

Improved Reading Achievement by Students in the Washington Local 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 elementary school students who used the products within the curriculum in a school setting. **Study Design:** The design of this study was a multiple school study using state achievement tests. **Participants:** Study participants were third and fourth grade students attending nine elementary schools in the Washington Local School District of Toledo, Ohio, who were at-risk for academic failure. **Materials & Implementation:** Following staff training on the Fast ForWord products, a group of students used the products during the 2003 – 2004 school year. Third grade students were evaluated with the Ohio Achievement Test (OAT) and fourth graders were evaluated with the Ohio Proficiency Test (OPT) in October of 2003, before Fast ForWord use and assessed again in March of 2004, after Fast ForWord participation. **Results:** On average, students made significant improvements in reading achievement, with 55% of students increasing at least one performance level and 47% of students meeting or exceeding Ohio testing standards after Fast ForWord use.

Keywords: Ohio, public elementary school, urban district, observational study, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 3, Ohio Proficiency Test (OPT), Ohio Achievement Test (OAT).

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 Washington Local 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 for improving 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.

METHODS

Participants

Located in Toledo, Ohio, the Washington Local School District is a Kindergarten through twelfth grade district with 12 schools and nearly 7,000 students. Approximately 14% are minority students and 13% have Individualized Education Plans.

Nine elementary schools in the Washington Local School District chose to use the Fast ForWord products during the 2003 – 2004 school year. In October of 2003, before Fast ForWord use, and in March of 2004, after participation on the Fast ForWord products, third grade students were assessed with the Ohio Achievement Test (OAT) and fourth graders were evaluated with the Ohio Proficiency Test (OPT). One hundred and eighty-five students had scores from both before and after Fast ForWord use and were included in this study. Students were in the third and fourth grades and at-risk for academic failure—91% of students were not meeting proficiency on the OAT or OPT. School personnel administered the assessments and reported scores for analysis.

Implementation

At each participating school, 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 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 Sequence¹ and Trog Walkers²: 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 Farm¹: 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 Identification¹, Polar Cop², and Treasure in the Tomb²: 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 Match¹ and Bug Out²: 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 Words¹: 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 Builder¹: 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 Commander¹: 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 Stories²: Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

Scrap Cat³: 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 participant can click a button to hear any word and see it defined. This exercise trains decoding, vocabulary, and word recognition skills.

Canine Crew³: 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.

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.

*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

All students were evaluated with the Ohio Achievement Test (OAT) or the Ohio Proficiency Test (OPT) in October 2003, before Fast ForWord use, and again after participation on the Fast ForWord products in March of 2004. Third graders in Ohio are assessed with the Ohio Achievement Test, a test of reading ability. Fourth grade students are evaluated with the OPT. The OAT and the reading portion of the OPT were used for analysis in this study.

Ohio Achievement Test (OAT): The OAT for third grade students is designed to measure four of the five standards in Ohio's Grade 3

Academic Content Standards for Reading: Acquisition of Vocabulary, Reading Process, Reading Applications: Informational Text, and Reading Application: Literary Text.

Ohio Proficiency Test (OPT): The OPT tests are criterion-referenced, and compare the performance of the students to Ohio's selected curriculum in five areas: reading, math, citizenship, science, and writing. Test items include multiple choice, short answer, and extended response style questions.

Scores on the OAT and OPT are reported in terms of scale scores. The Ohio State Board of Education has established performance standards (cut scores) based on these scores. These standards divide test scores into performance levels ranging from Limited/Below Basic to Advanced. The established proficiency standard (performance level for Proficient) for the Ohio Achievement Test for 3rd graders is a scale score of 400. The proficiency standard for Reading for 4th grade students is a scale score of 217.

Analysis

Scores were reported in terms of scale scores. Data were analyzed using 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 2003 – 2004 school year, the Washington Local School District chose to use a combination of the 100-Minute Fast ForWord Language Protocol, the 50- and 90-Minute Fast ForWord Language to Reading Protocols, and the 48- and 90-Minute Fast ForWord to Reading 3 Protocols. These protocols call for students to use the products for 48, 50, 90 or 100 minutes a day, five days per week for four to twelve weeks. Almost all of the students used the Fast ForWord Language product and completed an average of 71% of the product content after 20 days of participation. Detailed product use by product is shown in Table 1.

Figures 1-3 show the average daily progress through the Fast ForWord Language, Fast ForWord Language to Reading, and Fast ForWord to Reading 3 product exercises for students who used the products and 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 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
Fast ForWord Language	183	20	39	71%	59%
Fast ForWord Language to Reading	51	20	42	60%	53%
Fast ForWord to Reading 3	22	12	31	25%	37%

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 and participation level.

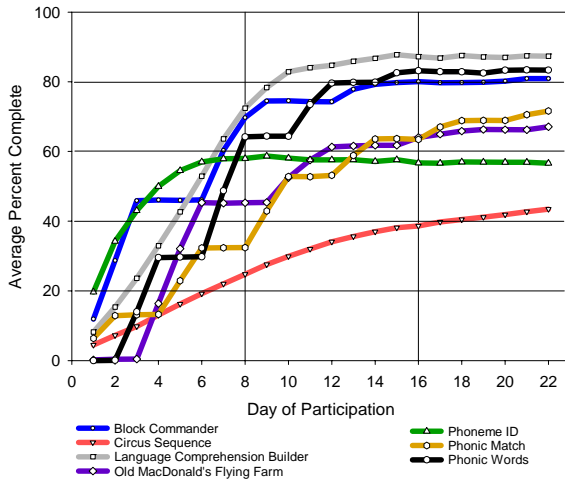


Figure 1. Average daily progress through the Fast ForWord Language product exercises. Results from 183 students are shown.

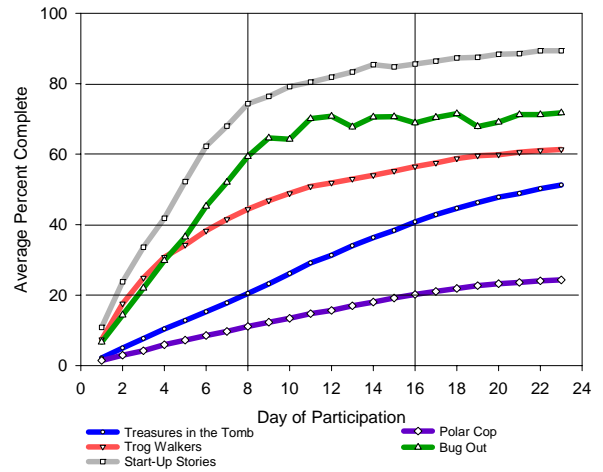


Figure 2. Average daily progress through the Fast ForWord Language to Reading product exercises. Results from 51 students are shown.

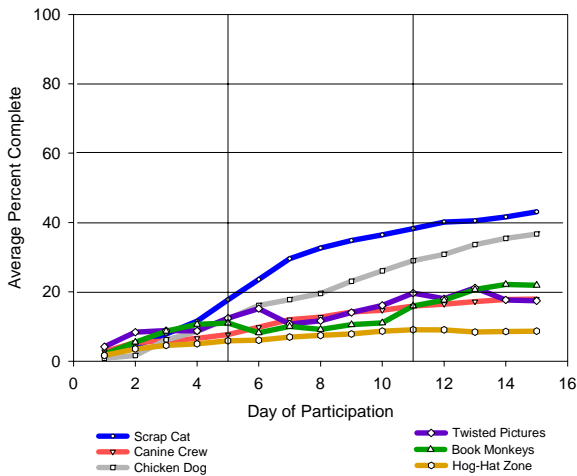


Figure 3. Average daily progress through the Fast ForWord to Reading 3 product exercises. Results from 22 students are shown.

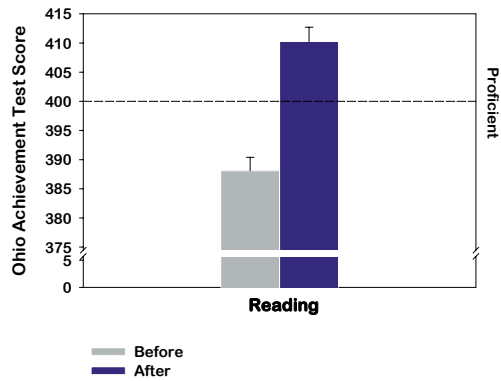


Figure 4. Students, on average, made significant improvements in reading achievement after Fast ForWord use and moved into the proficient range of reading as measured by the OAT. Results from 42 students are shown.

Assessment Results

The OAT and OPT were used to evaluate the reading achievement of students before and after Fast ForWord use. Students were assessed in October of 2003 and again five months later in March of 2004.

Ohio Achievement Test (OAT): Before participating on the Fast ForWord products, the average OAT score for the third graders was 388 which was below the proficiency standard for the Ohio Achievement Test, and 83% were at a performance level of Basic or

below. After Fast ForWord use, students made significant gains and moved well into the Proficient range on reading achievement with an average score of 410 (Figure 4; Table 2). In terms of performance levels, 85% of third grade students improved at least one level, and 91% of these students reached Proficient or higher after Fast ForWord use. Table 3 shows the performance level breakdown for before and after Fast ForWord participation. In this analysis of at-risk third graders, the total number of students who met or exceeded proficiency after Fast ForWord participation was 78%, compared to a district average of 85% and an Ohio state average of 78%.

Ohio Proficiency Test (OPT): Fourth grade students overall were performing in the Basic range of reading achievement before Fast ForWord use. After

participation, students made significant improvements and moved closer to the Proficient range (Figure 5). Looking at individual performance levels, nearly half (49%) of the fourth grade students who were not meeting proficiency increased one or more levels after Fast ForWord use, and 43% of fourth graders who were at Basic improved to Proficient (Table 4).

	n	Before		After		t-statistic
		Mean	SE	Mean	SE	
3 rd Grade	42	388.1	2.2	410.2	2.4	9.4*
4 th Grade	143	204.4	0.8	212.1	1.1	7.3*

Table 2. On average, students who used the Fast ForWord products made significant improvements in reading achievement on the OAT and OPT. * $p < 0.05$.

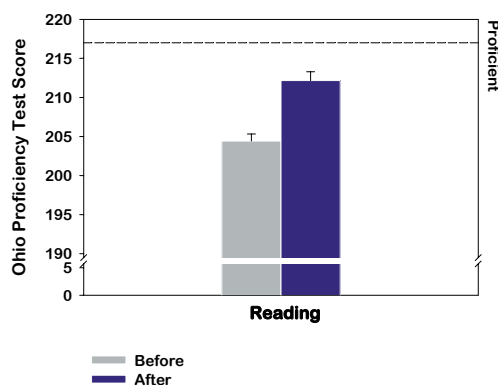


Figure 5. On average, fourth grade students who used the Fast ForWord products made significant gains in reading achievement. Results from 143 students are shown.

3 rd Graders	Performance Level				
	Limited	Basic	Proficient	Accelerated	Advanced
Before Fast ForWord	14	21	7	0	0
After Fast ForWord	2	7	18	11	4

Table 3. Third grade performance levels on the Ohio Achievement Test before and after Fast ForWord use. Eighty-five percent of students improved one or more levels; 91% were proficient after Fast ForWord participation.

4 th Graders	Performance Level			
	Below Basic	Basic	Proficient	Advanced
Before Fast ForWord	34	101	8	0
After Fast ForWord	20	69	54	0

Table 4. Fourth grade performance levels on the OPT before and after Fast ForWord use. Forty-nine percent of students performing at Below Basic or Basic levels improved one or more levels.

DISCUSSION

During the 2003 – 2004 school year, third and fourth grade students used the Fast ForWord products. On average, third grade students made significant improvements on the Ohio Achievement Test, with students improving their average score by 22 points. The group of fourth graders also made significant improvements on the OPT with scores improving by 8 points and 37% who were Basic or below meeting proficiency after participation on the Fast ForWord products. These findings demonstrate that, within the Washington Local 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 instructions, 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 Washington Local School District made significant gains in their reading achievement. This suggests that using the Fast ForWord products strengthened the students' foundational skills and helped them benefit more from the classroom curriculum.

Notes:

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