Improved Reading Achievement and Language Skills by Students in the Marion County Public Schools who used Fast ForWord® Products and/or Scientific Learning Reading Assistant: 2010 - 2011

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord products and the Scientific Learning Reading Assistant software on the reading achievement of middle and high school students who used the products within the curriculum in a school setting.

Results: After Fast ForWord participation, students who were at Level 1 and Level 2 on the 2010 FCAT Reading test made statistically significant improvements on their 2011 FCAT Reading Developmental Scale Scores with an increase that was greater than expected by a statistically significant amount (173 vs 115); 60% of the students made Annual Learning Gains.

Study Design & Participants: The design of this study was a multi-school observational study using high stakes and nationally-normed assessments. The 443 students in the study used Fast ForWord products and/or Reading Assistant software and were initially at FCAT Reading Level 1 or 2. The students attended middle and high schools in the Marion County Public Schools in Ocala, Florida, and most of them were eligible for Exceptional Student Education services.

Materials & Implementation: Following staff training on the Fast ForWord products, the students used the Fast ForWord products and/or Scientific Learning Reading Assistant software during the 2010-2011 school year and had their reading and language abilities evaluated before and after participation with the Florida Comprehensive Achievement Test (FCAT) and/or Reading Progress Indicator (RPI).

Keywords: Florida, middle school, high school, rural district, observational study, Special Education, Fast ForWord Literacy, Fast ForWord Literacy Advanced, Fast ForWord Reading Prep, Fast ForWord Reading Levels 1-4, Scientific Learning Reading Assistant, Florida Comprehensive Achievement Test (FCAT), and/or Reading Progress Indicator.

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).

Further research has demonstrated that the use of an optimal learning environment with a focus on reading and cognitive skills not only benefits the

auditory processing and language skills of school children who have specific language impairments, but can benefit the reading achievement of a wide range of students.

The Marion County Public Schools were 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 their students. In this study, commercially available computer-based products (Fast ForWord Literacy, Fast ForWord Literacy Advanced, Fast ForWord Reading Prep, Fast ForWord Reading Levels 1-4) were used to evaluate the effectiveness of this approach for improving the reading and language achievement of middle and high school students.

METHODS

Participants

Marion County, in central Florida, was established in 1844. Named after the American Revolutionary War hero, General Francis Marion, many of the early settlers were from South Carolina. The mostly rural county is just over an hour from several major cities including Tampa and Orlando, and has been one of the three fastest growing regions in the country.

The Marion County Public Schools serve approximately 42,000 students of which 60% are Caucasian, 19% are African American, and 15% are Hispanic. 54% of the students are eligible for free or reduced-price lunches, 6% are English language learners, and 16% receive services for special education.

During the 2010-2011 school year, five schools in the Marion County Public Schools used the Fast ForWord products and/or Scientific Learning Reading Assistant software and participated in the study reported here. The schools included three middle schools and two high schools.

This study focuses on 443 students who used the Fast ForWord and/or Scientific Learning Reading Assistant products for 5 or more days during the 2010-11 school year. All the students had scored Level 1 or Level 2 on the FCAT Reading in 2010 and most were eligible for Exceptional Student Education services. Before and after Fast ForWord participation, the students were assessed with the Florida Comprehensive Achievement Test (FCAT) and/or Reading Progress Indicator (RPI). 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 importance of guided oral reading practice for building reading fluency; 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 the online reporting tool, Scientific Learning® Progress Tracker, to monitor student performance; and techniques for measuring the gains students have achieved after Fast ForWord and Reading Assistant Expanded Edition participation.

Materials

The Fast ForWord products are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. Each product includes several exercises designed to build cognitive skills critical for all learning, such as attention and memory. These exercises simultaneously develop academic skills critical for reading, such as English language conventions, phonemic awareness, vocabulary, and comprehension.

Scientific Learning Reading Assistant is a computer-based tutor for guided oral reading. Combining advanced speech recognition technology with research-based interventions, Reading Assistant helps elementary and secondary students strengthen their reading fluency, vocabulary and comprehension.

Some of the primary skills developed by these products are outlined in Table 1. More detailed descriptions of the exercises and learning modes within each product can be found online at http://www.scientificlearning.com/exercises.

Primary Skills / Product Name	Listening Accuracy & Auditory Sequencing	Auditory Word Recognition	English Language Conventions	Following Directions	Listening Comprehension	Phonological Skills / Phonemic Awareness	Phonics / Word Analysis	Fluency	Vocabulary	Reading Comprehension
Fast ForWord Literacy	●	●	●	●	●	●			●	
Fast ForWord Literacy Advanced	●		●	●	●	●	●		●	
Fast ForWord Reading Prep				●		●	●			
Fast ForWord Reading Level 1					●	●	●	●	●	●
Fast ForWord Reading Level 2					●	●	●	●	●	●
Fast ForWord Reading Level 3						●	●	●	●	●
Fast ForWord Reading Level 4						●	●	●	●	●
Reading Assistant								●	●	●

Table 1: The Fast ForWord and Reading Assistant products work on numerous cognitive and early reading skills. The primary skills focused on by each product are noted in the table.

Assessments

Before and after Fast ForWord participation, student reading and language skills were assessed with the Florida Comprehensive Achievement Test (FCAT) and/or Reading Progress Indicator (RPI).

Florida Comprehensive Assessment Test (FCAT): The Reading and Mathematics portions of the FCAT are designed to assess student achievement of the high-order cognitive skills represented in the Sunshine State Standards (SSS). This is a criterion-referenced test. All students in Grades 3-10 take the FCAT in Reading and Mathematics in the spring of each year. The primary metrics for reporting student performance on the FCAT are the Scale Score and the Developmental Scale Score. The Developmental Scale Score is designed to increase from year to year as students increase their level of achievement.

Reading Progress Indicator (RPI): Reading Progress Indicator is a computerized assessment designed to rapidly measure the impact of the Fast ForWord products. It assesses a student's early reading skills including phonemic awareness, decoding, vocabulary, and comprehension.

Analysis

FCAT scores were reported in terms of Developmental Scale Scores and Achievement Levels. The analyses evaluated both student improvement on the Developmental Scale Score, and whether students met their Annual Learning Gains (ALG). In order for a student to meet Annual Learning Gains, a component in determining a school's grade, the Florida Department of Education requires students to meet one of the following three criteria:

1) Increase achievement level by one or more categories; or
2) If initial FCAT achievement level is 3, 4, or 5, maintain achievement level; or
3) If initial FCAT achievement level is 1 or 2, increase DSS score by an amount greater than the state-required threshold for their grade as shown in Table 2.

Grade	Expected Change in Reading Developmental Scale Score
6	133
7	110
8	92
9	77

Table 2: Expected change in Developmental Scale Score (DSS) varies by grade. Students who are Level 1 or Level 2 can make Annual Learning Gain by improving their DSS by more than the expected change.

The RPI scores were reported in terms of normal curve equivalents, scaled scores, grade equivalent scores, and percentile scores. The analysis was conducted using scaled scores and normal curve equivalents, however average scaled scores and NCE scores were converted to grade equivalents and percentiles for reporting purposes.

Data were analyzed using paired 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 and attendance levels). During the 2010 - 2011 school years, the Marion County Public Schools chose to use the 40-Minute protocols. This protocol calls for students to use the products for 40 minute a day, five days per week for nine to thirteen weeks. Detailed product use is shown in Tables 3 and 4.

2010 – 2011 Fast ForWord Use						
	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Literacy	314	39	96	67	88	66
Fast ForWord Literacy Advanced	132	34	71	59	97	80
Fast ForWord Reading Prep	25	20	45	89	98	72
Fast ForWord Reading Level 1	10	4	12	12	42	33
Fast ForWord Reading Level 2	24	13	25	53	97	87
Fast ForWord Reading Level 3	9	15	26	47	97	84
Fast ForWord Reading Level 4	1	--	--	--	--	--
Total	320	55	131	--	90	71

Table 3. Usage data showing the number of students who used the Fast ForWord products during the 2010 – 2011 school year, 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. Total values reflect the average total number of days that students used products. Note: Students often use multiple products.

2010 – 2011 Reading Assistant Use			
	Number of Students	Days Participated	Number of Calendar Days
Reading Assistant	329	11	81

Table 4. Usage data showing the number of students who used the Reading Assistant software during the 2010 – 2011 school year, along with group averages for the number of days participated and the number of calendar days between start and finish.

Assessment Results

Florida Comprehensive Achievement Test (FCAT):
Two hundred seventy-six students in 5th through 10th grades had FCAT Reading Developmental Scale Scores available from 2010 and 2011. On average, the students' scores increased 173 points during the year. The increase in score required to achieve Annual Learning Gain varies by grade and must exceed the expected change listed in Table 5; the average (weighted by grade) for the expected gain is 115. Overall, the difference between the average improvement (173 points) and the expected improvement (115 points) was statistically significant. An analysis by grade shows that for the 6th, 7th, and 8th grades, the students made substantial gains in their 2011 FCAT Reading scores (Figure 1) and the gains were greater than expected by a statistically significant amount (Table 5).

Grade	n	Mean Change	SE	Expected Change	t-statistic
5th	3	--	--	166	--
6th	132	180	22	133	2.1*
7th	46	231	39	110	3.1*
8th	67	198	32	92	3.3*
9th	24	1	64	77	-1.2
10th	4	--	--	77	--
Total	276	173	16.5	115	3.5*

*Table 5. Change in FCAT Reading DSS between 2010 and 2011, split by grade. Detailed results are not included for grades with fewer than five students. * $p < 0.05$.*

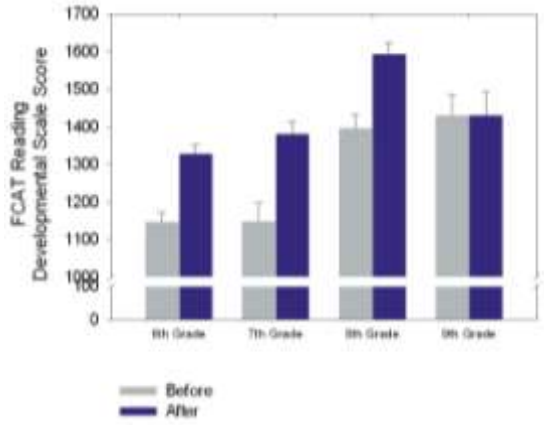

Figure 1. FCAT DSS for 2010 and 2011 for all grades with at least five students.

Level 1 and Level 2 students who increase their scores by more than the expected amount make Annual Learning Gains and positively contribute towards their school's grade. A majority of study participants (60%) made their ALG with the percentage ranging from 46% in 9th grade to 70% in 7th grade (Figure 2).

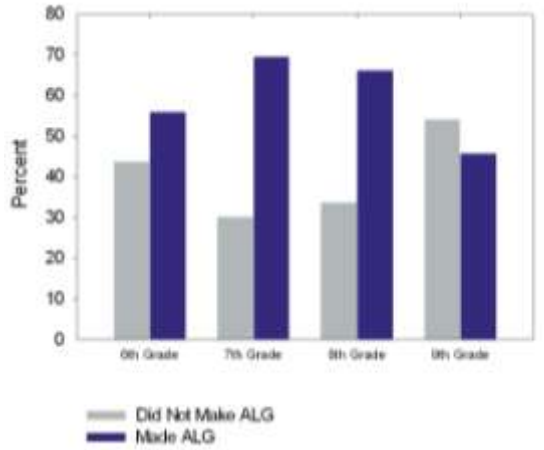

Figure 2. The percent of study participants contributing to their school's grade by making ALG in 2011 by either increasing their Achievement Level or by exceeding their expected gains.

Reading Progress Indicator (RPI): RPI was administered before students used the Fast ForWord products and then again, upon completion of each product. One hundred twenty-six students in fifth through twelfth grades had valid pre- and post-participation scores and are included in the RPI evaluation. Of the students, 85 (67%) showed improvement. The average grade level of the 126 students was 7.2 substantially higher than their initial skill level of 4.8. Following 3 ½ months of Fast ForWord participation, the students' skills had improved to the 5.3 level, an improvement of five months which corresponds to improving from the 8th percentile to the 13th percentile.

Correlation between FCAT and RPI: Eighty-six students in 6th – 10th grade had a 2011 FCAT Reading score and an RPI post-test from January 1st or later. Across grade levels, there was a statistically significant positive alignment between the students' RPI scaled score and FCAT Reading DSS with students who scored higher on RPI also receiving a higher FCAT Reading DSS. The correlation coefficient between the RPI and FCAT scores was 0.62 which is statistically significant ($p < 0.01$) (Figure 3).

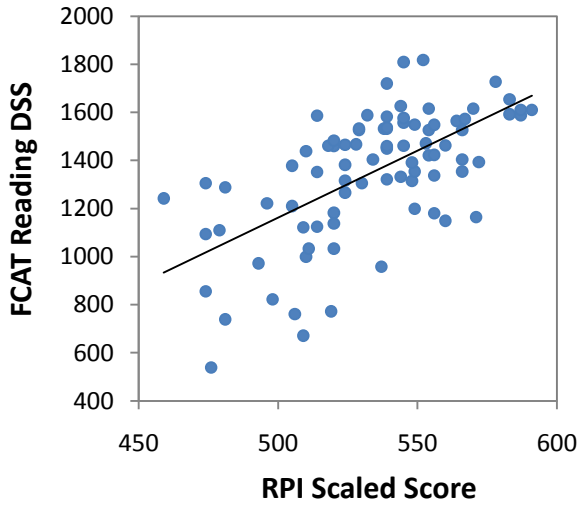

Figure 3. The relationship between the 2011 FCAT Reading DSS and the RPI Scaled Score is statistically significant ($p < 0.01$). Results from 86 students are shown here.

DISCUSSION

On average, during the 2010 – 2011 school year, Fast ForWord participants in the Marion County Public Schools significantly improved their reading achievement and language skills. Students were evaluated on the FCAT and RPI. The students were performing at FCAT Reading Level 1 and 2. Despite their history of struggles, the students made statistically significant improvements in their Developmental Scale Scores, with improvements ranging from 1 point (9th grade) to 231 points (7th grade).

These findings demonstrate that, within the Marion County Public Schools, an optimal learning environment coupled with a focus on cognitive and

early reading skills can help students attain a higher level of reading achievement and language skills.

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 Marion County Public Schools made significant gains in their reading achievement and language skills. These results replicate other studies and suggest 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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