

Improved Reading Skills by Students in the Lafayette Parish School System who used Fast ForWord® Products*

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord products on the reading skills of students who used the products within the curriculum in a school setting. **Study Design:** The design of this study was a multiple school study using nationally normed tests and state assessments. **Participants:** Study participants were third and fourth grade students attending elementary schools in the Lafayette Parish School System in Lafayette, Louisiana. **Materials & Implementation:** Before and after participation on the Fast ForWord products, students were evaluated with the Iowa Tests of Basic Skills (ITBS), the Louisiana Educational Assessment Program for the 21st Century (LEAP 21) and the Gates-MacGinitie Reading Tests (GMRT). **Results:** Students made significant gains on various measures of reading and language abilities, with some students improving by as much as 22 percentile points on the ITBS. The percentage of students who achieved beyond the Unsatisfactory level on the LEAP 21 increased.

Keywords: Louisiana, elementary school, urban, observational study, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 3, Fast ForWord to Reading 4, Iowa Tests of Basic Skills (ITBS), Louisiana Educational Assessment Program for the 21st Century (LEAP 21), Gates-MacGinitie Reading Tests (GMRT).

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 Lafayette Parish School System 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 reading skills of students in a school setting. In this study, commercially available computer-based products (Fast ForWord Language,

Fast ForWord Language to Reading, Fast ForWord to Reading 3, Fast ForWord to Reading 4) were used to evaluate the effectiveness of this approach at improving the reading skills of students.

METHODS

Participants

The Lafayette Parish School System is located in Lafayette, Louisiana. The district is made up of 45 schools serving nearly 30,000 students in kindergarten through twelfth grade. This report focuses on three elementary schools in the district.

Students at the schools had their reading and language skills assessed before or after Fast ForWord participation. A variety of tests were administered, including the Iowa Tests of Basic Skills (ITBS), the Louisiana Educational Assessment Program for the 21st Century (LEAP 21) and the Gates-MacGinitie Reading Tests (GMRT). This report focuses on the students who used Fast ForWord products during the 2004-2005 school year and had pretest and posttest scores available from the same assessment.

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

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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. The products used in this study (Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 3, Fast ForWord to Reading 4) include five to seven exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension. While there are differences between the products, all help develop certain critical skills as detailed in the following exercise descriptions.

Circus Sequence¹ and Trog Walkers²: 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 exercises improve working memory, sound processing speed, and sequencing skills.

Old MacDonald's Flying Farm¹: Students hear a single syllable that is repeated several times, and then interrupted by a different syllable. Students must respond when they hear a change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

Phoneme Identification¹, Polar Cop², and Treasure in the Tomb²: Students hear a target phoneme, and then must identify the identical phoneme when it is presented later. These exercises improve auditory discrimination skills, increase sound processing speed, improve working memory, and help students identify a specific phoneme. *Polar Cop* also develops sound-letter correspondence skills. *Treasure in the Tomb* also develops grapheme recognition.

Phonic Match¹ and Bug Out²: 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. The *Phonic Match* exercise develops auditory word recognition and phoneme discrimination, improves working memory, and increases sound processing speed. The *Bug Out!* exercise develops skill with sound-letter correspondences as well as working memory.

Phonic Words¹: 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.

Language Comprehension Builder¹: Students listen to a sentence that depicts action and complex relational themes. Students must match a picture representation with the sentence they just heard. This exercise develops oral language and listening comprehension, improves understanding of syntax and morphology, and improves rate of auditory processing.

Block Commander¹: In Block Commander, a three-dimensional board is filled with familiar shapes that students select and manipulate. The students are asked to follow increasingly complex commands. This exercise increases listening comprehension, improves syntax, develops working memory, improves sound processing speed, and increases the ability to follow directions.

Start-Up Stories²: Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

Scrap Cat³: In Scrap Cat, a series of words is visually presented and participants are asked to sort each word into the correct semantic, phonological, syntactic, or morphological category. For this exercise only, the participant can click a button to hear any word and see it defined. This exercise develops decoding, vocabulary, and word recognition skills.

Canine Crew³: In Canine Crew multiple words are presented together in a grid and participants are asked to find pairs that match on the basis of the current criterion. This criterion shifts from words that rhyme, to synonyms, to antonyms, to homophones, as the participant progresses. This exercise develops vocabulary, decoding, and automatic word recognition.

¹ Exercise from the Fast ForWord Language product.

² Exercise from the Fast ForWord Language to Reading product.

³ Exercise from the Fast ForWord to Reading 3 product.

*Chicken Dog*³: Participants hear a word and see it partially spelled. They must complete the word by filling in the missing letter or letter group. Five options are always provided, including options that represent common visual and phonological errors. This exercise develops basic spelling patterns, letter-sound correspondences, and decoding.

*Twisted Pictures*³: Participants are presented with a variety of pictures and asked to select the sentence that most accurately describes each picture from among four alternatives. The descriptive sentences incorporate a wide range of syntactic structures. As the participant progresses, the sentences get longer and more difficult vocabulary is included. This exercise builds sentence comprehension by developing syntax, working memory, logical reasoning, and vocabulary.

*Book Monkeys*³: Participants read narrative and expository passages and answer comprehension questions about each passage. The multiple-choice questions demand that the participant use memory for literal detail, generation of inferences, or grasp of among four alternatives. This task develops paragraph comprehension, inferential and cause-and-effect reasoning, working memory, flexible reading, and vocabulary.

*Hog Hat Zone*³: In Hog Hat Zone, short passages from classic children's literature are presented, with occasional gaps in the text where words are missing. Participants are asked to fill in each gap with the correct word from among four alternatives. The missing words are morphologically important items such as pronouns, auxiliary verbs, and words with suffixes and prefixes. This task develops paragraph comprehension, complex morphology, flexible reading, and vocabulary.

*Hoof Beat*⁴: The participant is presented with a question and four possible answers. The participant must choose the most appropriate answer. The questions relate to semantics, phonology, morphology, orthography, and syntax. The exercise encourages flexibility during reading and automatic access to the various dimensions of vocabulary and is designed to build vocabulary by showing the participant how words function.

*Jitterbug Jukebox*⁴: The participant hears a word spoken aloud and letters appear on the keys of a jukebox. The participant must spell the word by clicking on the jukebox keys. Jitterbug Jukebox helps participants improve spelling and sensitivity to letter-

sound correspondences. This exercise includes many of the 500 most commonly used words in written English including most word families found in 3rd and 4th grade content standards.

*Goat Quotes*⁴: In Goat Quotes four newspapers paraphrase a headline at the top of a news kiosk. The participant must select the correct paraphrase. The exercise is designed to sample the basic syntactic (i.e., grammatical) structures of spoken English generally mastered in the early elementary grades. The exercise develops logical thinking and working memory skills as well careful reading.

*Book Monkeys: Book Two*⁴: Participant reads a passage, chart, or schedule and then answers questions related to the material. This exercise develops a participants' ability to read for literal meaning, cause-and-effect relationships, and inferential comprehension. It also develops a participant's working memory as well as vocabulary skills, which are crucial for flexible, fluent reading.

*Stinky Bill's Billboard*⁴: Participants must select the word that accurately completes a sentence. In this exercise, participants improve sentence comprehension while practicing the decoding of words in realistic contexts. This exercise also helps build vocabulary and awareness of word structure.

*Lulu's Laundry Line*⁴: Short passages are presented with occasional gaps where punctuation is missing. The participant must read the words and understand the passage in order to determine the correct punctuation. The exercise develops punctuation skills as well as automaticity for decoding and sentence comprehension.

Assessments: The Iowa Tests of Basic Skills (ITBS) were administered to students in second and third grades.

Most students in the current study who took the ITBS were tested in 2004, as second graders, and then again in 2005 as third graders. Five students who were in third grade in 2004 were retained and also had scores available from 2005.

Third and fourth grade students were assessed with the Gates-MacGinitie Reading Tests. The initial assessments were administered in September, 2004, before Fast ForWord participation. Follow-up testing occurred after Fast ForWord participation in May, 2005.

⁴ Exercise from the Fast ForWord to Reading 4 product.

The Louisiana Educational Assessment Program for the 21st Century (LEAP 21) is administered to students in the fourth grade. The fourth graders in this study had scores available from March, 2005, towards the end of Fast ForWord participation. Fifty-one fourth grade students also had LEAP 21 scores available from March, 2004 because these students had been held back one year.

Iowa Tests of Basic Skills (ITBS): The ITBS are part of the Louisiana Statewide Norm-Referenced Testing Program. They are achievement tests that were standardized nationally thus scores can be used to compare the performance of students tested locally with the performance of students tested in the national sample.

Gates-MacGinitie Reading Tests (GMRT): The Gates-MacGinitie Reading Tests are used to assess a student's decoding, vocabulary, and passage comprehension skills. The assessment has two components, independently evaluating reading vocabulary and comprehension. In the Vocabulary subtest, the student selects the proper meaning of a written word. In the Comprehension subtest, the student must read passages of progressively increasing difficulty. This subtest measures a student's understanding of complex written material.

Louisiana Educational Assessment Program for the 21st Century (LEAP 21): LEAP 21 is part of Louisiana's criterion referenced state testing program. The LEAP is administered to students in grades 4 and 8 and measures how well a student has mastered the state content standards. Students receive a scaled score and one of five achievement ratings ranging from Unsatisfactory to Advanced.

Analysis

Scores were reported in terms of percentiles for the ITBS and GMRT. Percentile scores from these tests were converted into normal curve equivalents which are the most appropriate scores for statistical analyses. LEAP 21 scores were reported as scaled scores and as achievement levels ranging from Unsatisfactory to Advanced. All scores 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 level and attendance level). During the 2003-2004 and 2004-2005 school year, the Lafayette Parish School System chose to use the mixed protocols for Fast ForWord Language and Fast ForWord Language to Reading and the 48-minute protocol for Fast ForWord to Reading 3 and Fast ForWord to Reading 4. These protocols call for students to use the products for 48, 50, 75, 90, or 100 minutes a day, five days per week for four to twelve weeks. Detailed product use is shown in Table 1.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Language	703	34	69	81%	97%	75%
Fast ForWord Language to Reading	620	43	93	75%	95%	67%
Fast ForWord to Reading 3	401	21	68	43%	71%	50%
Fast ForWord to Reading 4	66	22	72	51%	71%	39%

Table 1. 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.

Assessment Results

Iowa Tests of Basic Skills (ITBS): Forty-five students had ITBS scores available from 2004, when they were second graders, and from 2005, when they were in third grade. Language scores improved significantly with average normal curve equivalents increasing from 43 to 55. Average performance on the Reading test also improved slightly from 43 to 44 (Table 2,

Figure 1). When interpreted in terms of percentiles, the Language scores increased from the 37th to the 59th percentile and the Reading scores edged up from the 38th to the 39th percentile.

Five third graders were retained and had scores available from both 2004 and 2005. These students also made significant gains on the Language subtest,

with normal curve equivalents increasing from 43 to 52, corresponding to improvements from the 36th percentile to the 54th percentile. Reading scores improved from a normal curve equivalent of 31 to a

normal curve equivalent of 38. In terms of percentiles, this corresponds to an increase from the 18th to the 29th percentile (Table 2, Figure 2).

Iowa Tests of Basic Skills (ITBS)									
Grade	n	Reading				Language			
		Before		After		Before		After	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE
Third	45	43.3	2.36	44.0	2.01	43.1	2.12	54.8	1.94
Third: Retained	5	31.0	6.03	38.18	4.29	42.5	2.84	52.3	3.12

Table 2. Students improved their performance on the ITBS after using Fast ForWord products. Their performance on the Language subtest was significantly greater than prior to use.

ITBS Results: Third Graders

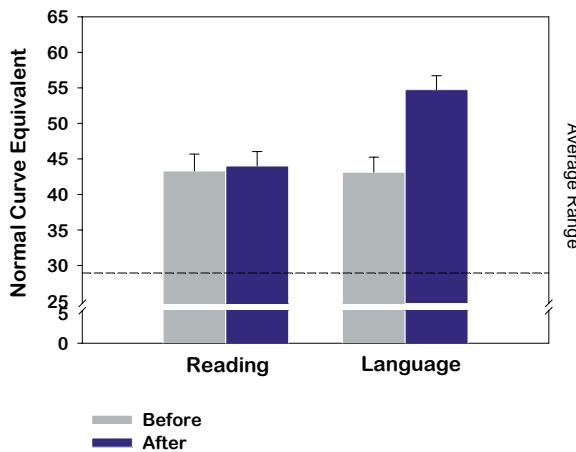


Figure 1. Third graders improved their language skills significantly following Fast ForWord participation. Results from 45 students are shown.

ITBS Results: Retained Third Graders

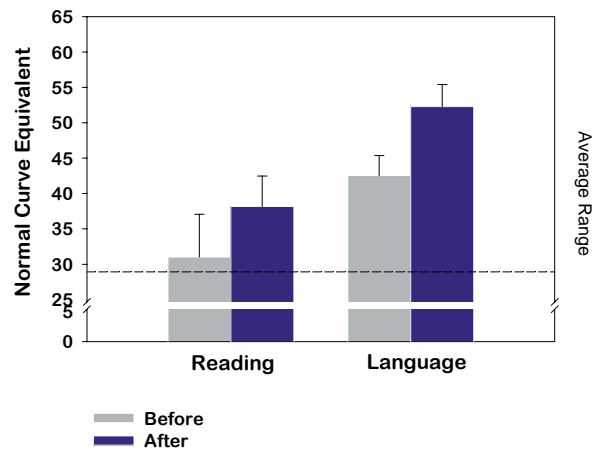


Figure 2. Third graders who were retained made improvements on both the Reading and Language subtests. Results from 5 students are shown.

Gates-MacGinitie Reading Tests (GMRT): GMRT scores were available from one hundred-nine third and fourth graders. Normal curve equivalents were analyzed for statistical significance. Percentiles are presented for descriptive purposes. Overall, students

made significant improvements, with normal curve equivalents increasing from 34 to 38. These scores reflect a gain of seven percentile points, from the 22nd percentile to the 29th percentile (Table 3, Figure 3).

	n	Before		After		t statistic
		Mean	SE	Mean	SE	
GMRT	109	33.9	1.15	38.5	1.11	-4.553*

Table 3. Students improved their reading skills significantly following Fast ForWord participation. Scores shown are normal curve equivalents. *p<0.05.

GMRT Results: Third and Fourth Graders

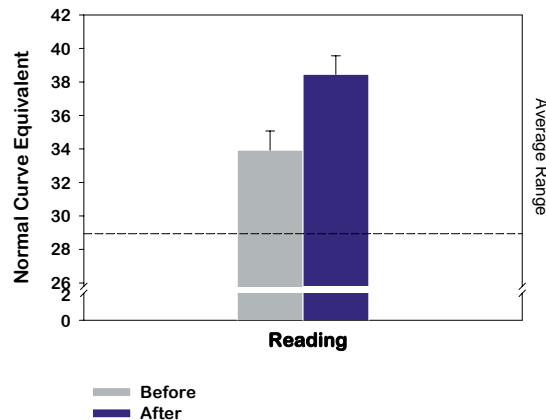


Figure 3. Third and fourth grade students made significant gains on measures of overall reading ability. Results from 109 students are shown.

Louisiana Educational Assessment Program for the 21st Century (LEAP 21): Because the LEAP 21 is given only in the fourth grade, this study only evaluates the 51 students who were retained; these students had scores available from two sequential years. These students were assessed with the Language Arts portion of the LEAP 21 in March of 2004, before or near the beginning of Fast ForWord participation. Because they repeated the fourth grade, they were assessed again the following year, after or near the end of Fast ForWord participation. Most students had finished using Fast ForWord products by the beginning of 2005, although a few students continued to use the products for up to two months following the testing. Performance on the LEAP 21

improved significantly, with scaled scores increasing from 254 to 294 (Table 4, Figure 4).

The average proficiency level improved. Initially, students were Unsatisfactory or Approaching Basic. The following year they had improved and, on average, were between Approaching Basic and Basic. The number of students performing at the Unsatisfactory level dropped from 26 to 8 and the number of those at the Approaching Basic level dropped from 25 to 18. Initially, no students performed at levels higher than Approaching Basic. After Fast ForWord participation, 25 students (49%) reached the Basic level or higher.

LEAP 21 Results: Fourth Graders

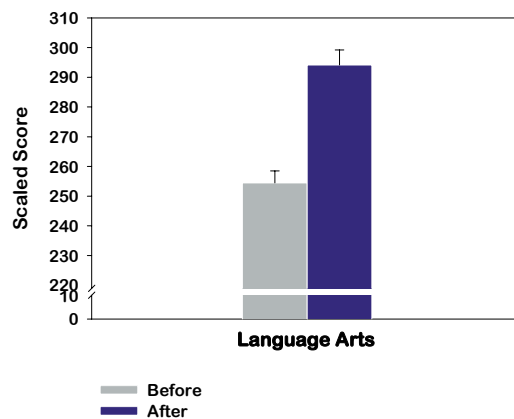


Figure 4. Fifty-one students made significant gains in language arts abilities as measured by the LEAP 21.

	n	2004		2005		t statistic
		Mean	SE	Mean	SE	
LEAP 21	51	254.5	4.06	294.1	5.05	-9.219*

Table 4. Fourth grade students, on average, made significant gains on the LEAP 21 following Fast ForWord participation. * $p < 0.05$.

	Unsatisfactory	Approaching Basic	Basic	Mastery
Before	51	49	0	0
After	16	35	47	2

Table 5. Forty-nine percent of students achieved the Basic level of proficiency or higher after Fast ForWord participation.

DISCUSSION

Students attending schools in the Lafayette School System during the 2003-2004 and 2004-2005 school years made improvements on measures of reading and language skills following Fast ForWord participation. The ITBS and GMRT were analyzed using normal curve equivalents as they are the most appropriate scores for statistical analyses. Scores were then converted back into percentiles for descriptive purposes. Normal curve equivalents are normalized to the grade of the student and the season of administration. This allows for comparisons across grades. Year-to-year, a student acquiring skills at a constant rate relative to his or her peers will maintain a constant normal curve equivalent score.

Third graders who took the ITBS in second and third grade made significant gains in language skills relative to their peers, gaining 22 percentile points. Retained third graders also made significant gains on the Language test average scores increasing from the 36th percentile to the 54th percentile.

Fourth graders with LEAP 21 scores available from before and after Fast ForWord participation made significant gains in language arts abilities. Forty-nine percent of students were performing at the Basic level of proficiency or higher following participation, versus zero percent before participation.

Third and fourth grade students were assessed with the GMRT and made significant improvements. These findings demonstrate that, within the Lafayette Parish School System, 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 Lafayette Parish School System made significant gains in reading and language skills as measured by various nationally normed tests and state assessments. This suggests that using the Fast ForWord products strengthened the students' foundational skills and helped them benefit more from the classroom curriculum.

Notes:

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