

Improved Reading Achievement and Skills by Students in the Merrillville Community School Corporation who used Fast ForWord® Products: 2010 - 2012

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ABSTRACT

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

Results: Following class-wide implementations of the Fast ForWord products, students made statistically significant improvements on both the English Language Arts (ELA) and Math components of the Indiana high stakes test (ISTEP+). The average class-wide ELA scores for students in 4th through 8th grade in 2012 (after Fast ForWord participation) improved between 8 and 35 points, exceeding the average 2011 scores for all grades except 7th. The average Math scores for students in 4th through 8th grade improved between 23 and 35 points, exceeding the average 2011 scores for all grades except 5th. In addition, between the fall and spring, students made statistically significant improvements on their SRI scores, exceeding the expected gains (based on fall-to-spring SRI norms), by 5 points (7th graders) to 114 points (2nd graders).

Study Design & Participants: The design of this study was a multiple school quasi-experimental study using nationally-normed assessments. Study participants were elementary, middle, and high school students in the Merrillville Community School Corporation of Merrillville, Indiana.

Materials & Implementation: Following staff training on the Fast ForWord products, students used the Fast ForWord products starting in January, 2011. The students had their reading achievement and skills evaluated before and after Fast ForWord participation with the Indiana Statewide Testing for Educational Progress Plus (ISTEP+), Scholastic Reading Inventory (SRI), and/or Reading Progress Indicator.

Keywords: **Indiana, elementary school, middle school, high school, suburban district, quasi-experimental study, Fast ForWord Language Basics, Fast ForWord Language Series, Fast ForWord Literacy Series, Fast ForWord Reading Readiness, Fast ForWord Reading Levels 1 - 5, Indiana Statewide Testing for Educational Progress Plus (ISTEP+), Scholastic Reading Inventory (SRI) and/or Reading Progress Indicator (RPI).**

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 Merrillville Community School Corporation 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 the reading achievement and skills of its students. In this study, commercially available computer-based products (Fast ForWord Language Basics, Fast ForWord Language Series, Fast ForWord Literacy Series, Fast ForWord Reading Readiness, Fast ForWord Reading Levels 1 - 5) were used to evaluate the effectiveness of this approach for improving the reading achievement and skills of elementary, middle, and high school students.

METHODS

Participants

The Merrillville Community School Corporation serves approximately 7,000 students in a district with rapidly changing demographics. Fifteen years ago, 12% of the district's students were eligible for free or reduced-price lunches and 28% were minority students. Today, 57% of the students are eligible for free or reduced-price lunches and 83% are minorities (57% are African American, 18% are Caucasian, 19% are Hispanic, and 7% are Multiracial); 3% of the students are English language learners, and 12% receive services for Special Education.

During the 2010-2011 school year, the five elementary schools, intermediate school, middle school, and high school started using the Fast ForWord products with selected students.

During the 2011-2012 school year, all students at the elementary, intermediate, and middle schools used the Fast ForWord products, as well as selected students at the high school.

This study focuses on the 3,983 Fast ForWord participants who were evaluated before and after product use with the Indiana Statewide Testing for Educational Progress Plus (ISTEP+), Scholastic Reading Inventory (SRI) 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 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.

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 Readiness				•		•	•			
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 and skills were assessed with a variety of tests including the Indiana Statewide Testing for Educational Progress Plus (ISTEP+), Scholastic Reading Inventory (SRI), and/or Reading Progress Indicator (RPI).

Indiana Statewide Testing for Educational Progress Plus (ISTEP+):

The ISTEP+ program is designed to measure the achievement of students in 3rd – 8th grade in a variety of subject areas including English/language arts (ELA) and math. Results are reported on a vertical scale showing the growth students have from year to year. In addition, results are reported in terms of an achievement level based upon the Indiana Academic Standards that were adopted in 2000 by the Indiana State Board of Education. Students receive one of three levels: Pass+, Pass, or Did Not Pass.

Scholastic Reading Inventory (SRI): The Scholastic Reading Inventory is a standardized assessment designed to measure how well students read literature and expository texts of varying difficulties. Available as both a target-level pencil and paper exam and a computer-adaptive test, the SRI's questions (items) consist of short passages accompanied by embedded response and answer choices. These questions are statements that either extend the ideas of the passage or ask a question about the passage with a missing word or phrase followed by four options.

Scores can be reported in terms of Lexiles which are units of measurement used to determine the difficulty of text and the reading

level of readers. A Lexile is equivalent to 1/1000th of the difference between the comprehensibility of basal primers (the midpoint of first grade text) and the comprehensibility of an electronic encyclopedia (the midpoint of workplace text).

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

Scores were reported in terms of scaled scores for the 2010 – 2012 administrations of the ISTEP+, Lexile scores for the 2011-2012 school year administrations of the SRI, and normal curve equivalents, scaled scores, grade equivalent scores, and percentile scores for Reading Progress Indicator. Scaled scores and normal curve equivalents were used to analyze Reading Progress Indicator scores. Data were analyzed using paired t-tests to compare pre- and post-participation tests. One-sample t-tests were also used to compare the change in SRI scores to expected changes based on norms. Unless otherwise stated, 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 - 2012 school years, the Merrillville Community School Corporation used a variety of

protocols with the elementary schools primarily using the 30-Minute protocols, the high school using the 30- and 40-Minute protocols, and the intermediate and middle schools using a variety of protocols ranging from 30-Minute to 90-Minute protocols. These protocols call for students to use the products for 30 to 90 minutes a day, five days per week for four to sixteen weeks. Detailed product use is shown in Table 2.

2010 – 2012 Product Use						
	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Attendance Level	Participation Level
Fast ForWord Language Basics	303	11	29	99	72	90
Fast ForWord Language v. 2	1905	50	113	90	77	93
Fast ForWord Language to Reading v. 2	1451	37	95	62	71	93
Fast ForWord Literacy	2008	33	93	89	72	90
Fast ForWord Literacy Advanced	1904	37	129	71	66	90
Fast ForWord Reading Readiness	250	32	75	97	74	93
Fast ForWord Reading Level 1	375	15	38	66	71	93
Fast ForWord Reading Level 2	220	14	42	53	65	90
Fast ForWord Reading Level 3	1010	23	79	77	69	89
Fast ForWord Reading Level 4	551	19	62	75	70	88
Fast ForWord Reading Level 5	225	22	63	32	76	86
Total	3983	85	242	-	70	91

Table 2. Usage data showing the number of students with scores who used the Fast ForWord products during the 2011 – 2012 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.

Assessment Results

Indiana Statewide Testing for Educational Progress

Plus (ISTEP+): Of the students who used the Fast ForWord products during the 2011 – 2012 school year, 1,964 students had ISTEP+ scores available from both 2011 and 2012 (1,944 had ELA scores available and 1,959 had Math scores available): Of the students with ISTEP+ scores, 56% were African American, 19% were Hispanic, 16% were Caucasian, and 7% were Multiracial. Across the group with scores, 59% were eligible for free- or reduced-price lunches, 7% were receiving Special Education services, and 3% had limited English proficiency.

The students made statistically significant improvements on both the ELA and the Math assessments, increasing their ELA scores by an average of 21.9 points and their Math scores by 27.8 points. The average improvement varied by grade, with students in the elementary and intermediate schools improving their ELA scores more than the students in the middle school (Tables 3 & 4; Figures 1 & 2).

ISTEP+ ELA				
Grade	n	Change	SE	t-statistic
3 rd	6	47.5	11.0	NA
4 th	300	27.7	1.7	16.6*
5 th	402	27.7	1.5	17.9*
6 th	415	34.7	1.9	18.0*
7 th	413	13.0	2.0	6.4*
8 th	408	7.7	1.7	4.4*

Table 3. Change in ISTEP+ ELA scores between 2011 and 2012. * $p < 0.01$. Due to the small number of students, a statistical analysis was not performed on the 3rd grade data.

ISTEP+ Math				
Grade	n	Change	SE	t-statistic
3 rd	6	69.7	19.6	NA
4 th	305	32.2	2.3	14.3*
5 th	405	25.2	1.8	13.8*
6 th	417	22.9	1.5	15.5*
7 th	416	23.8	1.5	15.7*
8 th	410	35.5	1.6	22.8*

Table 4. Change in ISTEP+ Math scores between 2011 and 2012. * $p < 0.01$. Due to the small number of students, a statistical analysis was not performed on the 3rd grade data.

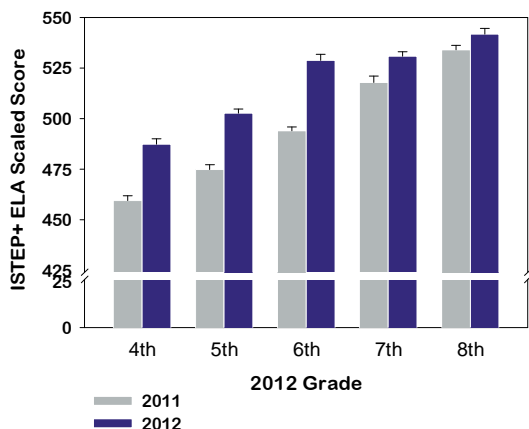


Figure 1. 2011 and 2012 ELA scores for students who used the Fast ForWord products during the 2011-2012 school year and had scores available. Only the six 3rd graders who were retained had pretest and posttest scores available; due to the small number of students, their scores were not included in the figure.

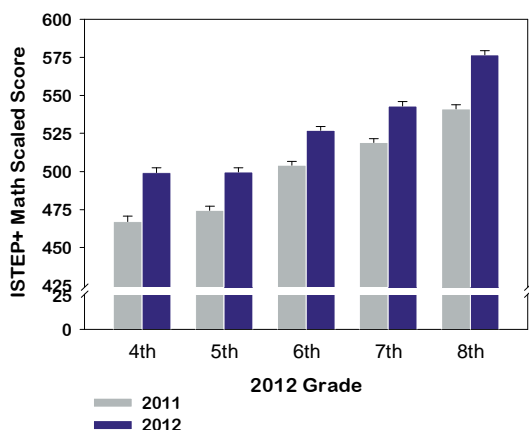


Figure 2. 2011 and 2012 Math scores for students who used the Fast ForWord products during the 2011-2012 school year and had scores available. Only the six 3rd graders who were retained had pretest and posttest scores available; due to the small number of students, their scores were not included in the figure.

Historical data show that over the past 15 years, the demographics of the district have changed. Despite the large demographic changes, the percentage of students passing the ISTEP+ ELA changed only slightly from 2004 through 2009 (decreasing from 71% to 64%), and has recently started to increase, reaching 78% in 2012. At the time of the 2007 administration of the ISTEP+, minority students comprised 74% of the district (55% African American, 11% Hispanic, and 7% Multiracial) and the Achievement Gap between Minority students and Caucasian students was 17.5%. During the 2011-2012

school year, minority students comprised 83% of the student population (57% African American, 19% Hispanic, and 7% Multiracial), and the Achievement Gap narrowed to 11.5%.

Scholastic Reading Inventory (SRI): During the 2011-2012 school year, the SRI was administered three times to students in 2nd – 8th grade, and twice to students in high school.

An analysis of fall and spring scores showed that 3,449 students used the Fast ForWord products during the 2011-2012 school year and had fall and spring SRI scores available. In the 8½ months between assessments, the students improved an average of 118 Lexiles with the average improvements ranging from 45 Lexiles (for 11th graders) to 280 Lexiles (for 2nd graders). Figure 3 shows the fall and spring scores for the students. Note that the Fast ForWord products were used by all students in 2nd through 8th grade, but only by selected students in 9th through 11th grade.

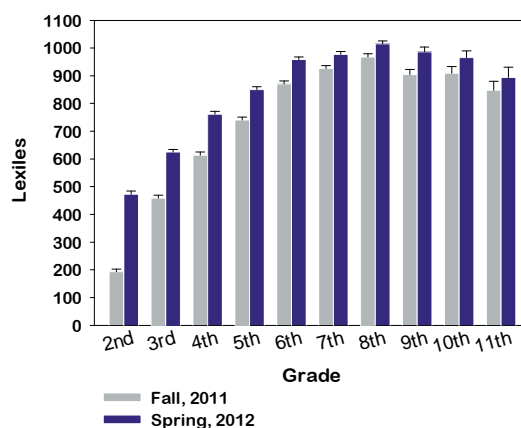


Figure 3. In 2nd – 8th grade, the Fast ForWord products were implemented across the entire grade. In 9th – 11th grades, the products were implemented as a pull-out program for struggling students. At each grade level, students made statistically significant improvements on their SRI Lexile scores.

For comparative purposes, the SRI Technical Guide reports normative fall and spring scores for students in each grade. According to the Guide, between the fall and spring, students at the 50th percentile typically improve between 165 points (2nd graders) and 10 points (11th graders). Figure 4 shows the typical fall-to-spring change for students at the 50th percentile compared to the actual changes at each grade level for students in the Merrillville Community School Corporation.

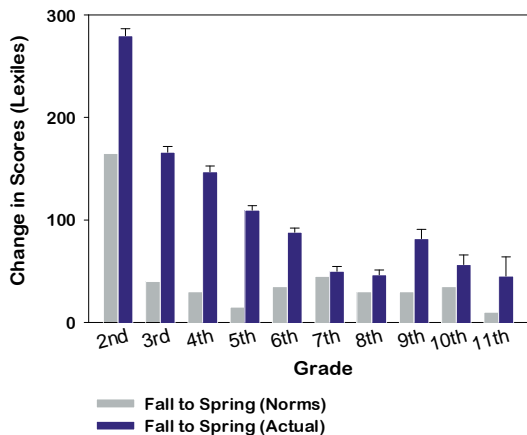


Figure 4. On average, students were pre-tested in late August and post-tested in mid-May. The improvements in scores were compared to fall-to-spring improvements for students at the 50th percentile on the SRI norm tables. At every grade level, the average improvements of the Merrillville students exceeded those from the norm tables.

One sample t-tests were used to compare the students' improvements on the SRI to the expected improvements for students at the 50th percentile at the corresponding grade level. At most grades (2nd – 6th, 8th – 11th), there was a statistically significant difference between the improvement of the students and the students' expected scores (Table 3).

Grade	N	Change		Change in Norms (Fall-to-Spring at 50 th Percentile)	t-statistic
		Mean	SE		
2	440	279.8	6.9	165	16.7*
3	426	166.0	5.6	40	22.4*
4	353	146.9	5.7	30	20.1*
5	471	109.6	4.5	15	21.2*
6	465	88.1	4.2	35	12.8*
7	494	50.1	4.7	45	1.1
8	467	46.6	4.7	30	3.5*
9	142	82.0	8.8	30	5.9*
10	141	56.5	9.5	35	2.2*
11	49	45.5	18.7	10	1.9

Table 3. Students in 2nd – 6th grade as well as 8th – 10th grade increased their scores on the SRI by an amount that was significantly greater than typical for fall-to-spring improvements for students at the 50th percentile (* $p < 0.05$).

Reading Progress Indicator (RPI): In addition to the ISTEP+ and SRI, RPI was used to evaluate the impact of the Fast ForWord products on students in the Merrillville Community School Corporation who used the Fast ForWord products during the 2011 – 2012 school year. RPI was administered before and after each Fast ForWord product. The RPI evaluation

includes 3,520 students in Kindergarten through twelfth grade who had pre- and post-participation scores available. Of the students, 2,756 (78%) showed improvement.

Dividing the students by school level (elementary, middle, intermediate, high) showed that at each level, students made statistically significant improvements, increasing their early reading skills by more than would be expected based on only typical classroom curriculum that would have occurred between the initial and final assessments (Figure 5).

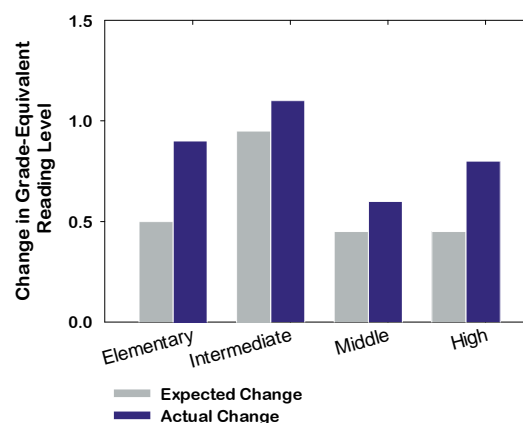


Figure 5. At each level, the average improvement of the students' early reading skills exceeded the improvement that was expected based upon the typical classroom curriculum.

DISCUSSION

On average, during the 2011 – 2012 school year, Fast ForWord participants in the Merrillville Community School Corporation significantly improved their reading achievement and early reading skills. These skills were evaluated on a variety of assessments including the SRI, RPI, and ISTEP+ (where 78% of the students passed the ISTEP+ ELA and 75% passed the ISTEP+ Math). Following the schoolwide Fast ForWord implementations that started during the 2011-2012 school year, students in the elementary and intermediate schools scored an average of 8 to 12 points higher on the ISTEP+ ELA than the students in comparable grades had scored in 2011 (refer to Figure 1: the 2012 ISTEP+ ELA score for the 4th graders is higher than the 2011 score for the current 5th graders). The only grade where the average score did not increase was for the 7th graders where there was a slight decrease (3 points). In a similar manner, average ISTEP+ Math scores increased for most grades with improvements ranging from 2 points to 25 points with the exception being the 5th graders, for whom there was a slight decrease (4 points).

Not only did the students show statistically significant improvements on their ISTEP+ ELA and Math scores, but they also improved their SRI scores, with students in 2nd - 6th and 8th - 11th grade improving their SRI scores significantly more than expected based on the SRI norms.

Finally, the students' early reading skills improved as shown by the RPI results; average improvement varied from 6 months to 1 year and 1 month for the different schools while the time between assessments varied from 4½ to 9½ months. It is important to note that at the high school, class-wide implementations were not used, struggling students were selected to use the Fast ForWord products. Before using the products, the students, on average, were performing well below grade level; at the high school, the students' average grade level was mid-way through 9th grade (9.6), but their reading skills were lagging at a level mid-way through sixth grade (6.6). During their school years, these students had not typically made the expected gains in reading skills, and now had reading skills averaging three years below their grade-level. Despite the students' past difficulties, even these students improved their reading skills more than expected, achieving 8 months of gains in 4½ months.

These findings demonstrate that, within both the schoolwide implementation at the elementary, intermediate, and middle schools, and within the pull-out program for struggling students at the high school, an optimal learning environment coupled with a focus on cognitive and early reading skills helped students attain a higher level of reading achievement and 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 Merrillville Community School Corporation made significant gains in their reading skills and achievement. 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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