Improved Reading Achievement by Students in the Everett Public Schools who used Fast ForWord® Products: 2006 - 2009

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ABSTRACT

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

Results: After Fast ForWord participation, the group of students made significant gains in reading achievement and continued to make statistically significant improvements two years later. By the end of the first year in which students started Fast ForWord participation, the number of Proficient students in 5^{th} – 10^{th} grade increased from 18% of the students in the study to 51% of the students in the study.

Study Design & Participants: The design of this study was a multi-school case study using high stakes assessments. Study participants were low-performing elementary and middle school students in the Everett Public Schools of Everett, Massachusetts.

Materials & Implementation: Following staff training on the Fast ForWord products, the students used the Fast ForWord products during the 2006-2009 school years and had their reading achievement evaluated annually with the Massachusetts Comprehensive Assessment System (MCAS).

Keywords: Massachusetts, elementary school, middle school, urban district, observational study, Fast ForWord Language Basics, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord Literacy, Fast ForWord Literacy Advanced, 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, Massachusetts Comprehensive Assessment System (MCAS).

INTRODUCTION

Numerous research studies have shown that cognitive and oral language skills are under-developed in struggling readers, limiting the students' 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 Everett Public Schools were interested in evaluating the ongoing 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 Language Basics, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord Middle & High School, Fast ForWord Literacy, Fast ForWord Literacy Advanced, and Fast ForWord Reading Levels 1 - 5) were used to evaluate the effectiveness of this approach for improving the reading achievement of elementary and middle school students.

METHODS

Participants

The Everett Public Schools serve more than 6,000 students. Approximately 47% of the students in the district are Caucasian, 17% are African American, and 26% are Hispanic. Nearly 69% of the students are eligible for free or reduced-price lunches, 41% are not native English speakers, and 17% receive services for special education. The district is further challenged by a very high mobility rate; during the first half of the 2009-2010 school year, 20% of the students enrolled, withdrew, or transferred to a different school within the district.

During the 2006-2007 school year, the first year the district used the products, Fast ForWord participants significantly improved their MCAS Reading scores with one-third of the participants in the "Needs Improvement" category reaching Proficient. Continuing the study during the 2007-2008 school year, many of the students were in their second year of product use although some were just starting. Again, one-third of the students who were initially at "Needs Improvement" reached Proficient or higher and 66% of the students improved their MCAS Reading scores.

This study focuses on students who used the products during the 2006-7, 2007-8, and/or 2008-9 school year. Study participants were in second through tenth grade at the time of initial use. Since the MCAS is initially administered in third grade, some of these students were too young to have their reading achievement evaluated prior to Fast ForWord participation. However, part of the analyses included a longitudinal study, and the later performance of students who were too young to be tested prior to Fast ForWord participation was analyzed to determine lasting impact. Students in 3rd through 10th grades were assessed each year with the Massachusetts Comprehensive Assessment System (MCAS). School personnel administered the assessments and reported scores for analysis.

During the 2006 – 2009 school years, more than 2,500 students in the district used the Fast ForWord products. Many students started with the Language products, and then worked their way through the Reading products until they completed Fast ForWord Reading Level 5. Nearly half the district's participants (1,198) have MCAS scores from at least one year between 2006 and 2009.

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 below in Table 1. More detailed descriptions of the exercises and learning modes within each product can be found online at http://www.scientificlearning.com .

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 Literacy	●	●	●	●	●	●			●	
Fast ForWord Literacy Advanced	●		●	●	●	●	●		●	
Fast ForWord Language	●	●	●	●		●			●	
Fast ForWord Language to Reading	●		●	●	●	●	●		●	
Fast ForWord Middle & High School	●	●	●	●	●	●			●	
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

Before and after Fast ForWord participation, student reading achievement was assessed with the Massachusetts Comprehensive Assessment System (MCAS).

Massachusetts Comprehensive Assessment System (MCAS): The MCAS is used to evaluate all public school students in Massachusetts, including students with disabilities and limited English skills. It is designed to measure students' performance based on the Massachusetts Curriculum Framework learning standards. All students in Grades 3 – 10 take the MCAS in the spring of each year. As a condition for graduation, students must pass the 10th grade MCAS in English/Language Arts and in Math.

Achievement Levels are reported for students in 3rd – 10th grades, and scaled scores for students in 4th – 10th grade. At all grade levels, a scaled score of 240 is required to demonstrate Proficiency.

Analysis

MCAS scores were reported in terms of both achievement level (3rd – 10th grade) and scaled scores (4th – 10th grade). Due to the method of reporting scores, the grade level of the students, and the mobility of the students, some students did not have MCAS scores available from all years while others had one or more years of pre-test and/or post-test scores. To use as much of the available data as possible, two separate analyses were performed: 1) Initial impact of the products and 2) Longitudinal impact of the products.

For both analyses, the pre-test score was the score from the spring prior to product use. For the analysis of initial impact, we compared the pre-test score to the score from the spring of the school year the products were first used. The longitudinal impact analysis incorporated data from any year(s) where there were two or more consecutive years of data and shows the change in score from one year to the next. Thus, a student who started using the products as a fourth grader and had no pre-test score available (scaled scores are not available for students in third grade), would have his or her scores from 4th and 5th grade analyzed to determine the impact of the products the year after the first year of participation.

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 2006 - 2009 school years, the Everett Public Schools chose to use the 50-Minute protocols with

most students. These protocols call for students to use the products for 50 minutes a day, five days per week for six to ten weeks. Detailed product use is shown in Table 2. As can be seen from the totals, most students used multiple products (average of 3.6 products per student) and participated across multiple school years (average of 30 full weeks of use across 14 months of participation).

2006 – 2009 Product Use						
	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Language Basics	247	6	11	96%	97%	80%
Fast ForWord Language	1543	27	86	74%	98%	76%
Fast ForWord Language to Reading	1110	46	115	77%	99%	74%
Fast ForWord Middle & High School	746	27	54	83%	98%	81%
Fast ForWord Literacy	336	26	73	86%	97%	66%
Fast ForWord Literacy Advanced	882	37	87	79%	97%	74%
Fast ForWord Reading Level 1	308	19	50	92%	98%	73%
Fast ForWord Reading Level 2	828	26	72	89%	97%	72%
Fast ForWord Reading Level 3	1092	42	124	81%	97%	70%
Fast ForWord Reading Level 4	1397	44	133	85%	98%	69%
Fast ForWord Reading Level 5	1069	90	267	63%	98%	65%
Total	2619	148	415	--	98%	73%

Table 2. Usage data showing the number of students who used the Fast ForWord products during the 2006 – 2009 school years, 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, and the average participation and attendance across all products used. Note: Students often use multiple products.

Assessment Results

Massachusetts Comprehensive Assessment System (MCAS): Two hundred students had MCAS Reading scale scores available from the spring before Fast ForWord participation and the spring of the school year the products were first used (after initial participation). On average, the students' MCAS Reading score from before participation was 230.4 – which puts a student in the middle of the "Needs Improvement" level (240 and above is "Proficient" while below 220 is "Warning"). The following spring, after initial participation, the students' average score was 237.0 – a statistically significant improvement and close to the level required for "Proficient". Figure 1 shows the students' average scores before and after participation while Figure 2 shows the number of students with each score before and after participation. Note the large increase in students with scores of 240 or above; there was a net increase of 67 Proficient students – a 33% increase.

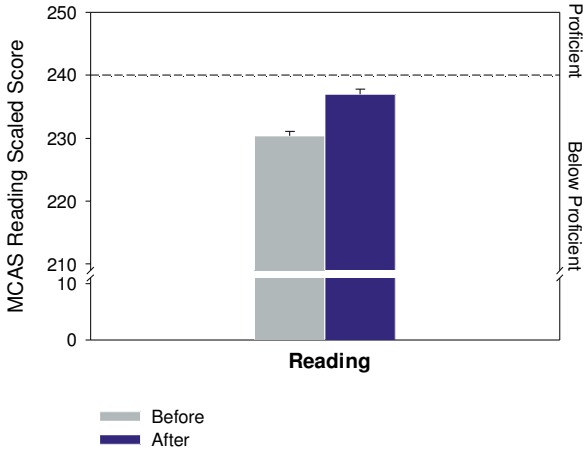

Figure 1: On average, students made statistically significant improvements on their MCAS Reading Scores following initial use of the Fast ForWord products (n = 200).

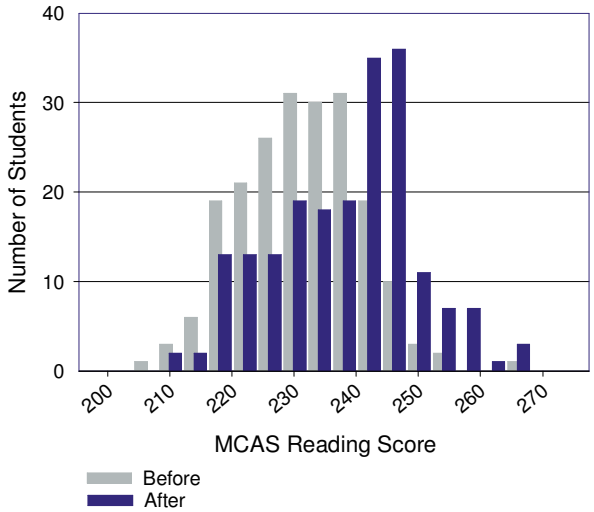

Figure 2: The distribution of scores before and after initial use of the Fast ForWord products. A score of 240 or more demonstrates Proficiency. The 200 students were in 5th – 10th grade at the time of initial use.

An analysis of Achievement Levels included the students who participated in the 4th grade (3rd graders are given only an Achievement Level – no scaled score). There were 260 students with Achievement Level data available immediately before and after initial use. Of those students, 38% improved one or more levels while 12% decreased one or more levels – a net increase of 26%. An evaluation of 176 students at the "Needs Improvement" level (including both "High Needs Improvement" and "Low Needs Improvement") showed that 43% of the students moved up to "Proficient" or higher while 8% of the students dropped to "Warning".

A longitudinal analysis showed that students made large increases the year they initially used the Fast ForWord products, and then continued to make improvements. This was true when they used the products for just one year (Figure 3 – dark line) or when they used the products for multiple years (Figure 3 – light line).

For both groups of students, there were not significant changes in scores prior to Fast ForWord participation but during the year(s) of participation, and following participation, the groups made statistically significant improvements in their MCAS Reading scores (Table 3).

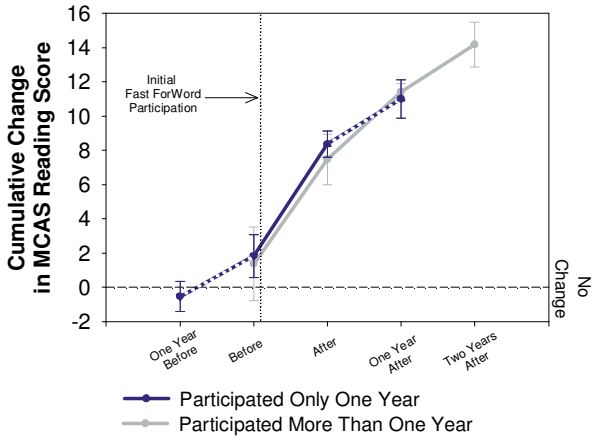

Figure 3: Longitudinal results show the estimated cumulative change scores based on data from all students who had scores from two or more consecutive years. The hashed line indicates periods where none of the students used the Fast ForWord products. Prior to participation, both groups of students (those who only participated one year and those who participated multiple years) had scores that showed no statistically significant changes from year to year; both groups showed statistically significant improvements up to two years after Fast ForWord participation. All students with two consecutive years of data are included so the number of students at each time point varies.

	Participated Only One Year				Participated Multiple Years			
	N	Change	SE of Change	t-statistic	N	Change	SE of Change	t-statistic
One Year Before	49	-0.53	0.89	-0.60	--	--	--	--
Before	61	2.36	1.24	1.90	16	1.37	2.15	0.64
After	143	6.77	0.76	8.86*	57	6.10	1.47	4.14*
One Year After	76	2.47	1.13	2.19*	444	3.94	0.47	8.44*
Two Years After	--	--	--	--	53	2.75	1.30	2.11*

*Table 3: Longitudinal results show the average year-over-year changes in scores starting one year before Fast ForWord participation, and continuing through two years after initial Fast ForWord participation. Both groups of students (those who only participated one year and those who participated multiple years) maintained constant scores prior to participation (no statistically significant change) and showed statistically significant improvements every year after Fast ForWord participation. All students with two consecutive years of data are included so N represents the number of students at each time point. *Statistically significant at the level of $p < 0.05$.*

DISCUSSION

On average, during the 2006 – 2009 school years, Fast ForWord participants in the Everett Public Schools significantly improved their reading achievement. Students were evaluated on the Massachusetts Comprehensive Assessment System, Massachusetts' high stakes test. Most of the students were struggling and at the "Needs Improvement" level. Despite the students' history of struggles, the students made improvements in their reading achievement with statistically significant increases not only during the year they used the Fast ForWord products, but during subsequent years also.

The improvements in the Everett Public Schools have been recognized by the state. Although a generally low-achieving school serving a challenging population (high levels of poverty and large numbers of English language learners), Parlin Elementary School has received recognition for being one of five low achieving high growth schools in the state with the school's median year-over-year growth in both 2008 and 2009 exceeding the 60th percentile. This means that, on average, for two years in a row, students at Parlin Elementary School performed well enough on the MCAS to exceed the improvement of 60% of the students statewide in comparable grades and with comparable initial scores (in fact, in 2009, students at Parlin had average improvement exceeding 64% of students with comparable grades and scores).

These findings demonstrate that, within the Everett 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.

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 Everett Public Schools made significant gains in their reading achievement. The gains were largest in the year(s) the students used the Fast ForWord products, but continued into subsequent years. These results replicate other studies and demonstrate that using the Fast ForWord products strengthens students' foundational skills and better positions them to benefit from the classroom curriculum.

Notes:

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