

# Improved Academic Achievement by Students in the Hamilton County School District who used Fast ForWord<sup>®</sup> Products

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## ABSTRACT

**Purpose:** This study investigated the effects of the Fast ForWord products on the reading and academic achievement 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 state assessments. **Participants:** Study participants were elementary school students who were attending Lakeside Academy in the Hamilton County School District in Chattanooga, TN. **Materials & Implementation:** Following staff training on the Fast ForWord products, a group of students used the products during the 2004-2005 school year. Before and after Fast ForWord participation, student academic performance was evaluated with the Tennessee Comprehensive Assessment Program (TCAP). **Results:** Following Fast ForWord product use, 90% of participants met Tennessee performance standards in Reading and 94% met performance standards in Math.

**Keywords:** Tennessee, elementary school, urban district, observational study, Fast ForWord Language, Fast ForWord Language to Reading, Tennessee Comprehensive Assessment Program (TCAP).

## 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 Hamilton County 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 academic 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 at improving the academic achievement of students.

## METHODS

### Participants

Located in southeast Tennessee along the Tennessee River, Chattanooga is the largest city in Hamilton County. The Hamilton County School District is a pre-Kindergarten to twelfth grade district of 81 schools and over 40,000 students. During the 2004-2005 school year, Lakeside Academy chose to use the Fast ForWord products and participate in the study reported here. Lakeside Academy has a student population of approximately 500 in Kindergarten through fifth grade.

Study participants were 78 students who were in the fourth or fifth grade; average grade level was 4.2. Student academic achievement was evaluated with the Tennessee Comprehensive Assessment Program (TCAP) before and after Fast ForWord participation. School personnel administered the assessments 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 Hamilton County 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<sup>1</sup> and Trog Walkers<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.

*Old MacDonald's Flying Farm<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 a change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

*Phoneme Identification<sup>1</sup>, Polar Cop<sup>2</sup>, and Treasure in the Tomb<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. *Polar Cop* also develops sound-letter correspondence skills. *Treasure in the Tomb* also develops grapheme recognition.

*Phonic Match<sup>1</sup> and Bug Out<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 *Bug Out!* exercise develops skill with sound-letter correspondences as well as working memory.

*Phonic Words<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.

*Language Comprehension Builder<sup>1</sup>*: 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<sup>1</sup>*: 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<sup>2</sup>*: Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

### Assessments

Students were evaluated with the Tennessee Comprehensive Assessment Program (TCAP) before and after Fast ForWord participation. The TCAP is administered in April of each school year and scores were available from the 2003, 2004, and 2005 administrations. The 2003 and 2004 administrations were before Fast ForWord participation; the 2005 administration was after Fast ForWord participation.

**Tennessee Comprehensive Assessment Program (TCAP):** The TCAP is a multiple choice assessment that measures student achievement in Reading, Language Arts, Mathematics, Science and Social Studies. It contains norm- and/or criterion-referenced items that are aligned with Tennessee content standards and has three performance levels to measure student proficiency according to state

<sup>1</sup> Exercise from the Fast ForWord Language product.

<sup>2</sup> Exercise from the Fast ForWord Language to Reading product.

curriculum standards: Below Proficient, Proficient, and Advanced. Students in grades 3-8 take the assessment each spring. For the 2003 and 2004 administrations of the TCAP, proficiency levels were determined for students in 3<sup>rd</sup>, 5<sup>th</sup>, and 8<sup>th</sup> grades. For the 2005 administration of the TCAP, proficiency levels were determined for students in 3<sup>rd</sup> – 8<sup>th</sup> grades.

The 2003 TCAP was norm-referenced. Performance levels were based upon specific cut scores (e.g. the minimum score (cut score) required for a performance level of Proficient in Reading for a third grader on the 2003 TCAP is a scale score of 615). Performance levels were only available for students in the 3<sup>rd</sup>, 5<sup>th</sup>, and 8<sup>th</sup> grades. The 2004 version of the TCAP was both norm- and criterion-referenced, bridging the change from the norm-referenced 2003 version to the criterion-referenced 2005 version. 2003 cut scores were used to determine performance level. Beginning with the 2004-2005 school year, the TCAP included only criterion-referenced items, and therefore did not report scores in terms of NCE's. This new version also used a different scale. However, performance levels were available with the new cut scores.

**Analysis**

Scores were reported in terms of scale scores, normal curve equivalents (NCE) and/or performance levels. Because different versions of the TCAP were used between the pre-Fast ForWord and post-Fast ForWord TCAP administrations, and different scores were available, comparisons of the pre- and post-

participation performance levels were used for the analysis.

**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 and attendance level). During the 2004-2005 school year, the Hamilton County School District chose to use the 50-Minute Fast ForWord Language and Fast ForWord Language to Reading Protocols. These protocols called for students to use the products for 50 minutes a day, five days per week, for eight to twelve weeks. 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 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	Attendance Level
Fast ForWord Language	78	28	60	85%	91%	72%
Fast ForWord Language to Reading	72	26	128	69%	85%	43%

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.

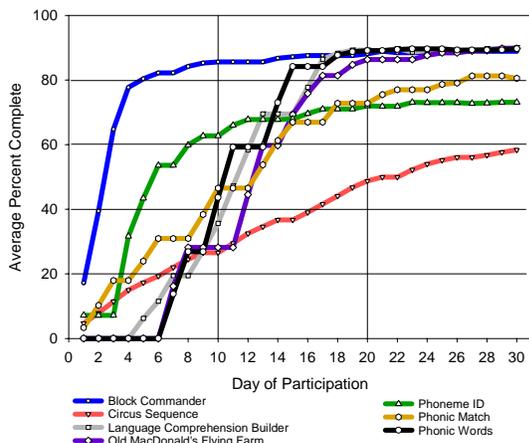


Figure 1. Average daily progress through the Fast ForWord Language product exercises. Results from 78 students are shown.

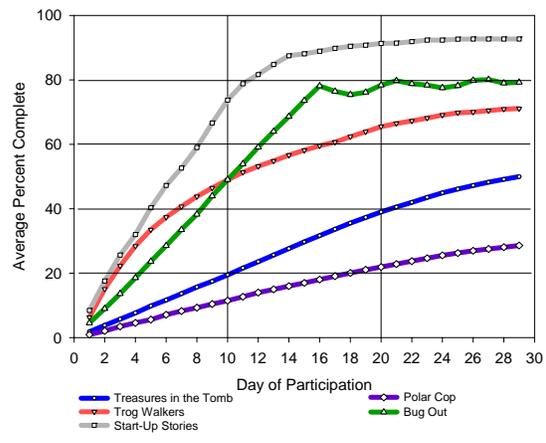


Figure 2. Average daily progress through the Fast ForWord Language to Reading product exercises. Results from 72 students are shown.

## Assessment Results

Tennessee Comprehensive Assessment Program (TCAP): TCAP scale scores from three school years (2002-2003, 2003-2004, and 2004-2005) were available. The 78 fourth and fifth grade students included in this study used Fast ForWord during the 2004-2005 school year and had available TCAP scores from before and after product use. These TCAP scores were converted into the corresponding performance levels.

Performance levels were available for 3<sup>rd</sup>, 5<sup>th</sup>, and 8<sup>th</sup> graders who took the TCAP in 2003. Using the same cut scores for the 3<sup>rd</sup>, 5<sup>th</sup>, and 8<sup>th</sup> graders who took the TCAP in 2004 gave initial (pre-participation) performance levels for students who were 4<sup>th</sup> or 5<sup>th</sup> graders during the 2004 – 2005 school year: initial performance levels for the fourth graders were from when they were third graders the year preceding Fast ForWord use (2004) while initial performance levels for the fifth graders were from were also from the year they were third graders – two years preceding Fast ForWord use (2003).

Reading and Language Arts were reported as separate scores for the 2003 and 2004 TCAP. In the 2005 TCAP, they were combined into one subtest: Reading/Language Arts. When comparing the performance levels from before Fast ForWord and after Fast ForWord use, the 2003 or 2004 Reading results were compared to the 2005 Reading/Language Arts results.

Before Fast ForWord use, 73% of participants were at Proficient or higher on the TCAP Reading assessment. After using products, this number rose to 90% (Table 2). For the Math assessment, 88% of students were at Proficient or higher before Fast ForWord participation, increasing to 94% following product use (Table 3).

Reading	n	Performance Level		
		Below Proficient	Proficient	Advanced
Before	78	26.9	51.3	21.8
After	78	10.3	52.6	37.2

Table 2. The percentages of students at each performance level for the Reading assessment before and after Fast ForWord participation.

Math	n	Performance Level		
		Below Proficient	Proficient	Advanced
Before	78	11.5	59.0	29.5
After	78	6.4	62.8	30.8

Table 3. The percentages of students at each performance level for the Math assessment before and after Fast ForWord participation.

## DISCUSSION

During the 2004-2005 school year, students in the Hamilton County School District used the Fast ForWord products and participated in the study reported here. On average, students made impressive gains in academic achievement after Fast ForWord product use. The percentage of students meeting Tennessee Reading performance standards rose from 73% to 90% with over one-third of the students reaching the Advanced level. Students made similar gains in the Math assessment with 94% of students meeting state standards after Fast ForWord use. These findings demonstrate that, within the Hamilton County 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 Hamilton County School District made substantial gains in their reading achievement and mathematical ability. 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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