Improved Reading Skills by Students who used the Fast ForWord® Literacy Product for Three Days a Week

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ABSTRACT

Purpose: This study investigated the effectiveness of the Fast ForWord Literacy product using two different implementations. Improvements in reading skills were compared following either a 50-minute,3 day-a-week schedule or a 30-minute, 5 day-a-week schedule. The software products were implemented within the curriculum in a middle school setting. **Study Design:** The design was a two-group study conducted within a single school in the Kentwood School District. Nationally-normed tests were used to evaluate effectiveness. **Participants:** Study participants were 104 sixth- through eighth-grade students attending Crestwood Middle school in Kentwood, Michigan. Students were assigned to one of two groups: one group used the 30-Minute Protocol, five days a week, while the other group used the 50-Minute Protocol, three days a week. **Materials & Implementation:** Following staff training on the Fast ForWord products, all study participants started to use the product during the 2007 – 2008 school year. Before and after Fast ForWord participation, students' reading skills were evaluated with Reading Progress Indicator and the Scholastic Reading Inventory. **Results:** On average, students made statistically significant improvements in reading skills, regardless of the protocol that was used. The magnitude of the reading gains were not statistically different and students using the different protocols reached similar high levels of product completion.

Keywords: Michigan, middle school, suburban district, experimental study, Fast ForWord Literacy, Reading Progress Indicator, Scholastic Reading Inventory (SRI).

INTRODUCTION

Numerous research studies have shown that cognitive and linguistic 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 enhanced learning capacity and cognition. The software focused on creating an optimal learning environment for building the memory, attention, processing and sequencing skills found to be critical for reading success (Merzenich et al., 1996; Tallal et al., 1996). The research-proven Fast ForWord software provides an optimal learning environment focused on building targeted reading and cognitive skills. Published research shows that use of the Fast ForWord software, when implemented correctly, resulted in dramatic improvements in the language and reading skills of school children, with published results for children struggling with language acquisition (Merzenich et al, 1996; Tallal et al., 1996; Tallal, 2000) or experiencing academic reading failure (Miller et al., 1999; Tallal, 2004).

The school was interested in evaluating the effectiveness of involving students in an optimal learning environment with a focus on early reading and cognitive skills. They wanted to determine whether a 30-minute daily involvement was as effective at improving the reading abilities of students as a 50-minute involvement, three days a week. To perform this study, two different protocols of a commercially-available, computer-based product (Fast ForWord Literacy) were used to evaluate the effectiveness of the different protocols at improving the reading skills of middle school students.

METHODS

Participants

The Kentwood School District has approximately 9,000 students in 16 buildings within 24.25 square miles. The district employs more than 1,080 certified and support staff to meet the needs of their children. A wonderful family-oriented community truly supports education. Crestwood Middle School, one of the district's three middle schools, chose to use the Fast ForWord Literacy product during the 2007 – 2008 school year and took part in this study. Crestwood Middle School serves approximately 620 sixth- through eighth-grade students.

One hundred and four students (51 sixth graders, 30 seventh graders, and 23 eighth graders) participated in this study. Fifty-six students used the Fast ForWord Literacy product for 30 minutes a day, 5 days a week and 48 students used the Fast ForWord Literacy product for 50 minutes a day, 3 days a week (and used a Monday, Wednesday, Friday schedule). Study participants were assigned to their study group based on classroom.

All students had their phonological awareness, decoding, vocabulary, and comprehension skills evaluated with Reading Progress Indicator before and after students used the Fast ForWord Literacy product. A subset of students also had their skills measures with the Scholastic Reading Inventory. School personnel administered the assessments and Scientific Learning Corporation analyzed the scores.

Implementation
Educators at Crestwood Middle School were trained in the scientific foundation validating the efficacy of the Fast ForWord products. Training included an update on current and established neuroscience findings on how phonemic awareness and the acoustic properties of speech impact the development of language and reading skills. Participants received information on methods for the assessment of at-risk and struggling students as well as the selection of appropriate measures for student testing and program evaluation. Training also included practical techniques for effective implementation including the use of progress monitoring tools (i.e., Progress Tracker reports) to monitor student performance.

Materials
The Fast ForWord Literacy product is a computer-based product that combines an optimal learning environment with a focus on early reading and cognitive skills. The products include six exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension.

Space Racer: 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 exercise improves working memory, sound processing speed, and sequencing skills.

Galaxy Goal: Students hear a single syllable that is repeated several times, and then interrupted by a different syllable. Students must respond when they hear the change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

Spin Master: Students hear a target phoneme, and then must identify the identical phoneme when it is presented later. This exercise improves auditory discrimination skills, increase sound processing speed, improve working memory, and help students identify a specific phoneme.

Lunar Tunes: Students choose a square on a grid and hear a sound or word. Each sound or word has a match somewhere within the grid. The goal is to find each square's match and clear the grid.

Star Pics: 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.

Stellar Stories: Students listen to stories, then answer multiple-choice questions about them, match pictures to sentences, and follow commands of increasing complexity. As participants integrate information across the sentences of a paragraph, and across the paragraphs of a story, they build listening comprehension skills. This exercise simultaneously develops basic language skills such as auditory word recognition, auditory memory, and basic vocabulary, along with more complex language skills such as attending to word and sentence structure. This exercise provides a comprehensive "cross-training" of oral language skills, to create a solid foundation for reading.

Assessments
Study participants from Crestwood Middle School took Reading Progress Indicator and the Scholastic Reading Inventory before and after Fast ForWord use. Scores were analyzed by Scientific Learning Corporation.

Reading Progress Indicator (RPI): Reading Progress Indicator is a computer-based assessment designed to rapidly measure the effects of the Fast ForWord products. There are four levels of the assessment, each designed for a specific grade range. Each test level measures phonological awareness, decoding, vocabulary and comprehension. Scores are reported as Normal Curve Equivalents, grade-equivalents, and percentiles.

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 as Lexiles.

Analysis
Scores were reported in terms of Normal Curve Equivalents (NCE's) for Reading Progress Indicator and in terms of Lexiles for the Scholastic Reading Inventory (SRI). NCE's have a mean equal to 50 and a standard deviation approximately equal to 21. Lexiles are units of measurement used to determine the difficulty of text and the reading level of readers. Lexiles range from 200 to 1700 and are 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).

Data were analyzed using paired t-tests and a repeated measures multivariate analysis of variance (MANOVA). 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 level). During the 2007 – 2008 school year, students either used the 30- or 50-Minute protocol, for three or five days a week.

All 104 study participants from Crestwood Middle School had pre-tests, but 88 of the 104 had pre- and post-tests. This study included ESL students, some of whom have lived in the United States for less than one full academic year. It also included students who are struggling in mathematics and students who are receiving special education services.

The two groups of students reached comparable high completion levels on the product within a similar number of days of participation. But as predicted, the 50-Minute Protocol group required more calendar days to complete the content. The 30-Minute Protocol, 5-day-a-week group completed 95% content in 34 days and the 50-Minute Protocol, 3-days-a-week group completed 90% of the same content in 33 days. Detailed usage information for the study participants is shown in Table 1.

Figures 1 and 2 show the average daily progress through the 30-Minute and 50-Minute Fast ForWord Literacy Protocols, respectively. 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.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
30-Minute Group, 5 days a week	56	34	85	95%	98%	65%
50-Minute Group, 3 days a week	48	33	111	90%	98%	49% *

*Table 1. Usage data showing the number of students who used the different Fast ForWord Literacy protocols along with group averages for the number of days participated, the number of calendar days between start and finish, the percentage of product completed, participation level, and attendance level. * The Attendance score is based on a 5-day-a-week schedule.*

Learning Curves:
30-Minute Protocol, 5 Days a Week

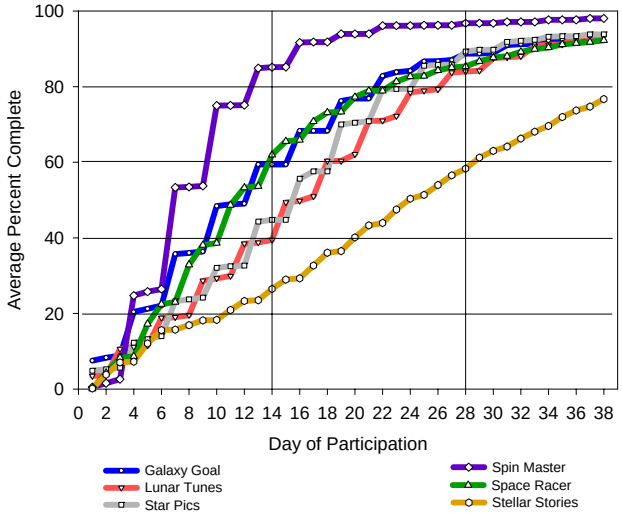

Figure 1. Average daily progress through the Fast ForWord Literacy exercises on the 30-Minute Protocol. Students used the product five days a week.

Learning Curves:
50-Minute Protocol, 3 Days a Week

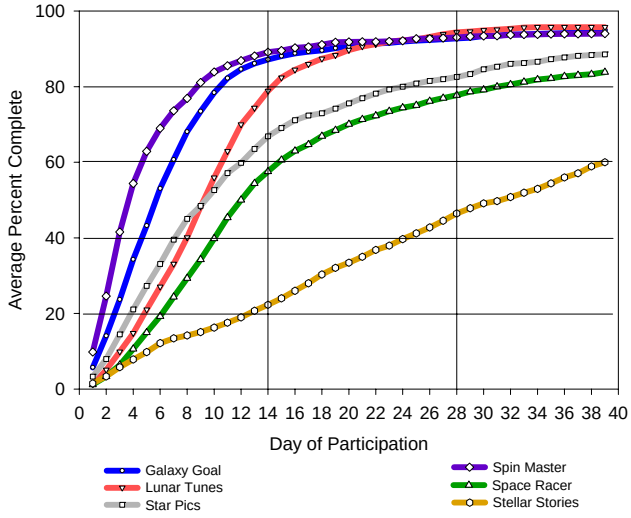

Figure 2. Average daily progress through the Fast ForWord Literacy exercises on the 50-Minute Protocol. Students used the product three days a week.

Assessment Results

Reading Progress Indicator: Reading Progress Indicator was used to evaluate the reading skills of the students in this study, both before and after the students participated on the Fast ForWord Literacy product. Scores were analyzed using Normal Curve Equivalents (NCE's).

The analyses below divide the students into product groups: Crestwood Middle School students who used the Fast ForWord Literacy 30-Minute Protocol for five days a week, and those who used the Fast ForWord Literacy 50-Minute Protocol for three days a week. All students who scored above chance at pre- and post-test were included in the statistical analyses. Results show that after Fast ForWord participation, both protocol groups achieved statistically similar gains, as shown in Figure 3. The five-day-a-week group improved from the 13th to 21st percentile, whereas the three-day-a-week group improved from the 10th to 20th percentile. Average gains were statistically significant for both protocol groups.

A multivariate analysis of variance (MANOVA) showed no significant interaction of group by time, showing that the two protocol groups achieved statistically similar gains on Reading Progress Indicator (see Table 2).

Scholastic Reading Inventory

Scholastic Reading Inventory scores were also analyzed for the same students who had valid pre and post Reading Progress Indicator scores. On average, students increased their Lexile scores between the pre- and post-assessments, regardless of the protocol that was used.

	MANOVA	
	df	F
time	70	38.7*
time x group	70	0.6

*Table 2. A MANOVA showed that students who used the different Fast ForWord Literacy protocols achieved similar gains. * $p < 0.05$*

Fast ForWord Literacy Group	n	RPI: Before		RPI: After		t-statistic
		Mean	SE	Mean	SE	
30-Minute, 5 Days a Week	45	25.8	1.9	33.1	2.1	4.3*
50-Minute, 3 Days a Week	27	22.6	2.8	32.0	3.0	4.6*

*Table 3. On average, students improved in reading skills after Fast ForWord use, with both protocol groups achieving statistically significant gains on Reading Progress Indicator. * $p < 0.05$*

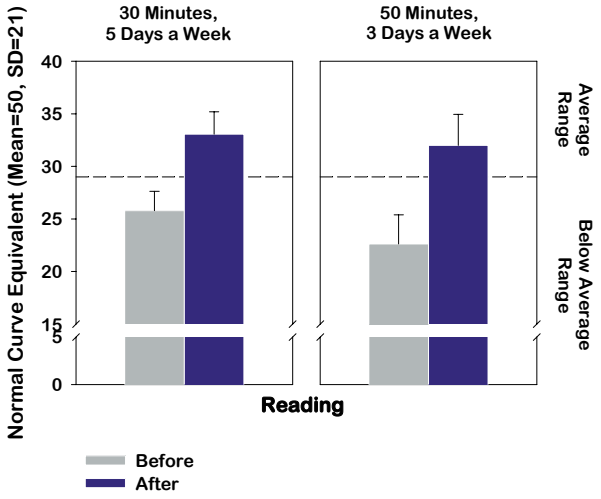

Figure 3. Fast ForWord participants made statistically significant improvements in reading skills after using the Fast ForWord Literacy product, regardless of protocol.

Similar to the Reading Progress Indicator analysis, a MANOVA showed no significant interaction of group by time, showing that the two protocol groups achieved statistically similar gains on the Scholastic Reading Inventory (see Table 4). Table 5 shows detailed results of the performance of these Fast ForWord participants, split by protocol group.

Since there was no statistical difference between the performance of the groups and the size of the 50-Minute group was small (15 students), SRI scores from both protocol groups were analyzed together. Looking at the results of the two groups combined, on average, Fast ForWord participants made statistically significant gains in their reading skills, improving from a Lexile score of 489 to a Lexile score of 597 (see Figure 4).

	MANOVA	
	df	F
time	47	20.6*
time x group	47	0.2

*Table 4. A MANOVA showed that students who used the different Fast ForWord Literacy protocols achieved similar gains on the SRI. * p < 0.05*

Fast ForWord Literacy Group	n	SRI: Before		SRI: After		t-statistic
		Mean	SE	Mean	SE	
30-Minute, 5 Days a Week	34	516.6	36.4	631.8	33.3	5.6*
50-Minute, 3 Days a Week	15	422.3	88.5	516.7	86.0	1.8

*Table 5. On average, students improved in reading skills after Fast ForWord use, with the 30-Minute Protocol group achieving statistically significant gains on the Scholastic Reading Inventory. * p < 0.05*

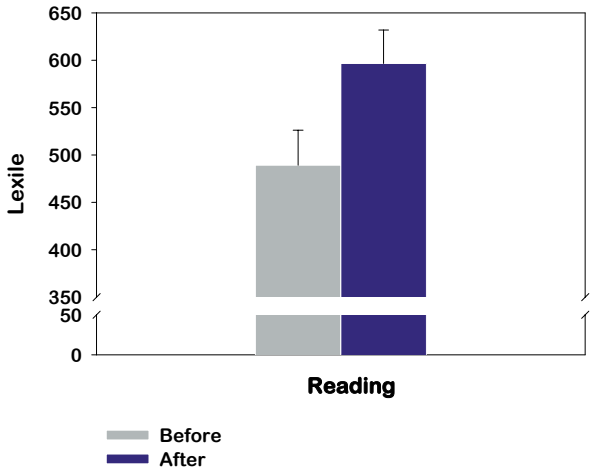

Figure 4. Fast ForWord participants made statistically significant gains in reading skills after using the Fast ForWord Literacy product, as measured by the Scholastic Reading Inventory.

DISCUSSION

During the 2007 – 2008 school year, a group of 104 students from Crestwood Middle School used the Fast ForWord Literacy product. Overall, students made statistically significant improvements in reading skills, including phonological awareness, decoding, vocabulary and comprehension skills. Students used one of two daily protocols: either 30 minutes of participation a day for five days a week or 50 minutes of participation a day for three days a week. Statistical analyses reveal that the different protocol groups made statistically similar gains on two different assessments, suggesting that the two protocols provide equivalent benefits. These findings demonstrate that, regardless of which daily protocol is used, 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. Language and listening skills have a direct influence on a student's ability to benefit from classroom instruction. In addition, strong linguistic skills provide a critical foundation for building higher level reading and writing skills. Fast ForWord targets the foundational listening, language and reading skills necessary to become an effective learner. In the present study, following the use of Fast ForWord software, students in the Kentwood Public Schools made significant gains in their reading ability. Gains were achieved using two different implementation protocols, 50 minutes for 3 days-a-week or 30 minutes for 5 days-a-week. These results suggest that schools have additional implementation choices for the effective use of the Fast ForWord products, which can strengthened the students' foundational skills and better positioned them to benefit from the classroom curriculum.

Notes:

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REFERENCES

Lyon, G.R. (1996). Learning Disabilities. *The future of children: Special education for students with disabilities.* 6:54-76.

Merzenich MM, Jenkins WM, Johnston P, Schreiner CE, Miller SL, & Tallal P (1996). Temporal processing deficits of language-learning impaired children ameliorated by training. *Science*, 271, 77-80.

Miller, S.L., Merzenich, M.M., Tallal, P., DeVivo, K., Linn, N., Pycha, A., Peterson, B.E., Jenkins, W.M., (1999). Fast ForWord Training in Children with Low Reading Performance, *Nederlandse Vereniging voor Lopopedie en Foniatrie: 1999 Jaarcongres Auditieve Vaardigheden en Spraak-taal*. (Proceedings of the 1999 Dutch National Speech-Language Association Meeting).

Reading Progress Indicator, Bookette Software Company, 2007.

Scholastic Inc. (2005). *The Scholastic Reading Inventory*. New York, NY: Scholastic Inc.

Tallal, P (2000). The science of literacy: From the laboratory to the classroom. *Proceedings of the National Academy of Science*, 97(6), p. 2402-2404.

Tallal, P (2004). Improving language and literacy is a matter of time. *Nature Reviews Neuroscience*, 5: p. 721-728.

Tallal P, Miller SL, Bedi G, Byma G, Wang X, Nagarajan SS, Schreiner C, Jenkins WM, Merzenich MM (1996). Language comprehension in language-learning impaired children improved with acoustically modified speech. *Science* 271:81-84.