accurately describes the picture presented. The sentences incorporate a wide range of syntactic structures, and students must rely on the syntax to rule out the foil sentences. As students progress, they are challenged with longer sentences that include more difficult vocabulary. This exercise builds sentence comprehension by developing working memory, logical reasoning, vocabulary, and syntactic skills.

*Book Monkeys:* Students read narrative and expository passages and answer comprehension questions about each passage. In order to select the best answer from among four alternatives, the student must remember specific details, generate inferences, or grasp causal relationships. This exercise develops

paragraph comprehension, cause-and-effect reasoning, working memory, flexible reading, and vocabulary skills.

*Hog Hat Zone:* Students read short passages from classic children's literature and must fill in occasional gaps in the text. Four alternatives are presented for each gap, and students must rely on structural and meaning-based cues in the context sentence to select the correct word. The missing words are grammatically important items such as pronouns, auxiliary verbs, and words with suffixes and prefixes. This exercise develops paragraph comprehension, complex morphology, flexible reading, and vocabulary skills.

### **Assessments**

Reading achievement was assessed with subtests from the *Stanford Achievement Test Series, Ninth Edition* (SAT-9), a nationally standardized measure of academic achievement.

The reading portion of the *Stanford Achievement Test Series, Ninth Edition* (SAT-9) comprises two subtests, Vocabulary and Reading Comprehension. The scores from these two subtests are combined to obtain the Total Reading composite score. Performance can be reported in terms of Scale Scores, Raw Scores, Grade Equivalents, and Percentiles for subtests and composites.

Before and after the students used the Fast ForWord to Reading 3 product, school personnel administered the reading subtests from the SAT-9. One group of students was given Form S of the SAT-9 for pre-testing and another group was given form SA (an abbreviated version of form S). Both groups used the other form for post-testing. School personnel scored some tests by hand, whereas others were submitted to the test publisher for electronic scoring. All scores for Vocabulary, Reading Comprehension, and Total Reading were provided for analysis.

### **Analysis**

Scale Scores were used for all analyses. Student scores were compared using an analysis of variance (ANOVA) with two within-subjects factors (time x subtest), to determine whether scores on the Vocabulary and the Reading Comprehension subtests were differentially affected. All analyses used a p-value of 0.05 as the criterion for identifying statistical significance.

## **RESULTS**

### **Participation level**

During the spring of 2001, 25 Centerville Elementary School students used Fast ForWord to Reading 3. On average, these students used the product 45 minutes per day for 29 days over a period of 46 calendar days and they completed 59% of the product content (Table

2). Average daily progress through the Fast ForWord to Reading 3 exercises for the first 24 days of use was charted for all students (Figure 1). (For students who used the product fewer than 24 days, percent complete is maintained at the level achieved on their final day of use.)

School staff at Centerville Elementary School designed an alternative protocol in which students began with three of the six exercises and mastered all of the material in those three before moving on to the remaining exercises. The classroom teachers of the participating students identified which exercises would most benefit each student. Those recommendations

were used to determine on which exercises a student would begin. The study group spent more time working on the sentence-level exercise, “Twisted Pictures” (25 sessions, on average), than they spent on any of the word-level or paragraph-level exercises (10 to 15 sessions, on average). This discrepancy is due to two factors: nearly all of the students were assigned to begin with this exercise, and few completed it during the study period. There was more variation in which of the word-level and paragraph-level exercises individual students were assigned to begin with, and the students often completed these exercises and moved on to the remaining ones.

Product	Number of Students	Average Days of Product Use	Average Number of Calendar Days	Average Overall Percent Complete
Fast ForWord to Reading 3	25	29	46	59%

Table 2. Usage data showing the number of Centerville Elementary School students who used the Fast ForWord to Reading 3 product in the spring of 2001 along with group averages for the number of days of use, calendar days between start and finish, and percentage of content covered.

Daily Progress through Fast ForWord to Reading 3 by Centerville Elementary Students

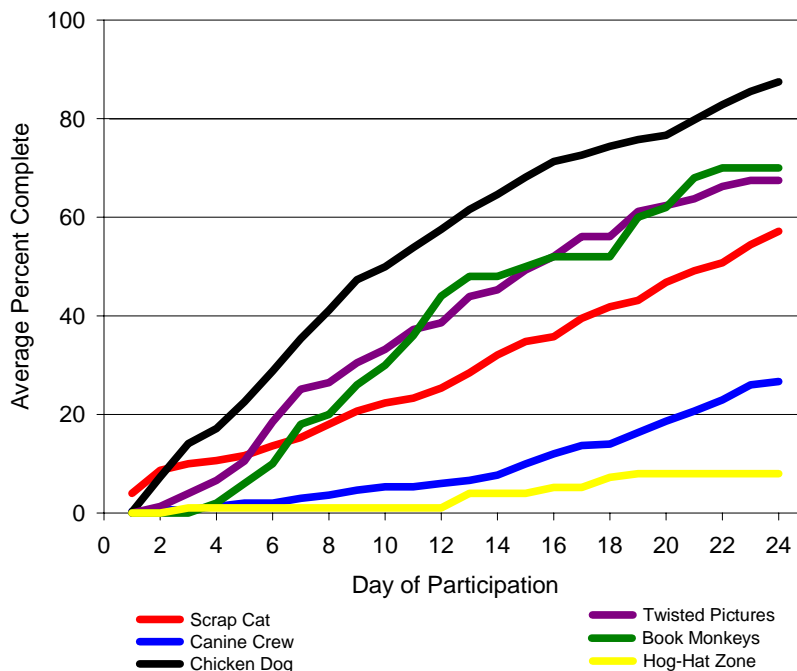


Figure 1. Average daily progress over the first 24 days of use of Fast ForWord to Reading 3 for the 25 Centerville Elementary School students in the study.

**Assessment Results**

Stanford Achievement Test Series, Ninth Edition

For 24 of the study students, Scale Scores were reported from the Reading Comprehension and Vocabulary subtests, along with the Total Reading composite. Only Vocabulary scores were reported for the remaining student. The results of an ANOVA (Table 3) revealed main effects for both time and subtest, but with no interaction between these factors.

This indicated that there was a statistically significant difference between the Vocabulary and Reading Comprehension scores, but that students made similar gains on the two subtests. This analysis showed that, on average, participating students made significant gains in both Vocabulary and Reading Comprehension after using Fast ForWord to Reading 3 (Table 4, Figures 2 and 3).

SAT-9	df	ANOVA F
Time	23	14.10*
Subtest	23	14.69*
Time x Subtest	23	1.32

Table 3. An ANOVA showed that the students in this study performed differently on the Vocabulary and Reading Comprehension subtests of the SAT-9, and that the changes on the two tests, with time, were different. \* $p < 0.05$ .

SAT-9	n	Before		After	
		Mean	SE	Mean	SE
Vocabulary	25	613.6	5.7	634.6	5.8
Reading Comprehension	24	632.3	5.0	644.6	5.3

Table 4. Average Scale Scores on the Vocabulary and Reading Comprehension subtests of the SAT-9, before and after the study students used the Fast ForWord to Reading 3 product.

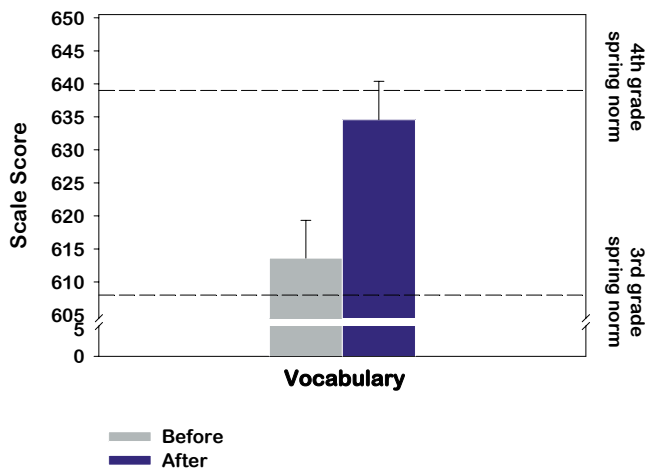


Figure 2. In this case study, 25 third graders with special needs demonstrated improved Vocabulary skills after using the Fast ForWord to Reading 3 product.

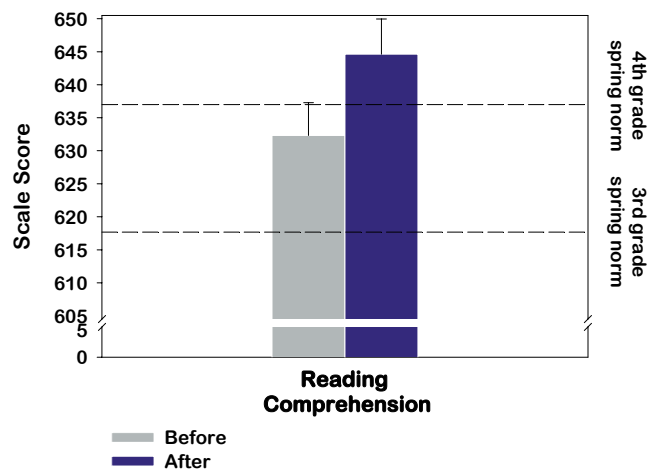


Figure 3. In this case study, 24 third graders with special needs demonstrated improved Reading Comprehension skills after using the Fast ForWord to Reading 3 product.

## DISCUSSION

The analysis of Scale Scores shows that using the Fast ForWord to Reading 3 product helped students at Centerville Elementary School achieve greater proficiency in reading skills. Interestingly, despite the facts that these third graders were identified as “nonproficient readers,” and that most of them were receiving supplementary special educational services, their initial test performance indicated that they began the study with reading skills higher than the national average for students of the same grade level. After using Fast ForWord to Reading 3 for seven weeks, on average, these students demonstrated even higher levels of reading skill.

## CONCLUSION

In the third grade and beyond, students are expected to have mastered the mechanics of reading. To keep pace with their peers, they must begin reading to learn. For this, they need a solid foundation of cognitive, linguistic, and reading skills. Students equipped with these fundamental skills are prepared to build the more advanced reading comprehension and vocabulary skills they need to access increasingly sophisticated texts.

On average, the students who participated in this study made significant improvement on both the Vocabulary and Reading Comprehension components of the SAT-9. These findings demonstrate that, at Centerville Elementary School, an optimal learning environment coupled with a focus on cognitive, linguistic, and reading

skills can help third graders with special needs make significant improvements in reading achievement.

The results found in this study extend the original studies on improved language skills, and demonstrate that using Fast ForWord to Reading 3 also benefits the reading skills of students with special needs in a school environment.

### Notes:

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