

Improved Reading Achievement by Students in the Dallas Independent School District who used Fast ForWord[®] Products and/or Reading Assistant[™]: 2007 - 2008

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord products and/or Reading Assistant program on the reading achievement and reading skills of students who used the products within the curriculum in a school setting.

Results: After using Fast ForWord products, a group of struggling middle school and high school readers narrowed the gap with their peers state-wide, with the discrepancy between the TAKS scores of the students in the study, and students statewide, decreasing by 18% after Fast ForWord participation. In addition, high school students who used a combination of the Fast ForWord products and Scientific Learning's Reading Assistant software significantly improved their reading fluency skills with their average skill level improving from the 15th percentile to the 31st percentile.¹

Study Design: This report encompasses two studies. The design of the first study was a multi-school case study using high stakes assessments to evaluate the Fast ForWord products. The second was a single school case study that used nationally normed assessments to evaluate a combination of the Fast ForWord and Reading Assistant products.

Participants: Study participants were students attending middle and high schools in the Dallas Independent School District in Dallas, Texas.

Materials & Implementation: Following staff training on the Fast ForWord products, a group of students used the products during the 2007-2008 school year and had their reading abilities assessed with Texas Assessment of Knowledge and Skills (TAKS). Following additional staff training on the Reading Assistant product, another group of students used Reading Assistant and the Fast ForWord products in the spring of 2008 and had their word reading and fluency skills assessed with the Test of Word Reading Efficiency (TOWRE).

Keywords: Texas, public school, middle school, high school, urban, observational study, Fast ForWord Language Basics, Fast ForWord Middle & High School, 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, Reading Assistant, Texas Assessment of Knowledge and Skills (TAKS), Test of Word Reading Efficiency (TOWRE).

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

¹ Views expressed in this report are those of the research group at Scientific Learning and may not reflect the opinion of the Dallas Independent School District.

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.

In 2000, the Dallas Independent School District started using the Fast ForWord products at Barbara Manns Alternative High School. Then, during the 2001-2002 school year, the District's Division of Evaluation and Accountability did a study on the products and, among Fast ForWord participants, found substantial increases in the number of students passing the TAAS, with 90% of the teachers reporting improvements in skills critical to learning such as listening skills, the ability to follow the flow of a conversation, and the ability to recall a series of events in proper sequential order. During the 2003-2004 school year, the district decided to use the Fast ForWord products in all of their high schools.

A longitudinal study tracking students from 2004-2007 demonstrated that students who used the Fast ForWord products improved their performance more than students who did not use the Fast ForWord products. The Fast ForWord participants in the study were struggling readers, performing lower than the average of students statewide. However, after using the Fast ForWord products, they narrowed the gap by 25%.

During the 2007-2008 school year, the district was interested in continuing their studies on the impact of the optimal learning approach, using the TAKS to evaluate students before and after Fast ForWord participation (in 2007 and 2008). They were also interested in evaluating the impact of a combination of Scientific Learning's Reading Assistant software and Fast ForWord products on fluency skills. The students in the second study were evaluated with the Test of Word Reading Efficiency (TOWRE) before and after product participation. The TOWRE is an assessment of a student's ability to read sight words as well as to decode nonsense words.

For both studies, commercially available computer-based products² (Fast ForWord Language Basics, Fast ForWord Language to Reading, Fast ForWord Middle

² Fast ForWord Language and Fast ForWord Reading Level 5 were used by fewer than 5% of the students so information about those products is not included.

& High School, 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, and Reading Assistant) were used to evaluate the effectiveness of an optimal learning environment for improving the academic performance of middle and high school students.

METHODS

There are two studies described in this report. The first one focuses on students who used the Fast ForWord products during the 2007-2008 school year and had TAKS scores available from both 2007 and 2008. The second study focuses on students who did not use the Fast ForWord products until April of the 2007-2008 school year, at which time they used a combination of the Fast ForWord and Reading Assistant products. Students in the second group were evaluated before and after participation with the Test of Word Reading Efficiency (TOWRE).

Participants

Dallas is the third largest city in Texas and the ninth largest city in the nation. It also is considered to be among the most diverse communities in the nation. During the 2005-2006 school year, the Dallas Independent School District spanned 351 square miles and 11 municipalities. More than 161,000 students were enrolled in its 217 schools. The student population was 63% Hispanic and 31% African-American. Students in the district came from homes where more than 70 different languages were spoken.

The Dallas Independent School District uses the Fast ForWord products with struggling middle and high school students. For high school students who meet eligibility for tier two intervention, there is a ninth grade elective credit reading course that includes Fast ForWord participation. Tier two eligibility is defined as students reading below the 40th percentile or students who have a TAKS Reading score below 2100. Tier two eligibility is applied equitably across all students including English language learners, those receiving services for special education, and students at risk for academic failure.

The combination of the Reading Assistant and Fast ForWord products was used with a group of students at W.T. White High School who were eligible for tier two intervention, but had not been able to fit Fast ForWord participation into their schedules.

Since the TAKS was administered in early March, the Fast ForWord study focuses on the 535 students in the Dallas Independent School District who used Fast

ForWord products during the 2007-2008 school year, started prior to December 31, 2007, and had TAKS scores available from both before, and after, participation. These students represent 35 of the middle and high schools in the District that are using the Fast ForWord products. Since the District targets ninth graders for the intervention, half of the students with scores available for this study used the Fast ForWord products as freshmen (n = 305). Another third (n = 206) were in 7th or 8th grade.

The students with scores available for the study were primarily Hispanic (72%) and Black (26%). Most of the students (94%) were receiving services for Title I; 41% had limited English proficiency and 13% were receiving services for special education.

The Reading Assistant/Fast ForWord study focuses on 25 students who used Reading Assistant and Fast ForWord products in April and May, had not used Fast ForWord prior to this study, and had TOWRE scores available from both before, and after, participation.

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 and Reading Assistant 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.

The Reading Assistant product is a computer-based tutor for guided oral reading. Reading Assistant combines advanced speech recognition technology with scientifically-based interventions to help elementary and secondary students strengthen their reading fluency, 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 at <http://www.scientificlearning.com>.

Product Name	Primary Skills									
	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 to Reading	•		•	•	•	•	•		•	
Fast ForWord Middle & High School	•	•	•	•	•	•			•	
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						•	•	•	•	•
Reading Assistant								•	•	•

Table 1: The Fast ForWord and Reading Assistant 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 using the products, the reading skills of students in the Fast ForWord study were assessed with the Texas Assessment of Knowledge and Skills (TAKS) while the reading skills of students in the Reading Assistant/Fast ForWord study were assessed with the Test of Word Reading Efficiency (TOWRE).

TAKS scores are reported in terms of the Reading Scale Score. The District provided the 2007 and 2008 scores for students who used the products and had scores available.

TOWRE scores are reported in terms of standard scores which are age-corrected. A teacher trained in the administration of the TOWRE administered the assessment immediately before students used the Reading Assistant product and again immediately following product use, and provided the protocol sheets for scoring and analysis.

Texas Assessment of Knowledge and Skills (TAKS): The Texas Assessment of Knowledge and Skills is administered annually throughout Texas. The TAKS is closely aligned with state curricular standards (Texas Essential Knowledge and Skills). The Reading subject-area test of the TAKS, which is administered to students in grades 3-9, measures a student's ability to comprehend and critically analyze culturally diverse written texts. The English-Language Arts subject-area test of the TAKS, which is administered to students in grades 10-12, measures writing skills in addition to reading skills.

Test of Word Reading Efficiency (TOWRE): The TOWRE is a nationally normed measure of word reading accuracy and fluency. It monitors growth of the ability to "sound out" words and the ability to accurately recognize familiar words as whole units ("sight words"). The TOWRE contains two subtests: The Sight Word Efficiency subtest assesses the number of real printed words accurately identified within 45 seconds. The Phonemic Decoding Efficiency subtest measures the number of pronounceable printed non-words accurately decoded in 45 seconds.

Analysis

The Fast ForWord impact study examined the reading performance of 5th grade through 11th grade students who used the Fast ForWord products in the 2007-2008 school year and who had TAKS scores available from the spring of 2007 and the spring of 2008. Average scores were calculated, representing the students' performance before and after using the Fast ForWord products.

Because TAKS scoring depends on both the grade-level of the assessment administered and the administration year, it is important to evaluate students' results in the context of comparable scores. State-wide average scores for 2007 and 2008, in the relevant grades, are presented in Table 2.

Average State Scores		
Grade	2007	2008
4	2247	2247
5	2244	2256
6	2366	2350
7	2251	2261
8	2306	2351
9	2241	2255
10	2238	2261
11	2288	2282

Table 2: Average scores on the TAKS, state-wide, for 2007 and 2008.

State-wide average scores for corresponding years and grades were combined³, weighting the averages by the number of Fast ForWord participants in each grade during each year. This gave state-wide grand averages for 2007 and for 2008, for students at the same grade levels as the Fast ForWord participants. Average scores for the participants in the Fast ForWord study were compared to these state-wide grand averages to evaluate the impact of Fast ForWord participation. Note: The use of weighted averages has the potential to distort the relationship between Fast ForWord participation and reading achievement.

As a follow-up analysis, the Texas Growth Index (TGI) was calculated for participants in the Fast ForWord study. The TGI provides an estimate of a student's growth on the TAKS in two consecutive years. A TGI of 0 indicates that the student made the expected improvement. A negative score is less than the typical (or expected) improvement while a positive score is more than the typical (or expected) improvement. The TGI is only appropriate for students who were promoted one grade level between the 2007 and 2008 TAKS. Other students, for example, those who were retained, are not included in this follow-up analysis.

For all participants in the Reading Assistant/Fast ForWord study, the tests and scores were double-

³ Note: The use of weighted average TAKS Reading scores across grade levels should be viewed with appropriate caution. At the time this document was prepared, the treatment of weighted average scores across grade levels was not specifically described on the Texas Education Agency website (www.tea.state.tx.us) and, as such, these analyses may potentially distort the relationship between Fast ForWord use and academic performance.

checked. Scores were then analyzed using multivariate analysis of variance (MANOVA) and paired t-tests, as appropriate. In all analyses, a p-value of less than 0.05 was used as the criterion for identifying statistical significance.

RESULTS

Study of Fast ForWord Impact Product Use

Research conducted by Scientific Learning shows a relationship between product use and the benefits of the products. Product use is composed of content

completed, days of use, and adherence to the chosen protocol (participation and attendance levels). The Dallas Independent School District students typically used the 40- and 50-Minute protocols for the Fast ForWord products. These protocols called for students to use the product for 40 or 50 minutes a day, five days per week for eight to twelve weeks. Some students used 30-Minute protocols which require more days to complete. Detailed product use is shown in Table 3. Note that many students used multiple products.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Language Basics	166	3	9	88%	92%	73%
Fast ForWord Language to Reading	57	15	72	22%	56%	58%
Fast ForWord Middle & High School	36	27	70	73%	67%	73%
Fast ForWord Literacy	478	33	92	77%	88%	66%
Fast ForWord Literacy Advanced	286	31	77	61%	89%	70%
Fast ForWord Reading Level 1	93	18	76	71%	80%	58%
Fast ForWord Reading Level 2	106	16	50	49%	81%	60%
Fast ForWord Reading Level 3	111	32	75	60%	91%	73%
Fast ForWord Reading Level 4	45	30	61	58%	88%	75%
Total	535	66.3	183.4	-	-	-

Table 3. Usage data for students who had TAKS scores from the year before and after Fast ForWord participation, and who are included in the first analysis below. The data show 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. Total values reflect the average total number of days that students used products. Note: Students often use multiple products. Fast ForWord Language and Fast ForWord Reading Level 5 were used by fewer than 5% of the students and are not included in the table.

Study of Fast ForWord Impact Assessment Results

Compared to state averages: The first analysis included all students who had two TAKS scores and started using the Fast ForWord products prior to December 31, 2007. The 2007 scores of Fast ForWord participants were compared to average scores statewide for students in corresponding grade levels in 2007, and the 2008 scores of participants were compared to average scores statewide for students in corresponding grade levels in 2008. In 2007, the average grade level of the participants was 7.46, and the statewide average for students at similar grade levels was 2292.0. In 2008, the average grade level of the participants was 8.38 and the statewide average for students at similar grade levels was 2279.4. During that same timeframe, the average

TAKS Reading scores for students in the study increased from 2040.2 to 2076.8 (Table 4).

Fast ForWord Participants	Average	SE
2007 TAKS Reading Score	2040.2	6.6
2008 TAKS Reading Score	2076.8	6.5

Table 4. TAKS Reading Scores were available for 2007 and 2008 for 535 middle and high school students who used the Fast ForWord products. This table gives the mean and standard error for the scores.

Initially, the gap between the students who used Fast ForWord products, and students in comparable grades was 251 points. After Fast ForWord participation, the gap was narrowed to 205 points, a decrease of 18% (Figure 2).

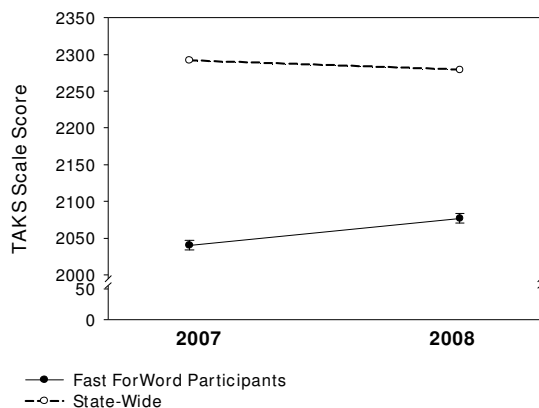


Figure 2. After Fast ForWord participation, 535 students who were evaluated with the TAKS improved their Reading or English Language Arts scores, reducing the gap between their scores and those of students state-wide by 18%.

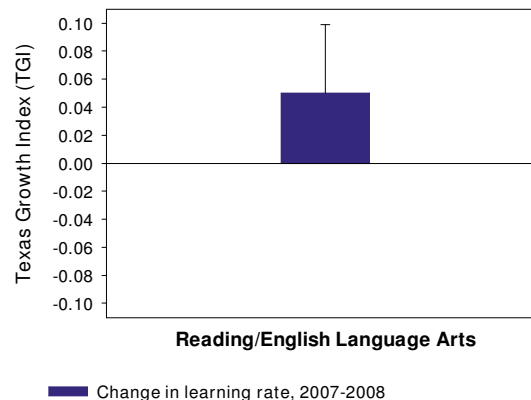


Figure 3. After Fast ForWord participation, the TGI was calculated for 472 students who were evaluated with the TAKS. TGI scores above 0 indicate improvements above that which was expected.

Using the Texas Growth Index (TGI): The TGI provides an estimate of a student’s growth on the TAKS in two consecutive years and is only appropriate for students who are promoted one grade level.

Four hundred seventy-two students from the prior analysis were promoted one grade level between 2007 and 2008 and were appropriate for the TGI analysis. The TGI for the group was 0.05 (Figure 3), a positive value indicating that the group improved more than expected.

ForWord products. As part of this study, they used the Fast ForWord and/or the Reading Assistant products 50 minutes a day, five days a week.

All students started with the Fast ForWord Literacy 30-Minute Protocol; a few completed Fast ForWord Literacy and progressed to the Fast ForWord Literacy Advanced product. Three days a week, the students also used Reading Assistant for twenty minutes; the other two days, students used the Fast ForWord products for another 20 minutes giving a total of 50-minutes of product use, 5 days a week, for six weeks.

Study of Reading Assistant/Fast ForWord Impact Product Use

The students who were in the Reading Assistant/Fast ForWord study had not previously used the Fast

Tables 5 and 6 give product use information for this study.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Literacy	25	22	39	70%	87%	63%
Fast ForWord Literacy Advanced	6	8	12	24%	99%	74%
Total	25	23.5	42.0	-	-	-

Table 5. Usage data for students who used Fast ForWord products and Reading Assistant and are included in the second study. The data show 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. Total values reflect the average total number of days that students used products. Note: Students often use multiple products.

Product	Number of Students	Days Participated	Minutes per Day	Words Read	Reading Rate (WPM)	Questions Answered	Percent Correct
Reading Assistant	25	11	9.1	4,860	55	101	83%

Table 6. Usage data showing the number of students who used the Reading Assistant product (test scores were , along with group averages for the number of days participated, minutes of product use per day, time on task (the percentage of total product use time spent in one of the product’s learning modes, either reading aloud to the computer, listening to recordings, reviewing vocabulary, or answering comprehension questions), total words read (or re-read), reading rate in words per minute (WPM), number of comprehension questions answered, and the percentage of those answers that were correct.

Study of Reading Assistant/Fast ForWord Impact Assessment Results

The students were assessed with the Test of Word Reading Efficiency (TOWRE) in mid-April and then again in late May. A multivariate analysis of variance (MANOVA) was performed with the Sight Word Efficiency and the Phonemic Decoding Efficiency scores from before and after participation. There was a main effect of time, but no test effect or time by test interaction (Table 7).

Test of Word Reading Efficiency		
	df	F-statistic
Time	24	136.1*
Test	24	0.859
Time x Test	24	0.047

Table 7: A MANOVA revealed a main effect of time, with students performing better on the post-test than the pre-test. The analysis did not find a significant difference between the two subtests or a time by test interaction. $p < 0.05$.

Since there was no time by test interaction, it is appropriate to focus on the total scores (Figure 4). However, scores for the two subtests are given along with the total fluency score in Table 8.

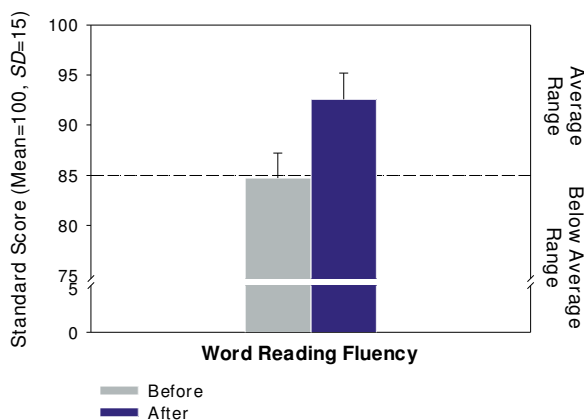


Figure 4. After six weeks of participation on the Fast ForWord and Reading Assistant products, the study group showed significant improvement in reading fluency. Results from 25 students are shown here.

	N	Before		After	
		Mean	SE	Mean	SE
Sight Word Efficiency	25	86.7	1.8	93.2	2.3
Phonemic Decoding Efficiency	25	87.8	2.6	94.5	2.3
Total Fluency	25	84.7	2.5	92.6	2.6

Table 8: Mean and standard errors for the two subtests, as well as the total fluency score.

DISCUSSION

During the 2007-2008 school year, struggling students attending middle and high schools in the Dallas Independent School District, used Fast ForWord products. Students at one high school used both Fast ForWord and Reading Assistant products for a short time at the end of the school year.

On average, students who used the Fast ForWord products made progress on the TAKS, narrowing the gap between their performance and that of students statewide.

Students who used the Fast ForWord/Reading Assistant combination also made significant gains, showing dramatic improvements in their reading skills. After six weeks of participation, overall word reading fluency improved from an average standard score of 84.7 to 92.6. This corresponds to an improvement from the 15th percentile to the 31st percentile, or moving from slightly below the average range to well within the average range.

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 use of the Fast ForWord and Reading Assistant products, middle and high school students in the Dallas Independent School District made statistically significant gains in their reading achievement and reading skills. This supports other studies, conducted within the Dallas Independent School District and elsewhere, showing that using the Fast ForWord and Reading Assistant products strengthens students' foundational skills and better positions 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).

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.

Texas Education Agency: TAKS Summary Reports.
<http://www.tea.state.tx.us/student.assessment/reporting/results/summary/taks.html>

Torgesen, JK, Wagner, RK, & Rashotte, CA (1999). Test of Word Reading Efficiency. Austin, Texas: Pro-Ed.