Improved Reading Achievement by Students in the Eustace 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 achievement of early elementary 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 state assessments. **Participants:** Study participants were first or second grade students who were attending a primary school in the Eustace Independent School District of Eustace, Texas. **Materials & Implementation:** Following staff training on the Fast ForWord products, a group of students used the products during the 2005-2006 school year. Student reading ability was evaluated with the Texas Primary Reading Inventory (TPRI) before and after Fast ForWord participation. **Results:** Following Fast ForWord participation, students made significant improvements in several reading skills measured by the TPRI including fluency, reading comprehension, and blending skills. First grade students, overall, were reading fluently. Total Reading Comprehension for second grade students was at a "Developed" level and 84% of the students were reading at an accuracy level of "Independent" – up from 53% before Fast ForWord participation.

Keywords: Texas, public school, elementary, suburban district, Title I, observational study, Fast ForWord Language, Fast ForWord Language to Reading, Texas Primary Reading Inventory (TPRI).

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 Eustace 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 and Fast ForWord Language to Reading) were used to evaluate the effectiveness of this approach for improving the reading achievement of early elementary school students.

METHODS

Participants

Located in Henderson County, the city of Eustace is approximately 60 miles southeast of Dallas, Texas.

The Eustace Independent School District is a four school district with an approximate student population of 1,500. Eustace Primary School chose to use Fast ForWord products during the 2005-2006 school year and participated in the study reported here. Eustace Primary is a Title I school with approximately 400 students in pre-Kindergarten through second grade. Eighty-nine percent of students are Caucasian and 7% are Hispanic. Seventy-one percent of the student population are eligible for free or reduced price lunches.

Participants in this study were in first or second grade. A group of 205 students (107 first graders and 98 second graders) used the Fast ForWord products during the 2005-2006 school year and were evaluated with the Texas Primary Reading Inventory (TPRI) before and after product use. 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 Eustace Independent School District, Fast ForWord Language and Fast ForWord Language to Reading, 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 both 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.

Assessments

Students were assessed with the Texas Primary Reading Inventory (TPRI) at the beginning of the school year before Fast ForWord participation and again at the end of the school year after product use.

Texas Primary Reading Inventory (TPRI): The TPRI is an individually administered assessment of reading ability designed for grades K-3. It contains a screening section to determine the reading level of a student and an inventory section to assess specific reading skills including phonemic awareness, fluency and comprehension.

The Institute for the Development of Educational Achievement, in accordance with the Reading First legislation, recognizes the TPRI

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

as an appropriate assessment for measuring improvement in the reading skills of children in early elementary school.

Analysis

Descriptive analyses are used to present the results. Scores were reported in terms of raw scores. 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 2005-2006 school year, the Eustace Independent School District chose to use the 50-minute protocol for the Fast ForWord Language and Fast ForWord Language to Reading products. These protocols called for students to use the products for 50 minutes a day, five days per week, for eight to twelve weeks. All 205 study participants started with the Fast ForWord Language product and about half also used the Fast ForWord Language to Reading product. One student also used two of the Fast ForWord Reading products. Detailed product use is shown in Table 1.

Figures 1 and 2 show the average daily progress through the Fast ForWord Language and Fast ForWord Language to Reading product exercises for students who had scores available for analysis. 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 Language	205	33	59	67%	98%	80%
Fast ForWord Language to Reading	96	15	27	36%	99%	82%

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,

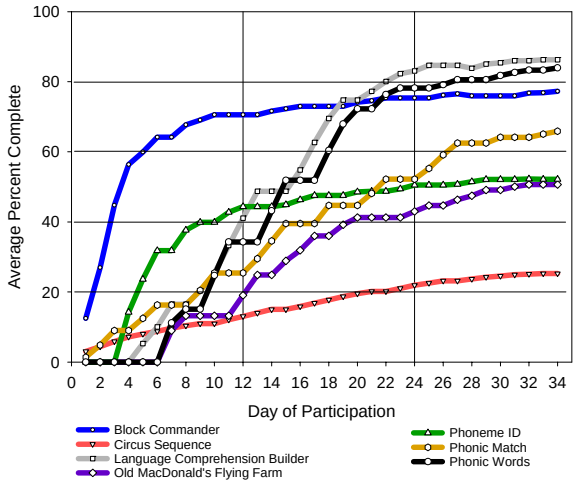

Figure 1. Average daily progress through the Fast ForWord Language product exercises. Results from 205 students are shown.

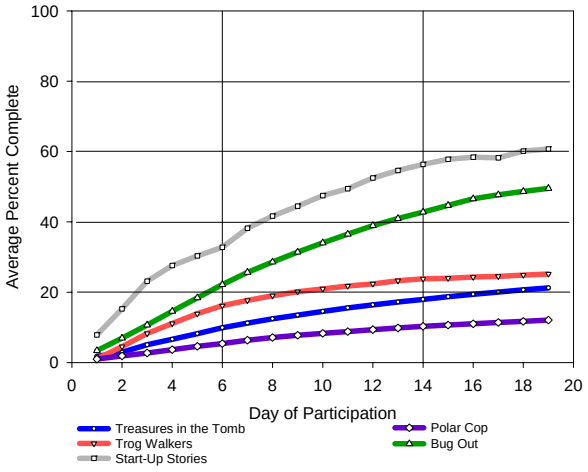

Figure 2. Average daily progress through the Fast ForWord Language to Reading product exercises. Results from 96 students are shown.

Assessment Results

Texas Primary Reading Inventory (TPRI): Raw scores were available for a variety of TPRI subtests. Most students had scores available from both before and after Fast ForWord use on the Reading Fluency (rate and accuracy) and Reading Comprehension subtests. Second graders also had results from four tests of graphophonemic knowledge. A subset of first graders who had not mastered certain basic skills at pre-test were re-evaluated on them at post-test. Skills included blending words, blending phonemes and initial/final consonants.

Both first and second graders were assessed with the Fluency subtest. A first grader who is reading at grade level can read approximately 60 words per minute on the fluency subtest; a second grader can read about 90 words per minute. Following Fast ForWord use, first and second grade students, most of who were not initially fluent readers, made significant improvements and were reading at 73 words and 83 words per minute, respectively (Figure 3, Table 3).

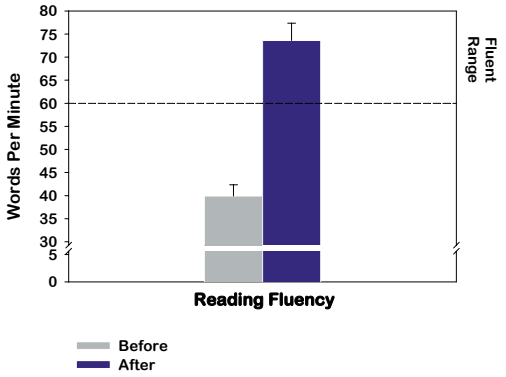

Figure 3. First grade students as a whole were reading fluently after Fast ForWord participation. Results from 55 students are shown.

Student reading accuracy levels were available for 158 first and second graders. The accuracy levels in this report were "Frustrational", "Instructional", or "Independent", with "Independent" being the highest level achieved. Table 2 shows the percentages of students at each reading accuracy level before and after Fast ForWord participation. After Fast ForWord, 84% of students had an accuracy level of "Independent", up from 53% prior to Fast ForWord use.

	Reading Accuracy Level		
	Frustrational	Instructional	Independent
Before	8.9	38.0	53.2
After	1.9	13.9	84.2

Table 2. The percentages of students at each reading accuracy level of the TRPI before and after Fast ForWord. Results from 158 students are shown.

Ninety-eight second graders had scores available from the Total Reading Comprehension subtest. For this subtest, students are given a score ranging from 1 to 5; a score of 4 or 5 is needed to reach the "Developed" level. Students, on average, had a Total Reading Comprehension score of 3.5 at pre-test and a significantly higher score of 4.1 after Fast ForWord product use.

The second grade students were assessed with four tasks of graphophonemic knowledge. These tasks begin with consonant vowel consonant and progress to digraphs. At post-test, students demonstrated significant improvements, approaching level 4 ("Developed") in all tasks except Task 4.

On the Blending Words and Blending Phonemes subtests, students are given a rank of 1 to 5, and in both cases, substantial improvements were made, with the majority of students achieving mastery (100% of the students achieved level 4 or 5 in Blending Words, up from 75%; 69% achieved level 4 or 5 in Blending Phonemes, up from 30% at pre-test.)

Tests of initial and final consonants demonstrated that while nearly all students were at the highest level (5) at pre-test on initial consonants, 56% were not at the highest level on final consonants. Three-fourths of the students had reached the highest level at post-test.

Subtest	n	Before	SE	After	SE	t-statistic
Fluency 1st Grade	55	39.9	2.42	73.6	3.73	11.6*
Fluency 2nd Grade	95	56.9	2.67	83.3	10.7	3.9*
Total Reading Comprehension	98	3.50	0.12	4.10	0.10	4.2*
Task 1	97	3.03	0.14	3.99	0.12	9.1*
Task 2	97	2.07	0.16	3.75	0.14	12.2*
Task 3	97	2.20	0.17	3.72	0.14	10.8*
Task 4	96	1.16	0.12	2.27	0.15	8.6*
Blending Words	17	4.18	0.20	4.65	0.11	2.1
Blending Phonemes	13	2.54	0.31	3.77	0.30	3.6*
Initial Consonants	18	4.66	0.28	4.94	0.06	0.96
Final Consonants	16	3.81	0.36	4.75	0.11	3.0*

*Table 3. Means and standard errors for the TPRI subtests before and after Fast ForWord use. * $p < 0.05$.*

DISCUSSION

A group of early elementary school students in the Eustace Independent School District used Fast ForWord products during the 2005-2006 school year. Student reading ability was evaluated with the Texas Primary Reading Inventory (TPRI). Among skills measured, the TPRI evaluates reading rate and accuracy level. As a student's skills improved, both the rate of reading and the accuracy of reading improve—with 84% of students achieving an "Independent" reading level and reading rate approaching or reaching benchmark.

On average, first grade students who were not reading fluently performed as fluent readers after using Fast ForWord products with significant improvements in both accuracy and rate. Second grade readers also demonstrated significant improvement, achieving the "Developed" level in Total Reading Comprehension, indicating mastery of that skill. These findings demonstrate that, within the Eustace 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 Eustace 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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