Improved Reading Skills by Students in the Petal School District who used Fast ForWord® Products

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 multiple school study using a state assessment test. **Participants:** Study participants were elementary and middle school students attending schools in the Petal School District, in Petal, Mississippi. **Materials & Implementation:** Before and after participation on the Fast ForWord products, students were evaluated with the Mississippi Curriculum Test. **Results:** Students, on average, made gains on both Reading and Language subtests that exceeded the predicted gains set forth by the Mississippi Curriculum Test prediction model. These gains resulted in 29% of students increasing their level of reading achievement by one or more levels and 51% of students increasing their level of language achievement by one or more levels.

Keywords: Mississippi, elementary school, middle school, rural, observational study, Fast ForWord Language, Fast ForWord Middle & High School, Fast ForWord Language to Reading, Mississippi Curriculum Test (MCT).

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 Petal 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 reading skills of students in a school setting. In this study, commercially available computer-based products (Fast ForWord Language, Fast ForWord Middle & High School and Fast ForWord Language to Reading) were used to evaluate the effectiveness of this approach at improving the reading skills of students.

METHODS

Participants

The Petal School District, located in Forrest County Mississippi, is a rural district with four campuses serving nearly 4,000 students in grades K-12. The district's commitment to the advancement of its students was recognized when it received the 2005 state Civic Star Award, given to districts that have partnered with their communities to develop and implement innovative programs ensuring advancement for all students.

Two schools within the district, W.L. Smith Elementary School and Petal Middle School, participated in the current study. Eighty-five students from these two schools used Fast ForWord products during the 2004-2005 school year. All but one of the students had assessment scores available from before and after Fast ForWord participation. Reading and language proficiency were measured using the Mississippi Curriculum Test (MCT), which was administered in May, 2004 and again in May, 2005. 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 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 differences between these products, all help develop certain critical skills as detailed in the following exercise descriptions.

Circus Sequence[1], Sweeps[2], and Trog Walkers[3]: 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] and Streams[2]: 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], IDs[2], Polar Cop[3], and Treasure in the Tomb[3]: 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], Matches[2], and Bug Out[3]: Students choose a square on a grid and hear a sound or word.

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[1] Exercise from the Fast ForWord Language product.
[2] Exercise from the Fast ForWord Middle & High School product.
[3] Exercise from the Fast ForWord Language to Reading product.

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] and Cards[2]: 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.

Stories[2] and Start-Up Stories[3]: Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

Assessments

Students had their reading and language abilities assessed with the Mississippi Curriculum Test in May, 2004, before Fast ForWord participation. Assessment was repeated in May, 2005, after Fast ForWord participation.

Assessment name: The Mississippi Curriculum Test measures a student's proficiency in the state standards for reading, language and mathematics. The Reading portion of the test measures semantic and syntactic knowledge, along with phonetic structure, vocabulary, and comprehension. The Language component focuses on editing, spelling, sentence structure and semantics

Analysis

Scores were reported in terms of scaled scores. Scaled scores can be translated into four proficiency levels:

Minimal, Basic, Proficient and Advanced. Proficiency levels were analyzed to investigate the movement of students between levels. Scaled scores for 2005 were then compared to scores predicted by the Mississippi Curriculum Test prediction model, a model that uses scores from one year to predict performance the next year. All analyses used a p-value of less than 0.10 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 (attendance and participation level). During the 2004–2005 school year, the Petal School District chose to use a combination of the 50-, 75-, and 100-minute protocols for the Fast ForWord Language product, the 48 and 90-minute protocols for the Fast ForWord Middle & High School product and the 50- and 90-minute protocols for the Fast ForWord

Language to Reading product. These protocols call for students to use the products for 48, 50, 75, 90, or 100 minutes a day, five days per week for four to twelve weeks. The forty-five students from W.L. Smith Elementary began with the Fast ForWord Language product while the forty students from Petal Middle School began with the Fast ForWord Middle & High School product. Both groups of students went on to use the Fast ForWord Language to Reading product. Detailed product use is shown in Table 1.

Figures 1 through 3 show the average daily progress through the exercises in the Fast ForWord Language, Fast ForWord Language to Reading and Fast ForWord Middle & High School products 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.

School	Fast ForWord Product	Number of Students	Number of Days	Calendar Days	Percent Complete	Participation Level	Attendance Level
W.L. Smith Elementary School	Language	45	30	57	76	96	73
	Language to Reading	45	13	27	35	94	65
Petal Middle School	Middle & High School	40	26	45	82	99	82
	Language to Reading	40	28	45	66	96	86

Table 1. Usage data showing the number of students who used each Fast ForWord product along with group averages for the number of days of product use, calendar days between start and finish, percentage of content completed, participation level, and attendance level.
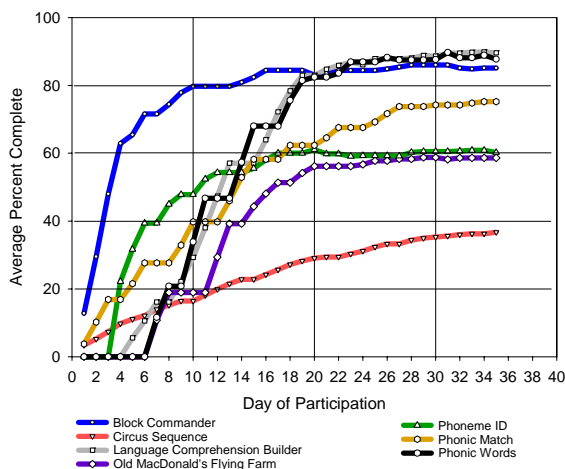

Figure 1. Average daily progress through the Fast ForWord Language product exercises. Results from 45 students are shown.
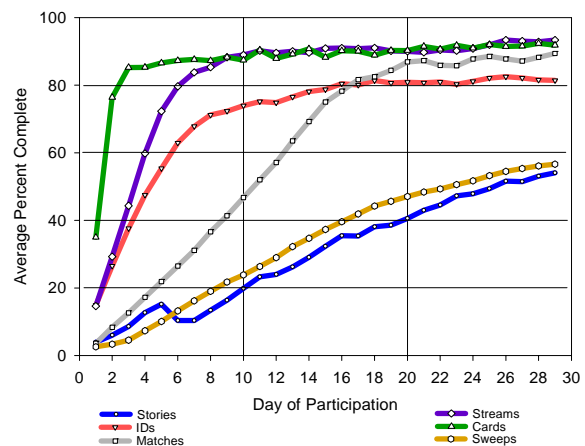

Figure 2. Average daily progress through the Fast ForWord Middle & High School product exercises. Results from 40 students are shown.
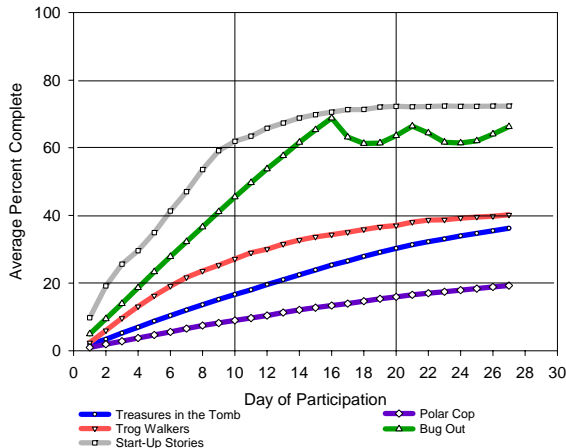
Figure 3. Average daily progress through the Fast ForWord Language to Reading product exercises. Results from 85 students are shown.

Assessment Results

Mississippi Curriculum Test

The Mississippi Curriculum Tests were administered in May 2004 and again in May 2005, after Fast ForWord participation, and Reading and Language sub-test results were reported for analysis. Scores were available for 44 third, fourth and fifth graders at W.L. Smith Elementary School and for 40 sixth, seventh and eighth graders at Petal Middle School.

Students at W.L. Smith Elementary showed progress on both the Reading and Language portions of the test. Reading scores indicate that the number of students performing at the Minimal and Basic levels remained constant or decreased while the number of those performing at Proficient and Advanced levels remained constant and increased, respectively. Twenty-five percent of the students increased their reading proficiency by at least one level.

Language scores also reflect increased proficiency, with 61.4% of students increasing by one or more levels. All of the students who were performing at the Minimal level in 2004 had progressed to a higher level by 2005. The number of students at the Basic level dropped substantially while the number of those performing at the Proficient level increased. Finally, no students reached Advanced Proficiency in 2004 but by 2005, 9.1% were performing at this level (Table 2).

Petal Middle School students also showed gains from 2004 to 2005 on both Reading and Language. The number of students at the Minimal and Basic levels dropped while the number achieving Proficient levels increased across both content areas. The number of students performing at the Advanced level tripled on the Reading test (Table 3). Reading proficiency levels increased for 32.5% of the students and Language levels increased for 40.0% of students.

W L Smith Elementary	Reading				Language			
	Minimal	Basic	Proficient	Advanced	Minimal	Basic	Proficient	Advanced
2004	2.3%	18.2%	77.3%	2.3%	4.5%	84.1%	11.4%	0%
2005	2.3%	13.6%	77.3%	6.8%	0%	34.1%	56.8%	9.1%

Table 2. For students at W.L Smith Elementary School, proficiency levels on the MCT advanced following Fast ForWord participation.

Petal Middle School	Reading				Language			
	Minimal	Basic	Proficient	Advanced	Minimal	Basic	Proficient	Advanced
2004	12.5%	37.5%	47.5%	2.5%	10%	72.5%	17.5%	0%
2005	10.0%	25.0%	57.5%	7.5%	0%	65%	35%	0%

Table 3. For students at Petal Middle School, proficiency levels on the MCT advanced following Fast ForWord participation.

Figures 4 and 5 show gains for each school on both the Reading and Language portions of the MCT. Scores are represented as scaled scores.

Some degree of improvement on the Mississippi Curriculum Test is expected from year to year. The Mississippi Curriculum Test prediction model predicts scores for subsequent year tests based on performance from the prior year. Predictions are based upon a student's Reading, Math, and Language scores. This model was applied to students in the current study using their 2004 Reading and Language scores. State averages were used for predicting Math performance because Math scores were unavailable for analysis. Although this introduces an error into the model, it was considered acceptable because of the relatively small impact of the Math scores on the Reading and Language models.

Actual gains after Fast ForWord participation exceeded predicted gains for all test results, except

Petal Middle School Language results, which were on par with the predicted results. The difference in actual versus predicted gains for W.L. Smith Elementary School's Language scores and Petal Middle School's Reading scores are statistically significant at a 90% confidence level (Table 4, Figures 4 and 5).

School	Test	N	2004		2005		Actual Gain		Expected Gain
			Mean	SE	Mean	SE	Mean	SE	Mean
W L Smith	Reading	44	471.2	5.06	496.1	5.2	24.9	6.0	20.8
	Language	44	452.6	4.0	502.6	4.5	50.0	4.4	41.1
Petal Middle	Reading	40	517.8	5.5	546.7	5.5	28.8	6.1	18.0
	Language	40	517.7	5.2	535.8	3.9	18.2	4.7	18.4

Table 4. In most cases, gains exceeded expected gains. The difference between the actual and expected gains for W.L. Smith Language scores and Petal Reading scores is statistically significant. p< 0.10.
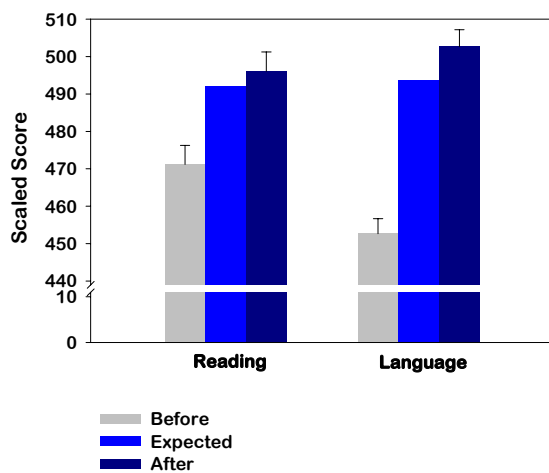

Figure 4. Students from W. L. Smith Elementary School made gains following Fast ForWord participation that exceeded expected gains. Results from 44 students are shown.
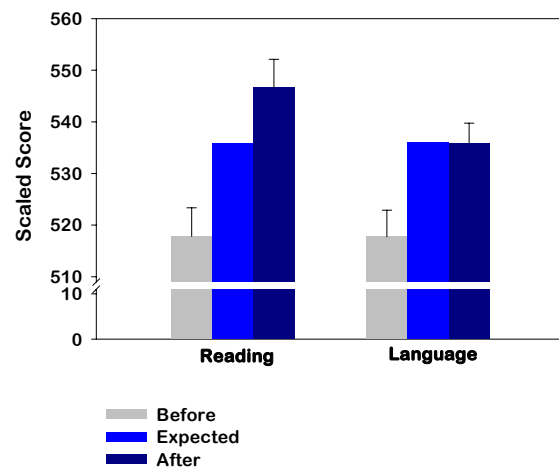

Figure 5. Following Fast ForWord participation, Petal Middle School students made reading gains that exceeded predicted gains. Results from 40 students are shown.

DISCUSSION

Students in the Petal School District who used Fast ForWord products became increasingly proficient in the reading and language standards outlined by the Mississippi Department of Education. Twenty-nine percent of the students increased their level of reading proficiency and 51% increased their level of language proficiency. The gains that students made exceeded expectations on three comparisons (W.L. Smith Elementary School Reading and Language, Petal Middle School Reading) and met expectations in one case (Petal Middle School Language). These findings demonstrate that, within the Petal School District, an optimal learning environment coupled with a focus on cognitive and early reading skills helped 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 Petal School District made gains in their reading and language performance that generally exceeded the expected gains. This suggests that using the Fast ForWord products strengthened the students' foundational skills and helped them benefit more from the classroom curriculum.

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