Improved Reading Achievement by Students in the Clarke County School District who used Fast ForWord® Products: 2006 - 2011

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ABSTRACT

Purpose: This study investigated the effects of Fast ForWord products on the reading achievement of students who used the products within the curriculum in a school setting.

Results: During the 2010-2011 school year, students in the Clarke County School District who used Fast ForWord products made statistically significant gains in reading achievement. These results applied to both subgroups evaluated: Limited English Proficiency and students receiving Special Education services. Following Fast ForWord participation in 2010-2011, 55% of students who were not proficient in 2010 crossed the proficiency threshold in 2011. Longitudinal data show that students who initially started to use Fast ForWord products before the 2010-2011 school year made statistically significant gains in their reading achievement after their first year of product use and maintained the gains in following years, even continuing to improve their scores.

Study Design: The design of this study was a multiple school quasi-experimental study using high stakes tests.

Participants: The study had two parts: The participants included in the 2010-2011 analyses were 497 elementary and middle school students attending schools in the Clarke County School District in Athens, Georgia who had Criterion-Referenced Competency Test scores from 2010 and 2011. The longitudinal analysis included 1,061 students who had used the products in previous years and had CRCT scores available from 2006 through 2011.

Materials & Implementation: Before and after participation on Fast ForWord products, students were evaluated with the Criterion-Referenced Competency Tests (CRCT) and Reading Progress Indicator.

Keywords: Georgia, elementary school, middle school, urban, at-risk, quasi-experimental study, longitudinal study, Fast ForWord Language Basics, Fast ForWord Language v2, Fast ForWord Language to Reading v2, 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, Fast ForWord Reading Level 5, Criterion-Referenced Competency Tests (CRCT), 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).

The Clarke 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 the reading achievement of students in a school setting. In this study, commercially available computer-based products (Fast ForWord Language Basics, Fast ForWord Language v2, Fast ForWord Language to

Reading v2, 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, Fast ForWord Reading Level 5) were used to evaluate the effectiveness of this approach at improving the reading ability of elementary and middle school students. The Clarke County School District has implemented the Fast ForWord products since 2006. In January, 2011, six of the district's elementary schools that have been using Fast ForWord products were named as Georgia Title I Distinguished Schools for being Title I schools that have made Adequate Yearly Progress for three or more years consecutively. The school district was also named the winner of the "large" district category for Title I Distinguished Districts in the state of Georgia in November, 2010, based on the district's CRCT scores over the last few years.

METHODS

Participants

The Clarke County School District is located in the college town of Athens in northeastern Georgia. Athens has grown up around the University of Georgia and has a current population of approximately 175,000 people.

Serving nearly 12,000 students at 23 schools, Clarke County School District's mission is to prepare its students to be productive members of society by providing a challenging and meaningful education. Approximately 47% of the students in the district are African-American, 42% are Caucasian and 11% are Hispanic.

The Clarke County School District started using the Fast ForWord products during the 2006-2007 school year. Earlier reports have shown statistically significant improvements in achievement after using the products and the district was interested in continuing to track the impact of the products on new students as well as follow the continuing impact on students who had used the products during previous years.

Four hundred ninety-seven students in second through eighth grade from 10 schools took part in this study and had their reading achievement assessed before and after Fast ForWord participation. Scores from these students were analyzed for the 2010-2011 school year as well as longitudinally, starting from previous years. Students started using the Fast ForWord products during different school years, some starting as early as 2006.

Two assessments were used: Georgia's high stakes reading assessment, the Criterion-Referenced Competency Tests (CRCT) and Reading Progress Indicator. School personnel administered the assessments or monitored the administration 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. 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.

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 Language Basics	●									
Fast ForWord Language v2	●	●	●	●		●			●	
Fast ForWord Language to Reading v2	●		●	●	●	●	●		●	
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						●	●	●	●	●
Fast ForWord Reading Level 5						●	●	●	●	●

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

Assessments:
In the spring semesters of 2006-2011, students' reading achievement levels were evaluated with the reading portion of the Criterion-Referenced Competency Tests (CRCT). School personnel administered the assessment and reported the scores for analysis. Students' reading skills were also evaluated with Reading Progress Indicator.

Criterion-Referenced Competency Tests (CRCT): The CRCT is designed to measure how well students acquire the skills and knowledge described in the Georgia Performance Standards (GPS). The CRCT is given every spring to all students to grades 1-8. Students are tested in Reading, English Language Arts and Mathematics. A score of 800 indicates Proficiency.

Reading Progress Indicator: 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:
Criterion-Referenced Competency Test (CRCT) scores were reported in terms of scaled scores. The scaled scores were analyzed using paired t-tests and repeated measures. Reading Progress Indicator scores were reported in terms of normal curve equivalents, scaled scores, grade equivalent scores, and percentile scores. Scaled scores and normal curve equivalents were used to analyze Reading Progress Indicator data. Results were converted into grade equivalent scores and percentiles for reporting purposes. A p-value of less than 0.05 was 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 and attendance level). During the 2010-2011 school year, the Clarke County School District used the 30-, 40-, 50-, 75- and 90-Minute protocols for Fast ForWord products. These protocols call for students to use the products for 30, 40, 50, 75 or 90 minutes a day, five days per week for four to sixteen weeks. Table 2 shows product use data for all students who used the products during the 2010-2011 school year, regardless of which year they started the products. Note: Many students used multiple products.

Assessment Results

Criterion Referenced Competency Tests (CRCT):

For this report, scores were analyzed in two different ways: (1) 2010-2011 Results: An analysis of the impact on students who first started using the products during the 2010-2011 school year. The 2010 and 2011 scores were used as pre- and post-test scores. When available, data was disaggregated for various demographic groups. (2) Longitudinal Results: CRCT scores were available from 2006 to 2011. This allowed the analysis of longitudinal results for students who first used the products during prior school years.

Product Use: 2010 – 2011 School Year						
	Number of Students	**Days Participated**	**Number of Calendar Days**	**Percent Complete**	**Attendance Level**	**Participation Level**
Language Series						
Fast ForWord Language Basics	23	9	45	83	64%	85%
Fast ForWord Language v2	180	23	51	46	73%	92%
Fast ForWord Language to Reading v2	186	26	69	53	65%	85%
Fast ForWord Literacy	60	61	146	70	79%	97%
Fast ForWord Literacy Advanced	66	33	97	55	64%	86%
Reading Series						
Fast ForWord Reading Prep	166	22	70	74	75%	95%
Fast ForWord Reading Level 1	173	30	80	69	76%	94%
Fast ForWord Reading Level 2	141	36	90	57	68%	89%
Fast ForWord Reading Level 3	58	28	72	59	71%	90%
Fast ForWord Reading Level 4	21	36	113	27	61%	91%
Fast ForWord Reading Level 5	11	23	72	75	67%	99%
Total Fast ForWord Product Use	497	77	181	--	71%	91%

Table 2. 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. This table includes all students who used the products during the 2010-2011 school year, regardless of which year they started the products. Note: Students often use multiple products.

	n	**2010**		**2011**		**t-statistic**
		Mean	**SE**	**Mean**	**SE**	
All 2010-2011 Participants	205	800.3	1.2	808.9	1.3	7.3*
Students with Limited English Proficiency	23	794.7	2.9	804.9	3.8	3.4*
Students Receiving Special Education Services	52	792.5	2.2	801.4	2.8	3.5*

Table 3. CRCT Reading scale scores for Fast ForWord participants who started Fast ForWord participation during the 2010-2011 school year. Results are significant if the p-value is less than 0.05 (*).

(1) 2010-2011 Results: On average, after using Fast ForWord products during the 2010-2011 school year, students made statistically significant improvements on the CRCT Reading test ($t(204) = 6.3$; $p < 0.01$). See Figure 1 for these results. On average, students with Limited English Proficiency also made statistically significant gains in their

Reading scores, with the average score at the time of post-test exceeding the Proficiency threshold ($t(22) = 3.4$; $p < 0.01$). Students receiving Special Education Services showed similar statistically significant gains, also crossing the threshold ($t(51) = 3.5$; $p < 0.01$). See Figure 2 and Table 3 for the results on the demographic groups.

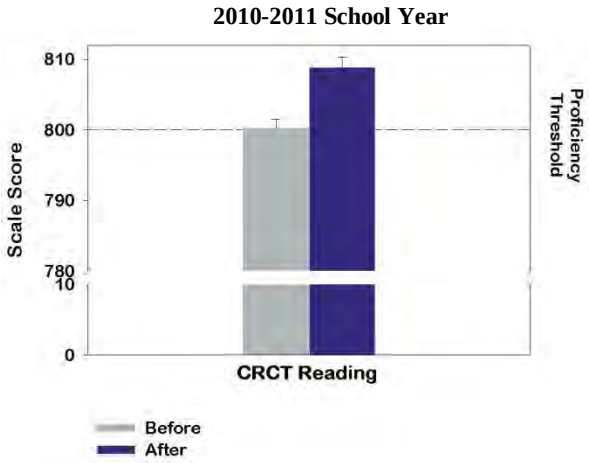

Figure 1. CRCT Reading scaled scores for Fast ForWord participants during the 2010-2011 school year. Students are considered proficient if they score better than 800 scale score points. Results are shown for the 205 students who started Fast ForWord participation in 2010.

(2) Longitudinal Results: CRCT Reading scores were available from 2006 through 2011for 137 students who started Fast ForWord products in 2006. These students show a steady increase in their scores, from their pre-test score in 2006 (796.6) to their most recent score in 2011 (813.1) with the mean score crossing the Proficiency threshold in 2007, the first year after the group used the products. All students who used products in 2006-2007 continued their participation on the products in at least one of the following school years. Of the 137 students, 100% used Fast ForWord products during the 2006-2007 school year, 65% continued product use in 2007-2008, 50% in 2008-2009, 11% in 2009-2010, and 15% in 2010-2011.

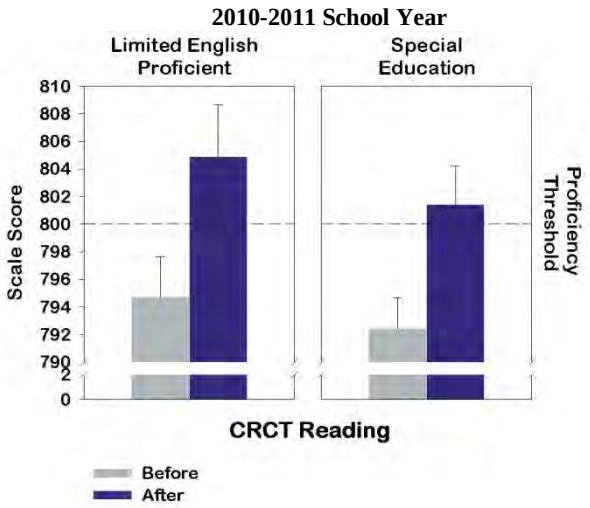

Figure 2. Students are considered proficient if they score more than 800 scale score points. CRCT Reading scale scores are shown for Fast ForWord participants with Limited English Proficiency and those receiving Special Education services. Results are shown from the 2010 and 2011 scores for 23 students and 52 students, respectively.

Longitudinal data were also analyzed for 81 students who started in 2007, 286 students who started in 2008, and 137 students who started in 2009. Data for 96 students who started in 2010 were also analyzed, looking back to the year 2006. All of these students had CRCT Reading test scores from 2006 through 2011, starting before the Fast ForWord products were used and continuing through product use and the year(s) after. Similar to the 2006 participants, all students who started to use products during these years continued their participation on the products in at least one of the following school years. Results consistently show that, on average, the students achieved higher scores in Reading after Fast ForWord participation. See Figure 3 and Table 4 for longitudinal results.

Since the CRCT is administered to students in $1^{st} – 8^{th}$ grade, students who have six years of data, and used the Fast ForWord products during the 2005-2006 or 2006-2007 school years must have been in early elementary school at the time of use while students who used the products during 2010-11 school years must have been in middle school at the time of use.

CRCT Proficiency Level Results: Students in Georgia are considered proficient in reading when they pass the proficiency threshold of 800 scale score points. Fifty-seven percent of the 2010-2011 Fast ForWord participants (117 of 205) were not proficient in 2010. Following Fast ForWord participation, 55% of the non-proficient students became proficient (64 of the 117).

Year of Test	First Year of Fast ForWord Implementation									
	2006 (n=137)		2007 (n=81)		2008 (n=286)		2009 (n=137)		2010 (n=96)	
	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error
2006	796.58	0.15	801.65	0.25	802.79	0.07	802.20	0.17	805.83	0.19
2007	804.03	0.13	803.16	0.26	801.75	0.09	798.51	0.16	806.93	0.22
2008	805.18	0.12	805.64	0.27	800.11	0.07	802.71	0.12	811.44	0.19
2009	806.36	0.14	810.60	0.33	807.11	0.08	795.38	0.12	806.46	0.18
2010	809.99	0.12	811.38	0.27	809.36	0.06	807.38	0.13	806.73	0.17
2011	813.12	0.13	815.72	0.23	815.62	0.07	807.15	0.12	813.69	0.18

Table 4. Longitudinal results, shown by which year the students started Fast ForWord participation. The shaded cells show the results from the years after implementation. For example, the 2007 scores are shaded for the students who started Fast ForWord participation in 2006.

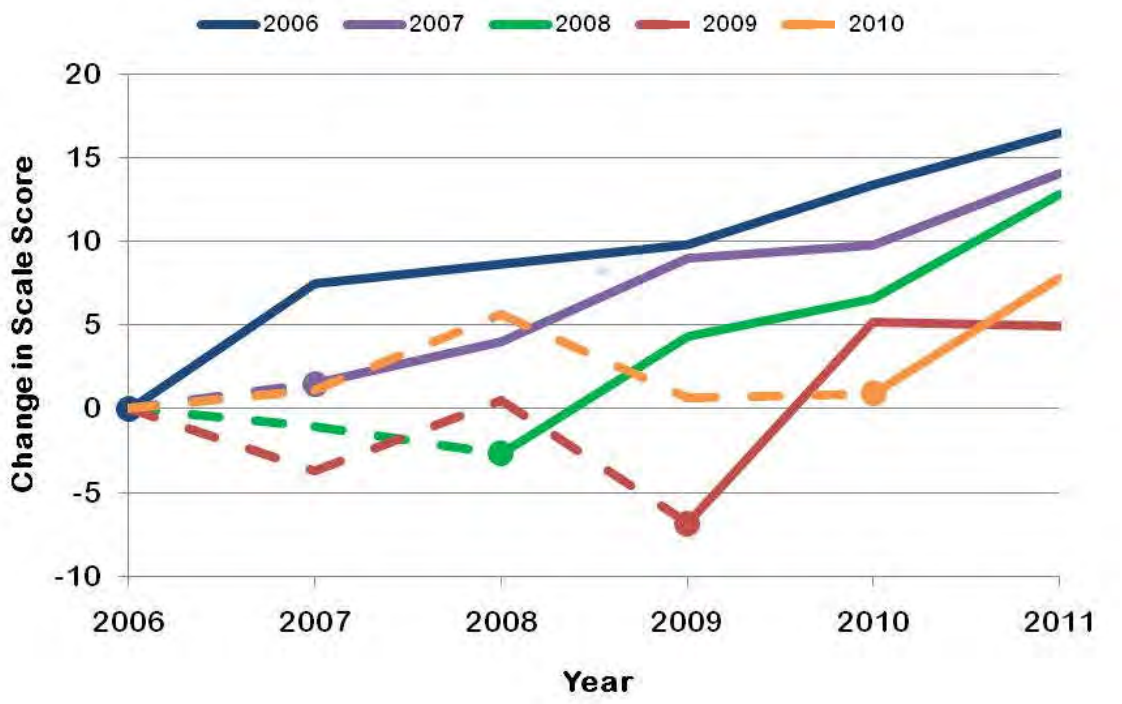

Figure 3. Scale scores from 2006-2011, each color represents a different initial Fast ForWord year and different grade level, with younger students starting in the earlier years. Lines are dotted prior to the use of Fast ForWord products and solid after Fast ForWord use.

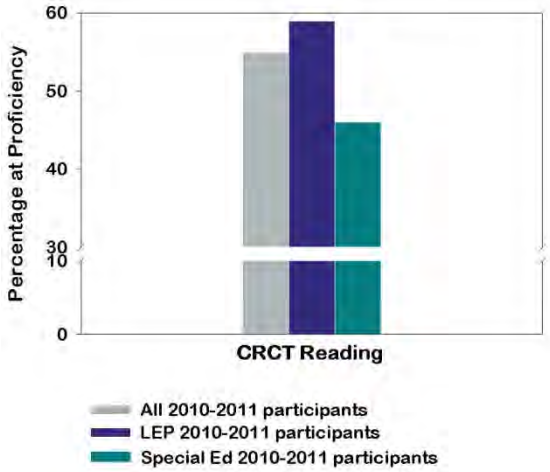

Figure 4. The percentage of non-proficient students reaching proficiency on the CRCT Reading scale scores after Fast ForWord participation reached 55%, 59%, and 46% for all 2010-2011 Fast ForWord participants, LEP participants from 2010-2011 and 2010-2011 participants receiving Special Education services, respectively.

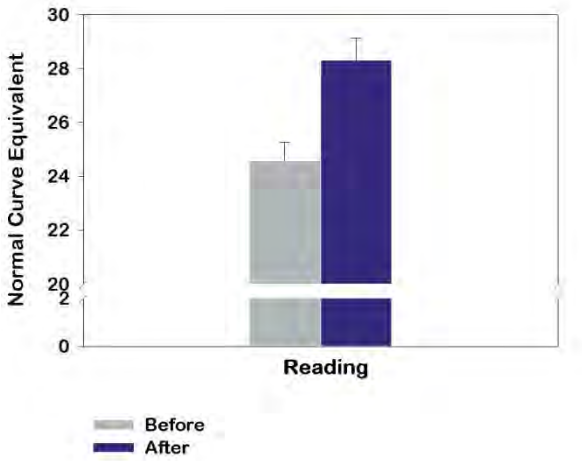

Figure 5. Reading Progress Indicator results for 388 students from 2010-2011.

Likewise, non-proficient students in the demographic groups also crossed the Proficiency threshold on the CRCT in 2011, with 59% (10 of 17) of students with Limited English Proficiency who were not proficient in 2010 becoming proficient in 2011 and 46% (19 of 41) of students receiving Special Education Services who were not proficient in 2010 becoming proficient in 2011. See Figure 4 for these numbers graphically.

Reading Progress Indicator:

Scores on Reading Progress Indicator were also analyzed for the students who first used the products during the 2010-2011 school year. On average, students who first used products during the 2010-2011 school year made statistically significant improvements in their reading skills ($t(387) = 4.0$; $p < 0.01$). This improvement translates to an increase from the 11th to the 15th percentile. See Figure 5 for Reading Progress Indicator results. Reading Progress Indicator results were not available for any subgroups.

DISCUSSION

Overall, students in the Clarke County School District made statistically significant gains in their reading achievement following Fast ForWord participation.

The group of students who started to use Fast ForWord products during the 2010-2011 school year made statistically significant improvements in 2011 on the Reading component of the Criterion-Referenced Competency Tests (CRCT) and on Reading Progress Indicator, with a majority of non-Proficient students crossing the CRCT threshold to Proficiency after using the products. Limited English Proficient students and students receiving Special Education services also achieved statistically significant improvements on the CRCT, suggesting that students of various abilities can benefit from the products.

Longitudinal results showed that not only did the improvements consistently occur immediately following Fast ForWord participation, but the improvements were further increased in the years that followed.

These findings show that Fast ForWord products have a significant, replicable impact on the reading proficiency of students in Clarke County and that an optimal learning environment coupled with a focus on cognitive and early reading skills can help students in Clarke County attain a higher level of reading achievement. It is of interest to note that the district's implementation of the Fast ForWord products in conjunction with the standard curriculum has earned the District the recognition of the state of Georgia as a Title I Distinguished District.

CONCLUSION

Language and reading skills are critical for all students, impacting the students' 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. During the 2010 – 2011 school year, students in the Clarke County School District who used Fast ForWord products made statistically significant gains in reading achievement. It was also shown that

students who used the Fast ForWord products in previous years made similar gains, and that in the years that followed, these gains were maintained or increased. These results applied to students of different grade levels as well as students in the Limited English Proficiency and Special Education subgroups, which supports other studies demonstrating that using Fast ForWord products strengthens foundational skills of students with various backgrounds and abilities and helps them benefit more from the classroom curriculum.

Notes:

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