Dallas Independent School District

FINAL REPORT OF THE 2001-2002 SCIENTIFIC LEARNING/FAST FORWORD PROGRAM

REIS02-168-2

DIVISION OF EVALUATION AND ACCOUNTABILITY

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Dallas Independent School District

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FINAL REPORT
SCIENTIFIC LEARNING/FAST FORWORD PROGRAM: 2001-2002

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Final Report

SCIENTIFIC LEARNING/FAST FORWORD PROGRAM: 2001-2002

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Abstract

Fast ForWord is a series of CD-Rom and Internet-based programs produced by the California-based Scientific Learning Corporation. The programs are based on years of brain research by the company's founding scientists and strive to help at-risk children build skills necessary for success in reading. Ten Dallas Independent School District campuses – nine elementary and one high school – used the Fast ForWord programs in 2001-2002. At the time of the study, the programs required an intensive training schedule of 90-100 minutes a day, five days a week, for at least four weeks. Since then, Scientific Learning has released a schedule for one Fast ForWord program that requires 48 minutes a day, five days a week, for six to ten weeks. Schools pay $24,900 the first year, $19,900 the second, and $9,995 the third year for the program. About 1,350 DISD students underwent Fast ForWord training this school year. Participating students were overwhelmingly Hispanic (73%), and slightly more than half of them (52.8%) were male. More than half (55%) had limited proficiency in English, and 62% were eligible for free or reduced-price lunches. More than two-thirds of the students were in Grades 2-5. Students who received Fast ForWord training during the school day were taken from their regular classrooms to attend training, and then returned at the completion of the day's session.

An assessment of program implementation revealed that the schools mostly adhered to the recommended 90-100 minute training guidelines and that most students trained for at least four weeks. However, student attendance was sometimes inconsistent. Surveys of classroom teachers revealed mixed results. A majority of teachers saw improved reading, attentiveness, and classroom participation from their students who participated in Fast ForWord, while others saw little or no improvements. Some of the surveyed teachers said the effects of Fast ForWord sometimes take time to reveal themselves. Results of the *Texas Assessment of Academic Skills* (*TAAS*) test revealed that participating students made statistically significant gains in reading and mathematics. The gains were relatively small, as measured by effect sizes. Fast ForWord students made smaller gains on their normal curve equivalent scores on the *Stanford 9/Aprenda*, but the gains were generally not statistically significant. Second graders made some statistically significant gains on the Texas Primary Reading Initiative (TPRI) test.

Observations of training sessions found that many students were pulled from regular classes to participate in Fast ForWord training, raising concerns about missing classroom content. In the study, Fast ForWord products were used both during and after-school hours. It is recommended that schools use Fast ForWord during the after-school hours to limit pulling students from class. Schools also should encourage regular and consistent attendance at sessions. Data uploaded to Scientific Learning should include the students' district identification numbers. Future evaluations should employ a more longitudinal perspective.

Program Description

Fast ForWord is a series of programs developed by the Scientific Learning Corporation of Oakland, Ca. Fast ForWord is a CD-ROM and Internet-based training program that strives to help at-risk children build oral language comprehension and other skills necessary for success in learning to read. The Fast ForWord series of programs was developed by research scientists who conducted extensive studies in brain research and the neurological basis of language development. Their studies found that students can develop critical language skills with the help of computers in an intensive training program in which speech sounds are altered and reproduced. The Fast ForWord programs present a series of training exercises in a game-like setting. The exercises use varying levels of acoustically altered speech. At the lowest levels, sounds are stretched and emphasized, and progress to natural speech at the highest level. The programs aim to help students develop skills in phonemic awareness, auditory processing speed, phonological awareness, working memory, grammar, syntax, and other skills related to reading. The products require intense, dedicated participation and have recommended protocols that have been tested for effectiveness. Different products have different protocols. There is a recently released 48-minute protocol for the Fast ForWord Middle & High School program where students use the exercises for 48-Minutes each day, five days per week, for six to ten weeks. Although the company is working on other protocols of similar duration, the ones available at the time of the study were 90- or 100-Minutes per day, five days per week, for four to eight weeks.

PURPOSE AND SCOPE OF THE EVALUATION

The purpose of the evaluation is to provide context, process and outcome data to the project managers and administrators for assessing program efficacy, and planning and implementing future activities to improve program operations.

MAJOR EVALUATION QUESTIONS

2.1 What was the context of the Fast ForWord program?

Methodology

Journal literature, program materials, and interviews with Scientific Learning representatives were used to collect context data.

Results

Literature Review

More than 25 years of neuroscientific research by the principal scientists of Scientific Learning Corporation and others formed the genesis of the Fast ForWord program. Citing longitudinal studies, Tallal et al. (1998) noted a convergence between preschool language impairments and later reading difficulties, including dyslexia. These studies gave rise to the term "Language-based learning impairment." Children with language impairments are developing normally in all areas, but fail to acquire language skills at the expected rate. Research cited by Tallal et al. (1998) suggests that deficient phonological processing skills are the roots of these language impairments. Normal phonological processing is critical to the development of written and spoken language. Children with language impairments appear to have difficulties perceiving and producing rapidly convergent sensory and motor information. Studies cited by the researchers have shown that subjects with language impairments require additional time to process brief stimuli that are followed rapidly by other stimuli.

In 1994 and 1995, scientists from Rutgers University and the University of California at San Francisco conducted studies to measure the effectiveness of the technology and methods that would be the basis of Fast ForWord. The results of these studies were published in 1996 in the peer-reviewed journal *Science*. Information regarding the subjects of the two studies is shown in Table 1. Subjects in both studies exhibited delayed language development, as demonstrated by mean language ages that were lower than the mean physical ages.

Table 1

Characteristics of 1994-1995 Subjects

Characteristic	Study 1	Study 2
Sample size	7	22
Mean age	7.3 years	7.4 years
Age range	5.9-9.1 years	5.2-10 years
Mean language age	4.8 years	4.9 years

The treatment used in both studies consisted of two audiovisual exercises or "games" that were precursors of the Fast ForWord program. The first game was a perceptual identification

task, requiring subjects to reproduce a sequence of two sounds by using touch-screen buttons. The second game was a phonetic recognition exercise, which presented consonant-vowel stimuli and required subjects to identify the correct sequence position. Speech and sounds in both exercises were acoustically modified, presented at varying speeds and volume levels. In the first study, all seven subjects were trained on the two games for 19-28 sessions of 20 minutes each over a four-week period. The second study divided the 22-subject sample into treatment and control groups of 11 each. The treatment group received training with acoustically modified speech, while the control group received the same training, only with no acoustic modification.

As outcome measures, both studies used the Tallal Repetition Test, which measures the threshold interstimulus intervals at which subjects perceive sequences of two-tonal stimuli at varying rates of duration (measured in milliseconds), and the Goldman-Fristoe-Woodcock Diagnostic Auditory Discrimination Test, which was designed to measure the ability to identify phonic elements within words. In the first study, the subjects demonstrated significant gains on the Tallal test in their sequencing abilities and temporal event recognition. Six of seven subjects made significant gains on the Goldman-Fristoe-Woodcock, translating to an average gain of 1.5 years in language development age.

The second study sought to replicate these results with a larger sample and add a control group. Ten of eleven treatment subjects showed improved performance in identification of rapidly successive stimuli, as measured by the Tallal test. On the Goldman-Fristoe-Woodcock measure of phonic identification, 6 of the 11 treatment subjects demonstrated statistically significant progress. The five treatment subjects with the lowest performance results were found to have spent less time on the training exercises. The control subjects had equal or poorer performances on the Tallal test after their four-week training period. The research team concluded that temporal processing deficits in children with language learning impairments could be overcome by training.

Scientific Learning Corporation was founded in 1996, and its Fast ForWord program was developed, based in part on the results of the studies discussed above. In 1996, Scientific Learning conducted a national field trial to evaluate whether the program would be successful in

broader, real-world settings, with a much larger sample. The National Field Trial (Scientific Learning Corporation, 1997) was conducted at 35 sites across the United States and Canada. The study examined the impact of Fast ForWord on auditory word discrimination, following directions, and overall language development. Subjects in the National Field Trial were assessed for auditory word discrimination abilities with the Goldman-Fristoe-Woodcock test. They were given the Token Test for Children to measure their ability to follow spoken directions. Subjects were assessed before and after Fast ForWord training. Pre- and post-intervention results are shown in Table 2. As shown below, only 7% of students scored at the level expected of their respective age levels on Goldman-Fristoe-Woodcock prior to Fast ForWord training. After training, the percentage increased to 39%. On the Token Test, only 13% had pre-test results at or above the standard mean. Post-testing revealed that 45% of subjects scored at or above the standard mean.

Table 2

Pre- and Post-Intervention Results for National Field Trial Subjects

Test name	N tested	% of students scoring above expected level pre-Fast ForWord	% of students scoring above expected level post-Fast ForWord
Goldman Fristoe Woodcock (auditory word discrimination)	235	7	39
Token Test for Children (ability to follow directions)	329	13	45

To examine the impact of Fast ForWord on overall language development, subjects in the National Field Trial were given two assessment tests: the Clinical Evaluation of Language Fundamentals and the Test of Language Development, Primary. The Clinical Evaluation of Language Fundamentals measures a wide range of expressive and receptive language skills, while the Test of Language Development, Primary, measures a child's ability to combine sentences, understand word meanings and sentence structures, and make generalizations. Results of these tests are displayed in Table 3.

Table 3

Language Development Test Results for National Field Trial Subjects

Test name	N tested	Pre-test scores above standard mean	Post-test scores above standard mean
Clinical Evaluation of Language Fundamentals, Receptive	90	7%	27%
Clinical Evaluation of Language Fundamentals, Expressive	77	5%	20%
Test of Language Development, Primary	77	15%	42%

Researchers concluded, based on the results of the National Field Trial, that Fast ForWord has the potential to benefit a wide range of children with reading and language problems.

In addition to the National Field Trial, Scientific Learning conducted a study (Miller, Merzenich et al., 1999) that sought to assess the impact of language training, such as the type offered by Fast ForWord, on children who were at-risk for failure in reading, but who were not diagnosed with a language or learning impairment. The study's subjects consisted of 452 children identified by teachers as academically at-risk based on performance in the language arts curricula of their schools. Subjects were assigned to treatment and control groups based on a stratified randomization procedure. The treatment group subjects (N=288) trained on Fast ForWord for 100 minutes a day, five days a week for an average of 39 days (days of training ranged from 15-116 days, with a standard deviation of 15.5). A child could end his or her Fast ForWord training upon reaching a 90% performance level on five of the program's seven exercises. Student performance was measured on three assessment instruments: Test of Auditory Comprehension of Language – Revised, Phonological Awareness Test, and the Woodcock-Johnson Single Word Reading test. Tests were given before and after Fast ForWord training. On all assessments, the group that received Fast ForWord training made larger improvements over their pre-test scores than the control group members. Other results included a finding that English as a Second Language subjects who received Fast ForWord training made greater gains than the control subjects. In addition, at the conclusion of the training, the gains in auditory comprehension performance did not differ significantly between ESL subjects and native English speakers in the treatment group. Pre-test assessments showed the ESL subjects in the

experimental group to have slightly lower scores. Further, ESL subjects made greater improvements in phoneme deletion – the ability to identify what is left in a word after a segment is removed (For example: Pronounce “bright” after “b” is removed. “Right.”) – than native English speakers in the treatment group. The researchers concluded that acoustically modified language training programs such as Fast ForWord could be successfully applied with ESL students in school settings. Finally, 75% of the children in the treatment group were effectively removed from the at-risk classification, based on performance scores in the post-intervention assessment that showed them to be near the median performance level expected of their respective age groups.

Turner and Pearson (1999) sought a more descriptive examination of Fast ForWord’s impact. Utilizing a case study methodology, Turner and Pearson (1999) presented four cases that received Fast ForWord training through the Dallas-based Callier Center for Communication Disorders. All four subjects had demonstrated language impairments or had received speech therapy prior to enrolling in Fast ForWord training. Results of Clinical Evaluation of Language Fundamentals testing, before and after Fast ForWord training, are shown in Table 4. The four cases were given all or part of the Clinical Evaluation of Language Fundamentals assessment. Results varied, with cases 1 and 4 showing the largest improvement. Case 2 remained in the lowest percentile in his overall language score, but showed significant improvement in the test’s expressive language component, improving from the lowest percentile to the 12th percentile. But Turner and Pearson (1999) noted that there was no significant improvement, otherwise. This student was diagnosed with Attention Deficit Hyperactivity Disorder at age 8 and had a suspected history of drug abuse and neglect by his biological mother. All four cases showed varying levels of improvement in some area of language. The authors concluded that Fast ForWord does not benefit every child in the same area or to the same extent. Some cases demonstrated large improvements, while others showed only minimal gains.

Table 4

Pre- and Post-Training Test Results for Callier Center Cases (Turner and Pearson, 1999)

Case	Weeks of training	Pre-training percentile	Post-training percentile
1. White male, age 6	5	4	84
2. Hispanic male, age 11	9	1	1
3. White male, age 13	4	55	58
4. White male, age 12	4	12	60

Note: Case 4's results were the average of two subtests on Clinical Evaluation of Language Fundamentals and the Test of Language Development, covering auditory sentence memory and following directions.

Schopmeyer et al. (2000) asked if Fast ForWord training could benefit a different population of children – namely, children with cochlear implants. The research team asked if children with cochlear implants had the auditory capability to perform the tasks presented through computerized, temporally altered signals, and whether the training would produce language and auditory skill benefits for this population. Using a sample of 11 children with cochlear implants who were currently or previously enrolled in the Johns Hopkins rehabilitation program (mean age: 7.5 years, range 4.8-11.4 years). Four of the subjects were tested three times at eight-week intervals and received Fast ForWord training during the second eight-week period, while the remaining seven students were tested twice, before and after Fast ForWord training. The subjects were given a variety of assessments, including the Token Test, Clinical Evaluation of Language Fundamentals, Test of Auditory Perceptual Skills, and Assessment of Children's Language Comprehension. Among the four subjects who were tested three times, all showed statistically significant gains on the tests given. The other seven subjects, who were given the complete Clinical Evaluation of Language Fundamentals, had a pre-training mean of 85 and an observed post-training mean of 110, exceeding the predicting post-training mean of 90 ($p = .006$). In addition to these results, the research team surveyed subjects' parents on perceived changes in their children's communication skills. More than 80% of the survey items were marked as improved. However, "marked changes" accounted for only 5% of the responses, while 35-40% were "small changes," and 25% were "notable changes." The authors concluded that children with cochlear implants could perform the auditory perceptual and linguistic tasks of Fast ForWord.

Miller et al. (1999) examined the relationship between Fast ForWord performance and language outcomes on the Clinical Evaluation of Language Fundamentals. Subjects consisted of 216 children considered to have receptive language impairments, in the judgment of independent speech and language pathologists. The mean age of the subjects was 8 years, 9 months, with a range from 4-18 years of age. The subjects had mean receptive and expressive language scores less than one standard deviation below the norm. The students trained on Fast ForWord for 100 minutes a day for an average of 39 days (range was 15-116 days). The subjects demonstrated statistically significant increases on both the receptive and expressive language components of the Clinical Evaluation of Language Fundamentals assessment.

The research team also tracked the subjects' completion of Fast ForWord training exercises, using the percent complete to divide the subjects into three groups. The first group consisted of children who had completed more than 90% of the exercises. Children who were 20-90% complete were in the second group, while group 3 was comprised of children who were below 20% complete. It should be noted that a child could, for example, be in the first group for one Fast ForWord exercise and the third group for another. Employing a multivariate analysis of variance, the researchers investigated whether scores on the Clinical Evaluation of Language Fundamentals pre-test influenced performance on the seven Fast ForWord exercises or "games." Improvement on the test's receptive language component did not differ significantly among the three subject groups, but significant variation was noted among the groups on the expressive language component. Improvements in expressive language scores were highest among children with the highest training performance.

More recently, researchers from Scientific Learning conducted a study in Dallas to examine the relationship between compliance with the Fast ForWord training schedule and the benefits of the program (Scientific Learning, 2002). The researchers collected data on 25 students at Barbara Manns High School who trained on Fast ForWord in the fall of 2000. The students were tested before and after training. Eight were tested with the Test of Adult Basic Education and 17 with the Diagnostic Skills Profile. On average, the students trained for an average of 11 days over a period of 39 calendar days, completing 58% of the exercise material

and achieving 49% compliance with the training schedule. Compliance was defined as the intensity and duration of student training compared to the suggested training schedule. Nationwide, the average compliance score is 68%, compared to a recommended compliance score of 80%. The percentage completed indicated the average amount of training content mastered by students. Scores of 80% or higher indicate that students progressed to the natural speech level.

Results from Barbara Manns High School indicated that, on average, the eight students tested with the Test of Adult Basic Education progressed from the seventh grade level to the 10th grade level in basic educational skills. The 17 students tested with the Diagnostic Skills Profile moved from the sixth grade level to the ninth grade level in terms of state performance standards for reading. Further, the students who completed the training moved to the 10th grade level, on average, as measured by the Diagnostic Skills Profile.

Scientific Learning Fast ForWord Program Descriptions

Scientific Learning offers four different products in its Fast ForWord family of programs. Each training program is designed to assist students at various stages of language and reading development. All programs are CD-ROM and Internet-based, using technology to assist in the development of reading and language skills. A description of each individual program follows.

Fast ForWord Language is intended to clarify sounds and develop the oral language skills that provide the foundation for reading. The program targets such skills as phonological awareness, sustained focus and attention, listening comprehension, and language structures.

Fast ForWord Language to Reading (formerly Step 4Word) contains a series of exercises that train language and reading skills critical to learning to read or becoming a better reader. The exercises target skills that link spoken and written language, such as sound-letter recognition, decoding, vocabulary and syntax, grammar, listening comprehension, and word recognition.

Fast ForWord Reading strives to build key reading skills such as word recognition and fluency, advanced decoding, spelling and vocabulary, and passage comprehension. The program is designed for students in various stages of reading development.

Fast ForWord Middle and High School is designed for older students and trains fundamental language skills that are critical for success in reading. Targeted skills include sustained focus and attention, listening comprehension, sequencing, and organization.

Table 5 displays a suggested place on which program to use, based on reading skill level. For students whose reading and language skills are below basic, *Fast ForWord Language* is recommended for younger students, while *Fast ForWord Middle and High School* may be the appropriate starting program for older students.

Table 5

Recommended Starting Places, Based on Reading Skill Level

Program	Below Basic	Basic	Proficient
Fast ForWord Language	✓		
Fast ForWord Language to Reading		✓	
Fast ForWord Reading			✓
Fast ForWord Middle and High School	✓		

More detailed descriptions of the Fast ForWord programs and the exercises they contain follow.

Fast ForWord Language consists of seven individual exercises that train students in the basic speech sounds and fundamental skills needed for learning to read. There are three sound exercises and four word exercises. The sound exercises present auditory information in a pre-word format using varying frequencies, speech sounds, phonemes, and time durations. The word exercises present words of varying complexity by themselves or within sentences. The words are acoustically modified to emphasize phonetic elements of speech. The sound exercises are Circus Sequence, Old MacDonald's Flying Farm, and Phoneme Identification. The four word exercises used in Fast ForWord Language are Phonic Match, Phonic Words, Language Comprehension Builder, and Block Commander.

- Circus Sequence – This exercise is set in a circus tent. Students doing the exercise must correctly identify a sequence of two sound sweeps by clicking the buttons that correspond to specific sweeps. The exercise trains working memory, sound sequencing, and auditory processing rate.

- Old MacDonald's Flying Farm – In this exercise, students click on an animated graphic of a flying farm animal. When they do this, the exercise repeats a single syllable. When the exercise interrupts this sequence with a different syllable, the student releases the mouse button, releasing the animal. This exercise trains auditory processing rate, phoneme discrimination, and the ability to sustain and focus attention.
- Phoneme Identification – This exercise depicts a contest between two characters. At the beginning of the exercise, the target syllable is announced. Then, each character announces a syllable. One of them will state the target syllable, while the other announces a distracter syllable that does not match the target. The student's task is to click the character that announced the target syllable. Phoneme Identification trains working memory, identification and discrimination of phonemes, and rate of auditory processing.
- Phonic Match – The exercise presents grids of tiles, in which each tile has an associated word or sound. The student's goal is to find each tile's match and clear the grid. The exercise trains word recognition, phoneme discrimination, working memory, and rate of auditory processing.
- Phonic Words – In this exercise, two pictures appear, along with instructions to click an object. Students must click the picture that contains or represents the object the exercise instructed them to identify. Phonic Words trains word recognition skills and rate of auditory processing.
- Language Comprehension Builder – This exercise presents a sentence and a series of pictures that are possible representations of the sentence heard. After students hear the sentence, they click the picture that most accurately represents the sentence. Language Comprehension Builder trains language and listening comprehension, syntax, morphology, grammar, and rate of auditory processing.
- Block Commander – Block Commander is a three-dimensional board game involving colored shapes. Verbal instructions tell the student to point to and move the shapes.

This exercises trains listening comprehension skills, syntax, working memory, grammar, and rate of auditory processing.

Fast ForWord Language to Reading consists of five individual exercises – one sound exercise and four word exercises. The five exercises work to train students in basic speech sounds and the fundamental skills needed for improved reading abilities. The sound exercise is called Trog Walkers, and the word exercises are Bug Out, Polar Cop, Treasure in the Tomb, and Start-Up Stories.

- Trog Walkers – This exercise requires students to select a character and win a race by correctly identifying sequences of sound sweeps. The more accurately sounds are identified and sequenced, the faster the character moves along the racetrack. Trog Walkers trains working memory, serial sound sequencing, and auditory processing rate.
- Bug Out – In this exercise, the student is confronted with a grid of animated scarabs, each of which has a word associated with it. Using audio and visual clues, the task is to match scarabs and clear the grid. Bug Out trains sound-letter correspondence and auditory memory.
- Polar Cop – In this exercise, students assume the role of an investigator on the trail of a ring of penguins known as the Word Burglars, who have stolen valuable words. In each scene in the exercise, the student is given a target word. The goal is to match the target word with words that appear in the on-screen viewfinder. Polar Cop trains auditory memory, phoneme discrimination, and sound-letter correspondence skills.
- Treasure in the Tomb – The student assumes the role of an archaeologist hunting treasure in the tomb of the Egyptian Pharaoh Phonemes. Each scene in this exercise displays a gong and two Egyptian characters. To hear the target word, students click the gong. The characters each unroll a scroll that displays a word, one of which will be the target word. The task is to click the character that displays and

reads the target word. Treasure in the Tomb trains phoneme recognition, grapheme recognition, and working memory.

- Start-Up Stories – This exercise presents three stores and related activities. The stories are Chicken Licken, Big Bad Pigs, and Little Red and the Wolf. The first story is presented in heavily modified speech. After hearing the narration and completing the related tasks, the next story is presented in less modified speech. The final story and related tasks are presented in natural speech. The exercises associated with each story test story comprehension, sentence comprehension, and the ability to follow directions. Start-Up Stories trains language and listening comprehension skills, grammar and syntax, working memory, and following directions.

Fast ForWord Reading consists of six individual exercises, each of which focuses on a fundamental skill necessary for improved reading skills. Table 6 displays the names of the six exercises and the corresponding reading skills on which they focus.

Table 6

Fast ForWord Reading Exercises and Skill Focus

Skill Focus	Reading Exercise
Decoding	Scrap Cat Canine Crew
Spelling	Chicken Dog
Sentence Comprehension	Twisted Pictures
Paragraph Comprehension	Book Monkeys Hog Hat Zone

- Scrap Cat – This exercise depicts a junkyard with graphics of bottles and cans, each of which displays a word. The student's task is to clear the junkyard by placing each bottle or can in one of four bins, each of which is labeled with a category. The student must choose the bin that best corresponds to the target word on the can or bottle. In addition to decoding, Scrap Cat trains vocabulary, automatic word recognition, and understanding of semantics, syntax, phonological and morphological properties, and conceptual relationships.

- Canine Crew – In this exercise, an animated steam shovel drops a load of bricks with words written on them above a large pothole in a city street. The student's task is to match synonyms, antonyms, rhymes, and homophones by clicking on a word and then its matching word. Once all word pairs are identified, the pothole will be filled. Canine Crew trains decoding, vocabulary, word recognition, semantics, phonological properties, and conceptual relationships.
- Chicken Dog – This exercise requires students to find the correct missing letters for a displayed word. When the word is said aloud, students then find the missing letters by clicking the graphic that displays the correct letters. Chicken dog trains spelling, letter-sound correspondences, and phonological awareness.
- Twisted Pictures – This exercise is set in an art museum in which the paintings' labels are wrong. Students must organize things by using sentence clues to re-label the portraits. Twisted Pictures trains sentence comprehension, syntax, working memory, logical reasoning, and vocabulary.
- Book Monkeys – In this exercise, students read a paragraph, after which they will hear a question and see possible answers displayed. They click the response that best answers the question. Book Monkeys uses this multiple-choice format to train passage comprehension, understanding of cause and effect, ability to make inferences, working memory, and vocabulary.
- Hog Hat Zone – Students use their reading comprehension skills to put the piping and girders of a new building together correctly in this exercise. The exercise displays paragraphs from children's literature classics, such as Frank L. Baum's The Wizard of Oz and Kenneth Graeme's The Wind in the Willows on the animated pipes and girders. The passages include missing words, and students complete the building by choosing the words that best fill in the blanks. Hog Hat Zone trains understanding of pronouns, auxiliary verbs, prefixes, and suffixes, and how they affect syntax and semantics. The exercise also trains working memory abilities and vocabulary skills.

Fast ForWord Middle and High School, geared mainly toward adolescents, not only trains English language phonemes, but also reading improvement skills. The program consists of three sound exercises and three word exercises. The sound exercises present auditory information in a pre-word format, using various frequencies, speech sounds and phonemes, and time durations. The sound exercises are IDs, Sweeps, and Streams. The word exercises present words alone or within sentences, acoustically modified to emphasize phonetic elements within natural speech. The word exercises are Matches, Cards, and Stories. The word exercises contain five speech levels: levels one and two modify speech by stretching and emphasis, three and four modify speech by emphasis only, and five presents natural speech.

- IDs – The goal of this exercise is to correctly identify the syllable that matches the target syllable. Students will hear the target sound, then two sounds. One sound is the target syllable, while the other is a distracter. Students must click the button associated with the target sound. IDs trains auditory processing rates, working memory, and phoneme identification.
- Sweeps – In this exercise, the object is to correctly identify a sequence of two sound sweeps by clicking the buttons that correspond to the specific sweeps. Sweeps trains auditory processing rates, working memory, and sound sequencing.
- Streams – Students must correctly identify when a new syllable interrupts a repeated syllable in this exercise. Streams trains auditory processing rates, phoneme discrimination, and the ability to sustain and focus attention.
- Matches – This exercise presents a grid of tiles, each of which has an associated word. The goal is to find each tile's match and clear the grid. Matches trains auditory processing rates, word recognition, phoneme discrimination, and working memory.
- Cards – Students are required to distinguish between two words that differ only by their initial or final consonant sound in this exercise, which trains word recognition, and rate of auditory processing.
- Stories – This exercise presents a story, followed by three different activities: story comprehension, sentence comprehension, and following directions. Stories trains

language and listening comprehension, grammar and syntax, working memory, and following directions.

Schools Using Fast ForWord programs

Ten DISD campuses – one high school and nine elementary schools – used Fast ForWord programs during the 2001-2002 school year. Two of the elementary schools – James Bowie and O.M. Roberts – began using the programs in the 2002 spring semester. Table 7 displays the 10 schools that used Fast ForWord programs this year and the programs they used. For Burnet and Walnut Hill elementary schools, 2001-2002 was their first year to use the Scientific Learning programs. Frank, Chavez, Kennedy, Lagow, Saldivar, and Manns were in their second year using the programs.

Three of the schools – Burnet, Lagow, and Saldivar – were rated low performing under Texas accountability standards in 2000, while the remaining schools were rated acceptable. In 2001, Burnet was rated low performing, while most of the other schools were rated acceptable. Walnut Hill received a rating of recognized for 2001.

Table 7

District Campuses That Used Fast ForWord Programs, 2001-2002

School Name	Fast ForWord Programs Used
Anne Frank Elementary	*Language, Language to Reading, Reading*
David G. Burnet Elementary	*Language, Language to Reading, Reading*
Cesar Chavez Learning Center	*Language, Language to Reading, Reading, Middle and High School*
John F. Kennedy Learning Center	*Language, Language to Reading, Middle and High School*
Walnut Hill Elementary	*Language, Language to Reading, Reading*
Richard Lagow Elementary	*Language, Language to Reading, Reading*
Julian T. Saldivar Elementary	*Language, Language to Reading, Reading*
O.M. Roberts Elementary	*Language, Language to Reading, Reading*
James Bowie Elementary	*Language, Language to Reading, Reading*
Barbara Manns High School	*Middle and High School, Language to Reading, Reading*

Table 8 displays the demographic characteristics of the 10 schools that used Fast ForWord programs. The campuses had a combined enrollment of 8,909. Nine of the 10 schools had student populations that were more than 50% Hispanic. At Burnet, Kennedy, Bowie,

Roberts, and Saldivar, Hispanics comprised more than 90% of the enrollment. At Barbara Manns, Hispanics made up 47.3% of the enrollment. At all of the schools, except Walnut Hill and Barbara Manns, most of the students were eligible for free or reduced-price school lunches. At five schools – Burnet, Kennedy, Chavez, Bowie, and Saldivar – the majority of students were limited English proficient. Lagow and Walnut Hill had the largest percentages of special education students.

Table 8

Characteristics of Schools Participating in Fast ForWord

Characteristic	Burnet	Lagow	W. Hill	Kennedy	Frank	Chavez	Saldivar	Manns	Bowie	Roberts
N students	1,516	668	459	931	1,166	881	1,295	368	1,044	581
% Anglo	1.1	27.2	23.5	1.3	17.0	1.1	0.5	4.3	1.0	0.9
% Hispanic	92.2	51.9	60.3	92.2	55.9	86.0	98.1	47.3	95.3	90.0
% Black	6.5	19.6	14.4	3.2	21.4	5.0	0.8	47.8	3.0	8.4
% Asian	0.0	0.3	1.5	3.0	5.4	7.6	0.4	0.3	0.2	0.7
% Am. Indian	0.2	0.9	0.2	0.3	0.3	0.2	0.2	0.3	0.5	0.0
% Low SES	93.0	75.6	50.6	95.3	64.3	91.6	93.8	30.2	93.1	89.0
% LEP	61.4	27.4	23.3	58.8	33.4	56.5	67.3	20.1	60.1	49.9
% Spec. Ed.	1.4	5.1	6.1	4.4	1.9	2.4	0.4	0.8	1.4	2.2

Budget

The budget for the Fast ForWord program in the participating schools was comprised mainly of the cost of the program itself. Schools using the program pay $24,900 the first year, $19,900 the second year, and $9,995 the third year. After the third year, the schools have the option of paying for continued technical support from Scientific Learning. The DISD campuses that used the program were all in their first or second year using it. Most of the participating schools paid the cost of the program out of Title I funds. In addition to the costs of the program itself, some schools budgeted funds for extra-duty pay and computer equipment.

2.2 How was the program implemented?

Methodology

Implementation data were obtained from Scientific Learning documents, interviews, observations, and data on student participants. Implementation manuals from Scientific Learning and interviews with company representatives provided details on recommended implementation guidelines. Fast ForWord teachers at the participating campuses were interviewed, as well. In addition, a series of classroom observations were conducted at four schools. Data on students who received Fast ForWord training were uploaded to Scientific Learning by each participating school. Scientific Learning then forwarded the student training data to the Department of Special Projects Evaluation for analysis. The training data were merged with student data from the District's student database to obtain information on the students who participated in the program.

Results

Students Served and Their Characteristics

The data uploaded to Scientific Learning from each participating campus did not include the students' identification numbers, making the task of matching to the student database a difficult one. The best determination available indicated that 1,349 students underwent Fast ForWord training during the 2001-2002 school year. Demographic data were found on 1,317 of the students. Table 9 displays the number of participants by school and gender. Cesar Chavez Learning Center trained the largest number of students, with 290, while Oran M. Roberts

Elementary trained the smallest number, with 17. Roberts did not begin Fast ForWord training until April 2002. More than half of the students (52.8%) were male.

Table 9

Fast ForWord Students, by Campus and Gender

	Male		Female		Not found		Total	
School	N	%	N	%	N	%	N	%
Barbara Manns	143	58.8	89	36.6	11	4.5	243	100
James Bowie	124	51.0	118	48.6	1	0.4	243	100
David G. Burnet	30	57.7	21	40.4	1	1.9	52	100
Richard Lagow	71	51.8	66	48.2	0	0.0	137	100
Oran M. Roberts	8	47.1	9	52.9	0	0.0	17	100
Walnut Hill	40	45.5	39	44.3	9	10.2	88	100
John F. Kennedy	37	53.6	31	44.9	1	1.4	69	100
J.T. Saldivar	35	60.3	22	37.9	1	1.7	58	100
Anne Frank	71	46.7	78	51.3	3	2.0	152	100
Cesar Chavez	153	52.8	132	45.5	5	1.7	290	100
Total	712	52.8	605	44.8	32	2.4	1,349	100

Table 10 displays other characteristics for Fast ForWord students. Data were not found for 32. Most of the students were Hispanic (73.1%), eligible for free or reduced-price lunches (62.9%), and had limited English proficiency (55.2%). Table 11 shows characteristics by campus.

Table 10

Demographic Characteristics of Fast ForWord Students

Characteristic	N	%
Ethnicity		
African-American	200	14.8
Asian	44	3.3
Hispanic	986	73.1
American Indian	6	0.4
Anglo	81	6.0
Unknown	32	2.4
School lunch eligibility		
Eligible for free/reduced	849	62.9
Not eligible	500	37.1
Special education status		
In special education	48	3.6
Not in special education	1,269	94.1
Unknown	32	2.4
Limited English Proficiency		
LEP	744	55.2
Not LEP	539	40.0
Unknown	3	0.2
Exited	63	4.7

Note: Percentages may not sum to 100 because of rounding.

Table 11

Demographic Characteristics, by School

Characteristic	Manns		Bowie		Burnet		Lagow		Roberts		W. Hill		Kennedy		Saldivar		Frank		Chavez	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Ethnicity																				
African-American	102	42	7	3	9	17	27	20	0	0	12	14	2	3	1	2	25	16	15	5
Asian	2	1	1	<1	0	0	1	<1	0	0	1	1	1	1	1	2	5	3	32	11
Hispanic	122	50	228	94	41	79	73	53	17	100	58	66	65	94	55	95	95	63	232	80
Am. Indian	2	1	1	<1	0	0	1	<1	0	0	0	0	0	0	0	0	0	0	2	<1
Anglo	4	2	5	2	1	2	35	26	0	0	8	9	0	0	0	0	24	16	4	1
Unknown/Missing	11	5	1	<1	1	2	0	0	0	0	9	10	1	1	1	2	3	2	5	2
Free lunch																				
Eligible	66	27	204	84	38	73	99	72	9	53	42	48	59	85	47	81	75	49	210	72
Not eligible	177	73	39	16	14	27	38	28	8	47	46	52	10	15	11	19	77	51	80	28
In special ed.	12	5	2	1	1	2	13	9	0	0	7	8	1	1	0	0	5	3	7	2
Not special ed.	220	91	240	99	50	96	124	91	17	100	72	82	67	97	57	98	144	95	278	96
Unknown/missing	11	4	1	<1	1	2	0	0	0	0	9	10	1	1	1	2	3	2	5	2
LEP	75	31	187	77	37	71	52	38	16	94	32	36	53	77	53	91	71	47	168	58
Not LEP	146	60	54	22	15	29	82	60	0	0	55	63	13	19	5	9	81	53	88	30
Exited	21	9	2	1	0	0	3	2	0	0	0	0	3	4	0	0	0	0	34	12
Undetermined	1	<1	0	0	0	0	0	0	1	6	1	1	0	0	0	0	0	0	4	1

Note: Percentages may not add to 100 because of rounding.

Table 12 shows the student participants by grade level. Nearly 20% of the students were in the fourth grade, and nearly 68% were in Grades 2-5. Grade level data were not found on 32 of the students.

Table 12

Fast ForWord Participants by Grade Level

Grade level	N	%
K	5	0.4
PK	1	0.1
1	55	4.1
2	177	13.1
3	229	17.0
4	269	19.9
5	241	17.9
6	105	7.8
7	2	0.1
8	3	0.2
9	133	9.9
10	66	4.9
11	25	1.9
12	6	0.4
Missing/not found	32	2.4
Total	1,349	100.0

Program Implementation

At the time of the study, Scientific Learning suggested the following guidelines for effective implementation of Fast ForWord programs[1]:

- A training schedule for five days a week for 100 minutes a day should be maintained for *Fast ForWord Language*. For *Fast ForWord Language to Reading*, *Middle and High School*, and *Reading*, the company recommends a training schedule of 90 minutes a day for five days a week.
- Training sessions should last four to eight weeks. Four weeks – 20 school days – was the recommended minimum. The training schedule also should be consistent,

[1] Scientific Learning has recently released a 48-minute protocol for Fast ForWord Middle and High School, which suggests 48 minutes per day, five days a week. Under the 48-minute protocol, sessions should last 6 to 10 weeks. The company is currently evaluation schedules for other programs that require less time per day.

striving to avoid interruptions of the training for holidays, semester breaks, testing, and other breaks in the school year calendar.

- To provide participants with adequate support, the recommended ratio of students to Fast ForWord teachers should be no more than 5 to 1. Guidelines recommend 2 teachers for participant groups of 6-10 students, 3 to 4 teachers for groups of 11-20, and 5 to 6 teachers for groups of 21-30.
- Short breaks should be taken at particular intervals in a training session, preferably when a student has completed an exercise and before proceeding to another one.

Observations were conducted between late January and early April 2002 at four sites. Sixty-three students across the four sites were observed. Observations revealed that the observed schools adhered to the recommended 90- and 100-minute training schedules. At one site, students attended training for one hour and then returned to their regular classrooms. They returned later in the morning for the remaining 40 minutes of training. At another site, training sessions were held throughout the school day, with students scheduled for training in 100-minute blocks of time. A third site conducted its Fast ForWord training after school for 100 minutes each day. The fourth site held its training during the last class period of the school day, as well as after school. At all sites, students were scheduled for at least 20 days of Fast ForWord training. Short restroom breaks were permitted between exercises at each of the observed sites. The number of students observed in the sessions ranged from 8 at one school to 20 at another and 21 at a third. Each of the four observed sites had only one teacher present during sessions. At three of those sites, however, the teachers seemed to handle the class sizes effectively. One teacher stated that the students understood early in the schedule that when they arrived in the classroom, they were to begin their Fast ForWord exercises immediately, with no talking permitted. At another site, where 21 students attended the sessions, some students needing individual help had to wait for some time while the teacher was involved in helping other students. The observed students, for the most part, received a minimum of four weeks of training. They trained for an average of 33.06 days, ranging from a minimum of 15 to a maximum of 81 days. Only four students (6.3% of the students observed) trained for less than 20 days.

Table 13 displays characteristics of the 63 observed students. By gender, 54% of the students were male, and 46% were female. Hispanics were the overwhelming majority (68.3%) of the students, which was consistent with the majority Hispanic population at most of the participating schools. Another 11.1% of the observed students were white, and 12.7% were African-American. Asian and American Indians made up much smaller proportions of the observed students. More than 80% of the observed students were eligible for free or reduced-price school lunches, and 55.6% had limited proficiency in English. The 63 observed children included no special education students.

Table 13

Characteristics of Observed Fast ForWord Students (N=63)

Characteristic	N	%
Grade		
1	11	17.5
2	24	38.1
3	4	6.3
4	10	15.9
5	14	22.2
6	11	17.5
Sex		
Female	29	46.0
Male	34	54.0
Ethnicity		
African-American	8	12.7
Asian	3	4.8
Hispanic	43	68.3
American Indian	2	3.2
White	7	11.1
Eligible for free/reduced lunch	53	84.1
Not eligible for free/reduced lunch	10	15.9
LEP	35	55.6
Exited	9	14.3
Not LEP	19	30.1
Special Education	0	0.0
Not in special education	63	100.0
Total	63	100.0

The 63 students trained on a variety of Scientific Learning programs. Eighteen of the observed students trained on *Fast ForWord Language*, and 19 trained on *Language to Reading*.

Ten students used the *Fast ForWord Reading* program, and 16 trained on *Fast ForWord Middle and High School*. Table 14 displays the percent complete for the 18 students who trained on *Fast ForWord Language* as of their last training day. Note that each student trained for a different number of days. Percent complete was a score used by Scientific Learning to measure how far students advanced through all possible levels of each exercise. Teachers in charge of Fast ForWord at each campus uploaded student performance data to the Scientific Learning website and were able to track student performance on the exercises over time. Percent completion plateaus that developed after at least 20 training days and continued for three or more days in the exercises could indicate program completion, according to implementation guides supplied by Scientific Learning. As shown in Table 14, more than half of the students showed less than 70% completion on five of the seven exercises in Fast ForWord Language. On one exercise – Block Commander – half of the students showed 90-100% completion, and the other half had less than 70% completion. On the Flying Farm exercise, six students had 90% completion or higher, and four had 70-89% completion. The percent completion rates in Table 14 suggest that the 18 students found Circus Sequence to be the most difficult of the seven exercises. Of 18 students, 16 had less than 70% completion, 1 had 70-79% completion, and 1 had 90-100% completion.

Table 14

Percent Completion on *Fast ForWord Language* Exercises (N=18 students)

Exercise	0-69% completion	70-79% completion	80-89% completion	90-100% completion	Total
Block Commander	9	0	0	9	18
Flying Farm	8	2	2	6	18
Phonic Words	13	1	1	3	18
Phonic Match	12	4	0	2	18
Lang. Comp. Builder	11	5	0	2	18
Phoneme ID	12	3	2	1	18
Circus Sequence	16	1	0	1	18

Table 15 shows percent completion rates for the 19 students who trained on the *Fast ForWord Language to Reading* program, which was geared toward students with basic proficiency in language and reading. The completion rates suggest that the observed students found Polar Cop and Trog Walkers to be the most difficult exercises. Fourteen of the 19 students

had less than 70% completion on Polar Cop. On Trog Walkers, all but three students completed less than 70% of all levels of the exercise. Students appeared to find Start-Up Stories and Bug Out to be the easiest exercises to complete.

Table 15

Percent Completion on *Fast ForWord Language to Reading* Exercises (N=19 students)

Exercise	0-69% completion	70-79% completion	80-89% completion	90-100% completion	Total
Bug Out!	2	0	0	17	19
Start-Up Stories	5	0	1	13	19
Treasure in the Tomb	5	3	4	7	19
Polar Cop	14	3	0	2	19
Trog Walkers	16	2	0	1	19

Table 16 displays percent completion rates for the 16 students who trained on the *Fast ForWord Middle and High School* program. In contrast, IDs appeared to be a more difficult exercise, with no students showing a completion rate above 90%.

Table 16

Percent Completion on *Fast ForWord Middle and High School* Exercises (N=16 students)

Exercise	0-69% completion	70-79% completion	80-89% completion	90-100% completion	Total
Cards	1	0	0	15	16
Matches	0	0	5	11	16
Stories	3	2	1	10	16
Sweeps	6	2	3	5	16
Streams	4	4	4	4	16
IDs	13	0	3	0	16

Table 17 displays percent completion rates for the 10 students who trained on *Fast ForWord Reading*. This program was designed to enhance and reinforce various skills in students who demonstrated some proficiency in reading. For the 10 students who trained on this exercise, Scrap Cat appeared to be the easiest exercise. All but one of the students had completion rates of 80% or higher. Hog Hat Zone and Twisted Pictures appeared to be the most difficult exercises to complete. All of the observed students completed less than 70% of the two exercises.

Table 17

Percent Completion on *Fast ForWord Reading* Exercises (N=10 students)

Exercise	0-69% completion	70-79% completion	80-89% completion	90-100% completion	Total
Scrap Cat	1	0	3	6	10
Chicken Dog	2	1	3	4	10
Book Monkeys	6	0	0	4	10
Canine Crew	8	0	1	1	10
Twisted Pictures	10	0	0	0	10
Hog Hat Zone	10	0	0	0	10

According to interviews at the participating sites, the schools generally used a combination of student scores on standardized tests and classroom teacher recommendations to select students for Fast ForWord training. Some schools targeted particular grade levels. Lagow Elementary, for example, planned to train all of its third grade students on Fast ForWord in preparation for their first year to take the *Texas Assessment of Academic Skills* (*TAAS*) test. The Fast ForWord program the students used depended on their reading and language abilities prior to training. Most of the third-graders at Lagow trained on *Language to Reading*, while some more advanced readers trained with *Fast ForWord Reading*. The students trained for 20 days. The Fast ForWord teacher and principal at Lagow said they preferred to train the students for 25 days, but that such a schedule would not allow them to serve every third grade student. At J.T. Saldivar Elementary, Fast ForWord was part of a continuum of interventions for students who needed additional help. Scores on the 2001 *Stanford 9* helped determine into which intervention the student was placed. The students placed in Fast ForWord had some of the lowest *Stanford 9* scores at the school.

Six of the 10 teachers interviewed said they did not have additional teachers, aides, or volunteers assisting them during Fast ForWord sessions. Another two had an extra teacher, aide, or computer laboratory assistant during the sessions. The remaining two did not have assistants during the school day sessions, but had part-time teachers or parent volunteers during evening and summer sessions. Nine of the 10 teachers interviewed indicated that they had received training from Scientific Learning on the Fast ForWord programs and their implementation. The ninth teacher said that, although she did not attend the formal training, a

Scientific Learning representative assisted her in learning the programs and setting them up for use at the school. The teachers said they especially liked the training's "hands-on" nature. Two teachers said they would like additional training on use of the performance data on reports, while another wanted additional training on troubleshooting. Another teacher was interested in further training in how to identify appropriate students for enrollment in Fast ForWord.

Teachers were asked what types of assessments – informal and formal – they used for measuring students' reading and language abilities prior to Fast ForWord training. Scientific Learning publishes two informal assessments – an observational survey for classroom teachers and a questionnaire for parents. The company also has a more formal assessment known as *Reading Edge*. Of the 10 teachers interviewed, three used the teacher survey, and two used the parent questionnaire. Some teachers did not use the parent questionnaire at their school because of a belief that there was no Spanish language version. A Scientific Learning representative confirmed that all of the company's materials were available in Spanish. Six teachers used the *Reading Edge* assessment, often administering it before students began Fast ForWord training and again after completion. Some schools used other formal assessments. Two schools administered the *Developmental Reading Assessment* to participating students. The assessment was given before they began and again after they completed training. Barbara Manns High School used the *Test of Adult Basic Education* as both a pre- and post-test. Students who scored below grade level in reading on the pre-test were referred for Fast ForWord training. They took the test again after completing Fast ForWord.

Scientific Learning recommended that students using the programs be able to sit at the computer for 20 minutes at a time and be able to point, click, and drag with a computer mouse or other pointing device. All of the teachers rated the Fast ForWord programs as very user-friendly for students. Teachers said students who underwent Fast ForWord training had adequate computer skills to do the exercises.

The Fast ForWord exercises award students points as a positive reinforcement for correct responses. Points were known as "tokens," "progress points," or "the score" depending on the particular program. Points were accompanied by animation to help keep students focused

and engaged. Scientific Learning's reference materials suggest the use of motivational activities that feature prizes based on the number of points earned by participants. Most of the teachers interviewed said they used some form of motivational activity in which they tracked the number of points earned by students and occasionally awarded small prizes such as pencils, stickers, or candies. One teacher said she awarded certificates based on point totals. Another teacher said she used to award prizes to students with the most improvement, but that some students would intentionally score low and then score much higher the next day to get the prize. She changed the prize system to require students to show consecutive days of improvement to get a prize. Another teacher used to use motivational prizes but said they often became a distraction. A teacher at one school said that instead of using prizes, she would show her students graphs that displayed their individual progress. She said the students liked seeing their progress over time and that they were motivated to better their own scores.

Two Fast ForWord teachers said they provided feedback to classroom teachers about the progress of their students on a weekly basis, while others said they provided such feedback on request or when the students completed the program. Four teachers provided feedback to the principal and other campus administrators on request. Two provided such feedback when students complete the program, while one provided weekly reports to the principal. Another teacher said she provided a quarterly report to the principal on student progress in Fast ForWord.

Teachers were asked what difficulties they encountered while implementing Fast ForWord at their schools. Three teachers cited computer equipment as a problem. At some campus sites, the computers would "freeze up" during the training sessions. Observations at some sites supported this. Another teacher said the student headphones wore out and required frequent replacement. Two teachers cited scheduling as an implementation difficulty. Student attendance at the training sessions was an issue at one school, and one teacher cited transportation issues related to after-school Fast ForWord training. Two other teachers said time presented difficulties because of the challenges involved in staying on schedule with the training. Two teachers did not cite any implementation difficulties.

Half of the schools offered Fast ForWord training during the school day and as a part of their after-school programs. One school did it only after school, and others did it only during the regular school day. Students who attended Fast ForWord during the school day were doing so in "pull out" sessions from their regular classes. Fast ForWord teachers were asked if there was any resistance to the program on the part of classroom teachers because of students missing class time. Some said there was initial resistance by classroom teachers, but that it diminished after they observed improvements in the attentiveness and school performance of students who had participated in Fast ForWord. The Fast ForWord instructors observed that the classroom teachers recognized the need for students to have the training, but sometimes worried about them missing too much material in their regular classes.

2001 Test Results

Because most schools used performance on standardized tests as one criterion for selecting students for Fast ForWord training, it is appropriate to examine the students' 2001 scores on the norm-referenced *Stanford Achievement Test*, 9th edition, or *Stanford 9*, and the criterion-referenced *Texas Assessment of Academic Skills* test. A later section will display 2002 gains and examine the impact of Fast ForWord on students' 2002 *Stanford 9* and *TAAS* scores. Table 18 displays details by campus on 2001 *TAAS* performance for the students who received Fast ForWord training and for the school as a whole. Mean *Texas Learning Index* (*TLI*) scores in reading and mathematics are displayed. Scores for Barbara Manns High School were not available. As shown in the table below, students who participated in Fast ForWord generally performed lower than the overall school average the previous year, indicating that the selected students trailed other students in their school, academically.

Table 18

2001 *TAAS* Results by Campus

School	Reading *TLI*		Mathematics *TLI*	
	Fast ForWord	Whole school	Fast ForWord	Whole school
Manns	58	Not available	59	Not available
Bowie	63	72	66	74
Burnet	55	70	55	71
Lagow	56	68	59	68
Roberts	16	68	53	69
Walnut Hill	55	80	64	78
Kennedy	60	71	64	73
Saldivar	35	54	43	57
Anne Frank	41	72	42	70
Chavez	71	77	75	76

Table 19 displays 2001 *Stanford 9* results for Fast ForWord students, compared to the overall school average. Mean percentile rankings are shown. In general, the students chosen for Fast ForWord this school year ranked in lower percentiles than the overall school average on the 2001 *Stanford 9*.

Table 19

2001 *Stanford 9* Results, by Campus

School	Reading Pct.		Mathematics Pct.	
	Fast ForWord	Whole school	Fast ForWord	Whole school
Manns	16	35	26	36
Bowie	17	33	28	45
Burnet	10	32	19	40
Lagow	32	37	38	47
Roberts	2	27	10	36
Walnut Hill	32	56	50	64
Kennedy	22	34	35	49
Saldivar	12	37	30	45
Anne Frank	25	50	39	60
Chavez	26	36	40	52

Training Results

As shown earlier, 1,349 students underwent Fast ForWord training at 10 DISD campuses. There were four Fast ForWord programs, and many students trained on more than one. The four programs and the total number of students who trained on them are shown by

campus in Table 20. Note that the totals for each program column will add up to more than 1,349 because many students trained on more than one program. *Fast ForWord Language to Reading* had the most participants, with 708, while *Fast ForWord Middle/High School* had the fewest, with 251. Students at only three schools trained on this program.

Table 20

Fast ForWord Participants, by Program and Campus

School	*Language*	*Language to Reading*	*Middle/High School*	*Reading*
Barbara Manns	0	157	43	102
James Bowie	226	25	0	27
David G. Burnet	51	51	0	47
Richard Lagow	0	54	0	87
Oran M. Roberts	17	0	0	0
Walnut Hill	88	56	0	12
John F. Kennedy	28	38	42	0
J.T. Saldivar	43	15	0	0
Anne Frank	48	113	0	5
Cesar Chavez	145	199	166	152
Total	646	708	251	432

Training data for all participants were analyzed to obtain the average number of days trained, the average percent complete, and the average compliance score. The average overall percent complete shows the average amount of training content in the exercises that the students mastered. Scientific Learning guidelines recommend a completion rate of 80% or higher. This rate indicates that students have progressed to the natural speech level. Compliance is a measure of the intensity and duration of student training compared to the training schedule recommended by Scientific Learning. Compliance scores range from 0 to 10. The company recommends a compliance score of at least eight for each participant. However, factors such as student attendance and time spent on the exercises can greatly affect a student's compliance score. For example, a student might complete a high percentage of the exercises, but have a low compliance score because of inconsistent attendance or failure to train for the recommended time length. Therefore, compliance scores should be interpreted cautiously. Table 21 displays training results for *Fast ForWord Language* by campus, as well as the averages for all participating campuses. Frequency distributions of the number of days trained, the average

percent completion rates, and the compliance scores revealed that 65.6% of the students trained for at least 20 days (four weeks), the minimum recommended by Scientific Learning. More than half (54.1%) had average completion rates above 60%, and 28.7% reached the recommended completion rate of 80% or higher. Slightly less than a third (31.8%) of the students had compliance scores of eight or higher.

Table 21

Fast ForWord Language Training Results by Campus

School	Days Trained	% Complete	Compliance
Bowie (N=226)	26	68.92	7.4
Burnet (N=51)	18	63.49	8.5
Roberts (N=17)	16	66.08	5.9
Walnut Hill (N=88)	20	66.85	6.7
Kennedy (N=28)	13	41.01	7.5
Saldivar (N=43)	38	53.04	3.7
Frank (N=48)	20	47.64	7.6
Chavez (N=145)	25	45.76	3.8
All schools (N=646)	23.78	59.53	6.39

Table 22 displays training results for students trained on *Fast ForWord Language to Reading*. Frequency distributions revealed that 48.8% of the students trained for 20 days or more and that 46.4% of the students had completion rates above 60%, and 10.8% had completion rates above the recommended 80%. Compliance scores were lower overall for this program, with only 8.5% achieving scores of eight or higher.

Table 22

Fast ForWord Language to Reading Training Results, by Campus

School	Days Trained	% Complete	Compliance
Manns (N=157)	15	48.11	4.0
Bowie (N=25)	10	31.11	5.3
Burnet (N=51)	20	62.91	7.0
Lagow (N=54)	17	55.57	5.7
Walnut Hill (N=56)	16	59.72	6.1
Kennedy (N=38)	14	21.26	1.9
Saldivar (N=15)	44	60.83	3.9
Frank (N=113)	23	61.14	6.5
Chavez (N=199)	24	47.28	3.8
All schools (N=708)	19.94	50.93	4.81

Students at Barbara Manns, Kennedy, and Chavez Learning Center used *Fast ForWord Middle and High School*, in addition to other Scientific Learning programs. Training results for *Fast ForWord Middle and High School*, by campus, are shown in Table 23. Nearly 39% of the students who used this program trained for 20 days or more. A similar percentage (38.2%) achieved completion rates of 60% or more, and 16.3% had completion rates above 80%. For this program, compliance scores were lower, with 21.6% achieving scores of eight or higher.

Table 23

Fast ForWord Middle and High School Training Results, by Campus

School	Days Trained	% Complete	Compliance
Manns (N=43)	6	52.44	6
Kennedy (N=42)	10	53.47	6
Chavez (N=166)	24	49.42	6
All schools (N=251)	18.30	50.61	5.54

Table 24 displays the average number of days trained, by campus, for students who used *Fast ForWord Reading*. Scientific Learning did not keep track of completion rates or compliance scores for this program. As shown below, the 27 students at Bowie who used *Fast ForWord Reading* trained for far fewer days on average than students at the other schools. This, however, did not greatly affect the average for all schools. When Bowie was excluded, the average number of days trained for all schools was 18.23. The number of days trained tended to vary widely, as indicated by the size of the standard deviations.

Table 24

Fast ForWord Reading Training Results, by Campus

School	Mean Days Trained
Manns (N=102)	15
Bowie (N=27)	2
Burnet (N=47)	18
Lagow (N=87)	19
Walnut Hill (N=12)	23
Frank (N=5)	20
Chavez (N=152)	19
All schools (N=432)	17.23

2.3 What were the teacher perceptions of students who received Fast ForWord training?

Methodology

Classroom teachers with students who participated in Fast ForWord were given a survey and asked to rate the changes they had seen in students completing Fast ForWord training. Survey questions were adapted from a survey designed by Scientific Learning and asked teachers about improvements in class participation, listening skills, speech, reading ability, and other indicators. Surveys were administered at six of the participating campuses. The survey was not given at Burnet and Walnut Hill. In addition, teachers at Roberts and Bowie were not surveyed because those schools had only recently begun using the programs. A total of 83 completed surveys were received.

Results

Table 25 displays survey results. Overall, results were mixed, making it difficult to draw any clear conclusions. For each question, between 6% and 15% of teachers surveyed saw no real effect on their students following Fast ForWord training, while another 6-12% saw improvements in most or all of their students (91-100%). Between 25 and 36% of teachers saw improvements in 1-30% of their students, while similar percentages observed improvements in 31-60% or 61-90% of their students.

The survey also asked the teachers if, in general, they believed that students were better able to benefit from classroom instruction following Fast ForWord training. Out of 83 teachers surveyed, 45 (54%) said “yes;” another 18 (21.7%) said “no;” 18 others (21.7%) said “maybe,” and two did not answer the question. The survey also asked teachers to name the subject areas in which they had observed student improvements and to offer any other comments. About 30 teachers offered written comments on their survey forms. Most indicated they had seen improved student performance in reading, while some also mentioned mathematics and social studies. Listening comprehension was mentioned as another area of improvement.

Areas in which teachers observed improvement included:

- Participation in class discussions;
- Improved writing abilities;
- More interest in reading and mathematics;
- Vocabulary and reading skills in English as a Second Language (ESL) students;
- Information recall and responses to questions in class.

Some teachers indicated that they had seen many improvements in their students, but that it may take a few weeks after the training for these gains to reveal themselves.

Table 25

Results of Fast ForWord Survey for Classroom Teachers

1. In what percentage of your students have you noticed the following improvements:	None		1-30%		31-60%		61-90%		91-100%	
	N	%	N	%	N	%	N	%	N	%
a. Improved listening skills	5	6.4	23	29.5	23	29.5	20	25.6	7	9.0
b. Use of more complex sentences	9	11.1	29	35.8	19	23.5	19	23.5	5	6.2
c. Improved response time to questions	6	7.5	28	35.0	16	20.0	22	27.5	8	10.0
d. Improved ability to explain detailed information	11	13.9	26	32.9	24	30.4	13	16.5	5	6.3
e. Improved pronunciation while reading aloud	7	8.6	23	28.4	21	25.9	23	28.4	7	8.6
f. Increased ability to follow flow of conversation	5	6.3	26	32.9	15	19.0	25	31.6	8	10.1
g. Improved attention span	12	14.8	22	27.2	15	18.5	25	30.9	7	8.6
h. Increased participation in class activities	8	10.4	21	27.3	13	16.9	26	33.8	9	11.7
i. Improved intonation of speech	9	11.3	29	36.3	15	18.8	23	28.8	4	5.0
j. Understand more complex sentences	11	14.1	24	30.8	21	26.9	16	20.5	6	7.7
k. Speak more clearly and without hesitation	9	11.3	23	28.8	17	21.3	22	27.5	9	11.3
l. Better able to recall events in proper order	7	8.8	29	36.3	17	21.3	19	23.8	8	10.0

2.4 What were the outcomes of the Scientific Learning/Fast ForWord program?

Methodology

Results of the norm-referenced *Stanford Achievement Test, Version 9* (*Stanford 9*) and *Aprenda*, and the criterion-referenced *Texas Assessment of Academic Skills* (*TAAS*) test were obtained for all Fast ForWord participants and analyzed using a pre- and post-test control group design. The 2001 test results were used as the pre-test measure and 2002 results as the post-test. An analyst in the Department of Special Projects Evaluation created control groups by matching Fast ForWord students with others from the district's student database. Students were matched on demographic variables (sex, ethnicity, limited English proficiency, socioeconomic status) and the pre-test results. A multivariate analysis of covariance (ANCOVA) was used to analyze the gains in test scores for the Fast ForWord students (the experimental group) and the control group. On the *Stanford 9*, *normal curve equivalent* (*NCE*) scores were examined. NCE scores have been calculated from percent correct (raw data) to have a mean of 50 and a standard deviation of approximately 21. This enables NCEs to be added or subtracted to produce meaningful gain or loss scores over time. *Texas Learning Index* (*TLI*) scores were examined on the *TAAS*. The *TLI* score is a statistic that allows for comparison across grades and subjects. A *TLI* score of 70 or above indicates that the student is performing at grade level. In addition to the *TAAS* and *Stanford 9*, the other test analyzed in this section is the *Texas Primary Reading Initiative* (*TPRI*), which is given to students in kindergarten through second grade.

Results

TAAS

Results of the 2002 *TAAS* reading test for Fast ForWord students are shown in Table 26. As shown below, 58.1% of the 706 students who took the *TAAS* reading test passed it. The passing rate was highest among third grade students (69.5%). As shown below, passing rates for Fast ForWord participants trailed the District passing rates, overall and by grade level.

Table 26

Passing Rates on 2002 *TAAS* Reading Test

	Fail		Pass		Total		DISD pass rate	
Grade	N	%	N	%	N	%	N	%
3	52	30.5	117	69.5	168	100.0	8,140	70.5
4	115	49.8	116	50.2	231	100.0	9,025	73.7
5	89	43.2	117	56.8	206	100.0	8,810	75.2
6	38	39.6	58	60.4	96	100.0	8,461	74.8
7	1	50.0	1	50.0	2	100.0	7,832	72.6
8	1	50.0	1	50.0	2	100.0	8,200	74.0
Total	296	41.9	410	58.1	706	100.0	50,468	73.5

The number of individual reading objectives mastered on the 2002 *TAAS* is shown in Table 27, for Fast ForWord participants and the District overall. A greater proportion of Fast ForWord students than DISD students did not master any objectives, and a lower proportion mastered all six objectives.

Table 27

Number of 2002 *TAAS* Reading Objectives Mastered

Number of Reading Objectives Mastered	Fast ForWord		DISD	
	N	%	N	%
0	188	26.6	11,085	16.1
1	73	10.3	4,009	5.8
2	61	8.6	4,398	6.4
3	83	11.8	5,566	8.1
4	71	10.1	8,023	11.7
5	101	14.3	12,421	18.1
All	129	18.3	23,199	33.8
Total	706	100.0	68,701	100.0

Tables 28 and 29 display the passing rates for individual objectives on the 2002 *TAAS* reading test. Table 28 displays the results for Fast ForWord students, and Table 29 shows the District results.

Table 28

Passing Rates for 2002 *TAAS* Reading Objectives, Fast ForWord Participants

	Fail		Pass		Total	
Objective	N	%	N	%	N	%
Word meaning	367	52.0	339	48.0	706	100.0
Supporting ideas	321	45.5	385	54.5	706	100.0
Summarization	459	65.0	247	35.0	706	100.0
Relationships and Outcomes	335	47.5	371	52.5	706	100.0
Inferences/Generalizations	364	51.6	342	48.4	706	100.0
Pt. of view/fact and non-fact	383	54.2	323	45.8	706	100.0

Table 29

Passing Rates for 2002 *TAAS* Reading Objectives, DISD

	Fail		Pass		Total	
Objective	N	%	N	%	N	%
Word meaning	23,465	34.2	45,236	65.8	68,701	100.0
Supporting ideas	19,180	27.9	49,521	72.1	68,701	100.0
Summarization	31,886	46.4	36,815	53.6	68,701	100.0
Relationships and Outcomes	19,679	28.6	49,022	71.4	68,701	100.0
Inferences/Generalizations	28,316	41.2	40,385	58.8	68,701	100.0
Pt. of view/fact and non-fact	26,786	39.0	41,915	61.0	68,701	100.0

The next series of tables review results on the mathematics section of the 2002 *TAAS*. Table 30 displays the overall passing rates on the mathematics test. Two-thirds of 706 students (66.6%) passed the mathematics section of the *TAAS*. The fifth grade students had the highest passing rate, at 69.9%.

Table 30

Passing Rates on 2002 *TAAS* Mathematics Test

	Fail		Pass		Total		DISD pass rate	
Grade	N	%	N	%	N	%	N	%
3	55	31.7	114	68.3	169	100.0	8,217	71.1
4	87	37.7	144	62.3	231	100.0	9,384	76.6
5	62	30.1	144	69.9	206	100.0	9,685	82.7
6	30	31.3	66	68.8	96	100.0	9,449	83.5
7	1	50.0	1	50.0	2	100.0	8,086	74.9
8	1	50.0	1	50.0	2	100.0	7,956	71.8
Total	236	33.4	470	66.6	706	100.0	52,777	76.8

Table 31 displays the number of *TAAS* mathematics objectives mastered by the students tested. More than 13% of the students did not master any of the 13 objectives on the test, while 3.4% mastered all of them.

Table 31

Number of 2002 *TAAS* Mathematics Objectives Mastered

Number of Mathematics Objectives Mastered	Fast ForWord		DISD	
	N	%	N	%
0	95	13.5	6,888	10.0
1	23	3.3	1,667	2.4
2	39	5.5	2,230	3.2
3	34	4.8	2,516	3.7
4	51	7.2	2,810	4.1
5	44	6.2	3,361	4.9
6	54	7.6	4,066	5.9
7	53	7.5	4,710	6.9
8	73	10.3	5,484	8.0
9	62	8.8	6,552	9.5
10	46	6.5	7,062	10.3
11	64	9.1	7,445	10.8
12	44	6.2	6,582	9.6
All	24	3.4	7,328	10.7
Total	706	100.0	68,701	100.0

Table 32 and 33 display the passing rates for the individual objectives comprising the mathematics section of the *TAAS*. Table 32 shows the results for Fast ForWord participants, while Table 33 displays the District results.

Table 32

Passing Rates for 2002 *TAAS* Mathematics Objectives, Fast ForWord Participants

Objective	Fail		Pass		Total	
	N	%	N	%	N	%
Number concepts	220	31.2	486	68.8	706	100.0
Algebraic/mathematics functions	332	47.0	374	53.0	706	100.0
Geometric properties	275	39.0	431	61.0	706	100.0
Measurement concepts	393	55.7	313	44.3	706	100.0
Probability and statistics	306	43.3	400	56.7	706	100.0
Use of addition	231	32.7	475	67.3	706	100.0
Use of subtraction	298	42.2	408	57.8	706	100.0
Multiplication and division	274	38.8	432	61.2	706	100.0
Estimation and reason (3), division (4-8,10)	355	50.3	351	49.7	706	100.0
Solution strategies (3), estimation (4-8,10)	459	65.0	247	35.0	706	100.0
Mathematical representation (3), solution strategies (4-8,10)	502	71.1	204	28.9	706	100.0
Mathematical representation	485	68.7	221	31.3	706	100.0
Reasonableness of solutions	580	82.2	126	17.8	706	100.0

Table 33

Passing Rates for 2002 *TAAS* Mathematics Objectives, DISD

Objective	Fail		Pass		Total	
	N	%	N	%	N	%
Number concepts	20,310	29.6	48,391	70.4	68,701	100.0
Algebraic/mathematics functions	23,111	33.6	45,590	66.4	68,701	100.0
Geometric properties	20,511	29.9	48,190	70.1	68,701	100.0
Measurement concepts	30,793	44.8	37,908	55.2	68,701	100.0
Probability and statistics	20,413	29.7	48,288	70.3	68,701	100.0
Use of addition	18,648	27.1	50,053	72.9	68,701	100.0
Use of subtraction	20,546	29.9	48,155	70.1	68,701	100.0
Multiplication (3-8), division (3)	19,055	27.7	49,646	72.3	68,701	100.0
Estimation and reason (3), division (4-8,10)	26,774	39.0	41,927	61.0	68,701	100.0
Solution strategies (3), estimation (4-8,10)	33,327	48.5	35,374	51.5	68,701	100.0
Mathematical representation (3), solution strategies (4-8,10)	42,687	62.1	26,014	37.9	68,701	100.0
Mathematical representation	41,281	60.1	27,420	39.9	68,701	100.0
Reasonableness of solutions	46,968	68.4	21,733	31.6	68,701	100.0

Out of the 706 Fast ForWord students who took the 2002 *TAAS*, 354 took the test in both 2001 and 2002. The next series of tables reviews their results from one year to the next. Table 34 displays the average raw gain in *TLI* scores on the reading and mathematics sections of the *TAAS* for Fast ForWord participants and all DISD students who took the *TAAS* in 2001 and 2002. Although the Fast ForWord participants' *TLI* scores were, on average, lower than the District means, the Fast ForWord students showed larger gains in both reading and mathematics.

Table 34

Average *Texas Learning Index* Scores for Fast ForWord Students, 2001-2002

	Fast ForWord (N=354)			DISD (N=49,135)		
Test	2001	2002	Gain score	2001	2002	Gain score
Reading	60.79	68.43	7.64	73.62	78.75	5.13
Mathematics	64.03	73.20	9.17	73.21	77.44	4.23

Tables 35 and 36 display the *TAAS* passing rates for the Fast ForWord students who took the test in 2001 and 2002. As shown, the passing rates increased for this group in both reading and mathematics.

Table 35

Passing Rates for *TAAS* Reading, 2001-2002

		2001				2002			
2001-2002		Fail		Pass		Fail		Pass	
Grade Level	N	N	%	N	%	N	%	N	%
3	2	2	100	0	0	2	100	0	0
4	138	92	67	46	33	69	50	69	50
5	133	69	52	64	48	48	36	85	64
6	78	33	42	45	58	24	31	54	69
7	2	1	50	1	50	1	50	1	50
8	1	0	0	1	100	0	0	1	100
Total	354	197	56	157	44	144	41	210	59

Table 36

Passing Rates for *TAAS* Mathematics, 2001-2002

2001-2002 Grade Level	N	2001 Fail N	2001 Fail %	2001 Pass N	2001 Pass %	2002 Fail N	2002 Fail %	2002 Pass N	2002 Pass %
3	2	2	100	0	0	1	50	1	50
4	138	89	65	49	35	51	37	87	63
5	133	70	53	63	47	31	23	102	77
6	78	14	18	64	82	17	22	61	78
7	2	1	50	1	50	1	50	1	50
8	1	0	0	1	100	0	0	1	100
Total	354	176	50	178	50	101	29	253	71

Tables 37 and 38 display analysis of covariance results, using the 2002 *TLI* scores in reading and mathematics as the dependent variables. The 2002 scores of 194 Fast ForWord participants were analyzed, along with 194 students in a matched comparison group. Students were matched on demographic variables and 2001 *TLI* in reading, which was used as a pre-test score. The two groups had a pre-test mean score of 69.6. Table 37 displays F-test results, statistical significance (.05 level) and effect sizes, using eta square as a measure of effect. For the effect sizes, scores of .01, .06, and .14 represent small, medium, and large effect sizes, respectively. As shown, there was a statistically significant relationship between Fast ForWord participation and higher *TLI* scores in reading. This relationship showed some practical significance, as measured by the small effect size. The mean 2002 *TLI* in reading was 74.8 for the Fast ForWord participants and 77.53 for the matched comparison group students.

Table 37

Analysis of Covariance Results, *TAAS* Reading *TLI*

Variable	F	p<.05	Effect Size (Eta square)
Intercept	72.662	.000	.160
2001 Reading *TLI*	124.589	.000	.246
Hispanic	.144	.705	.000
Sex	.017	.897	.000
Lunch	.065	.798	.000
LEP	8.525	.004	.022
Fast ForWord	4.851	.028	.013

Table 38 displays analysis of covariance results, using the 2002 *TLI* in mathematics as the dependent variable. For 2001, the Fast ForWord participants and the matched comparison group students had mean *TLI*s of 70 and 71, respectively. The mean 2002 *TLI* in mathematics was 78.1 for the Fast ForWord students and 76.8 for the comparison group. There was a statistically significant relationship between higher *TLI*s in mathematics and Fast ForWord participation. The correlation had some practical significance, as measured by the small effect size.

Table 38

Analysis of Covariance Results, *TAAS* Mathematics *TLI*

Variable	F	p<.05	Effect Size (Eta square)
Intercept	207.098	.000	.352
2001 Mathematics *TLI*	140.380	.000	.269
Hispanic	1.226	.269	.003
Sex	2.912	.089	.008
Lunch	.156	.693	.000
LEP	4.982	.026	.013
Fast ForWord	6.484	.011	.017

The analyses above, however, do not take into account varying completion rates among students who participated in Fast ForWord. Some students might have trained for four to eight weeks, while others may have trained for only a few days and completed little of the program. To consider any effect of varying completion rates, 2002 *TLI* scores in reading were regressed on several variables, including the average program completion rate. Table 39 displays those results for students who participated in the *Fast ForWord Language* program. Higher completion rates had a statistically significant relationship with higher reading scores. However, similar results were not found when average completion rates in the *Fast ForWord Language to Reading* and *Middle and High School* programs were used.

Table 39

Reading *TLI* Regression Results for *Fast ForWord Language* Participants

Variable	β	t	p<.05
2001 Reading *TLI*	.766	14.451	.000
Sex	.006	.117	.907
Free/reduced lunch	-.018	-.355	.723
LEP	-.132	-2.472	.015
Ethnicity (Hispanic)	-.028	-.552	.582
Average completion rate	.120	2.272	.025

Stanford 9/Aprenda

The *Stanford 9* is administered to students in Grades 1-9. The *Aprenda* is the Spanish language version of the test. The tests cover reading, mathematics, and language. There were 516 students who participated in Fast ForWord this school year who took the *Stanford 9* in both 2001 and 2002. Table 40 displays the mean normal curve equivalent (NCE) scores on the 2002 *Stanford 9*, for Fast ForWord participants and for the entire District. Overall, mean NCE scores for Fast ForWord participants were lower than the District averages.

Table 40

Stanford 9 Mean NCE Scores, 2002

Test	Mean NCE, Fast ForWord (N=781)	Mean NCE, Whole District
Reading	32.34	44.77
Mathematics	45.83	52.21
Language	39.22	49.32
Spelling	33.57	45.83

Table 41 displays the mean NCEs and raw gain scores from 2001 to 2002 for Fast ForWord students who took the test both years. Results are shown for the total reading, mathematics, language, and spelling sections of the *Stanford 9*. To compare the results with those of the District at large, mean raw gain scores from 2001 to 2002 are shown for the entire District. The results indicate that, although the Fast ForWord students' NCEs were lower than those of the whole District, the Fast ForWord NCE scores increased at a greater rate, on average, than those for the District overall in reading, mathematics, and language.

Table 41

Stanford 9 NCEs and Raw Gain Scores, 2001-2002

Test	Mean NCE, Fall 2001	Mean NCE, Spring 2002	Mean gain, Fast ForWord	Mean gain, whole District
Reading	31.27	33.55	2.28	2.08
Mathematics	41.05	46.88	5.83	3.01
Language	37.61	40.33	2.72	1.76
Spelling	33.91	35.10	1.19	1.86

Table 42 displays the NCE scores and raw gains on individual reading, mathematics, and language objectives for Fast ForWord students and the raw gains for the entire District. Results were mixed, with some gains larger among Fast ForWord students and others smaller.

Table 42

NCEs and Raw Gains on *Stanford 9* Objectives, 2001-2002

Objective	Mean NCE, Fall 2001	Mean NCE, Spring 2002	Mean gain, Fast ForWord	Mean gain, whole District
Sounds and letters	38.43	35.78	-2.65	4.28
Reading vocabulary	29.91	32.09	2.18	1.86
Sentence/reading comprehension	33.76	36.13	2.37	1.91
Mathematics – problem solving	41.61	47.67	6.06	2.80
Mathematics procedures	43.74	48.12	4.38	2.66

Table 43 displays the analysis of covariance results for 516 students who underwent Fast ForWord training and 516 non-Fast ForWord students. A dichotomous variable indicated whether a student participated in Fast ForWord. The latter group was the control group in this analysis. Control group members were matched on demographic variables and 2001 reading NCE scores, which were used as a pre-test measure. Both the Fast ForWord and control groups had mean 2001 NCE scores of 31.3 in reading. The 2002 NCE in reading was the dependent variable in this analysis. As shown below, Fast ForWord participation appeared to have some association with higher scores in reading, but the results were not statistically significant at the .05 level, the standard used for this analysis. The results were, however, statistically significant at the .10 level. The results were not, however, practically significant, as measured by the effect size.

Table 43

Analysis of Covariance Results, *Stanford 9* Reading NCEs

Variable	F	p<.05	Effect Size (Eta square)
Intercept	20.020	.000	.032
2001 Reading NCE	453.387	.000	.429
African-American	2.247	.134	.004
Hispanic	.454	.501	.001
White	.671	.413	.001
Sex	1.677	.196	.003
Lunch	1.267	.261	.002
LEP	1.948	.163	.003
Scientific Learning	2.851	.092	.005

Tables 44-47 display mean pre-test scores and analysis of covariance results, comparing NCEs in mathematics, language, and spelling, for Fast ForWord participants and students in the matched control group. Table 44 displays the mean pre-test scores for the two groups. In mathematics, the mean NCEs between the groups differ by 1.3 points. In spelling and language, the differences are less than a point.

Table 44

Mean Pre-Test Scores for Fast ForWord and Comparison Group Students

	Fast ForWord		Comparison Group	
Test	N	Mean	N	Mean
Mathematics NCE, 2001	516	40.8	516	39.5
Language NCE, 2001	516	37.6	516	38.2
Spelling NCE, 2001	516	33.9	516	33.4

Table 45 displays analysis of covariance results, with the 2002 NCE in mathematics as the dependent variable. No significant correlation was found between participation in Fast ForWord and improved scores on the mathematics section of the *Stanford 9*.

Table 45

Analysis of Covariance Results, *Stanford 9* Mathematics NCEs

Variable	F	p<.05	Effect Size (eta square)
Intercept	31.817	.000	.053
2001 Mathematics NCE	453.167	.000	.441
African-American	4.794	.029	.008
Hispanic	.829	.363	.001
White	.372	.542	.001
Sex	.134	.715	.000
Lunch	3.785	.052	.007
LEP	4.964	.026	.009
Fast ForWord	.013	.910	.000

Table 46 displays analysis of covariance results, with the 2002 NCE in language as the dependent variable. No significant correlation was found between participation in Fast ForWord and improved scores on the language section of the *Stanford 9*.

Table 46

Analysis of Covariance Results, *Stanford 9* Language NCEs

Variable	F	p<.05	Effect Size (eta square)
Intercept	51.731	.000	.083
2001 Language NCE	249.542	.000	.303
African-American	.114	.736	.000
Hispanic	.813	.368	.001
White	.267	.605	.000
Sex	6.014	.014	.010
Lunch	1.225	.269	.002
LEP	3.066	.080	.005
Fast ForWord	.006	.939	.000

Table 47 displays analysis of covariance results, with the 2002 NCE in spelling as the dependent variable. Participation in Fast ForWord was found to be statistically significant at the .10 level, but not at the .05 level. Participation was not found to be practically significant, as the effect size was only .005.

Table 47

Analysis of Covariance Results, *Stanford 9* Spelling NCEs

Variable	F	p<.05	Effect Size (Eta square)
Intercept	45.447	.000	.074
2001 Spelling NCE	311.790	.000	.354
African-American	2.031	.155	.004
Hispanic	2.498	.115	.004
White	1.777	.921	.000
Sex	13.934	.000	.024
Lunch	.316	.574	.001
LEP	6.635	.010	.012
Fast ForWord	3.029	.082	.005

The drawback of the matched comparison group analysis is that it did not account for varying levels of completion among participants in Fast ForWord. To consider any effects from varying levels of program completion, 2002 NCE scores in reading were analyzed by the use of linear regression, with average completion rate used as the measure of Fast ForWord participation. Table 48 presents regression results for students who trained on *Fast ForWord Language*. The 2002 NCE in reading was the dependent variable, and the average completion rate in *Fast ForWord Language* was the main independent variable of interest. Higher completion rates were found to have a statistically significant correlation with higher NCE scores in reading. The same analysis, however, did not find similar results associated with higher completion rates on the Language to Reading and Reading programs.

Table 48

Regression Results for *Fast ForWord Language* Participants

Variable	B	t	p<.05
2001 Reading NCE	.766	14.451	.000
Sex	.006	.117	.907
Free/reduced lunch	-.018	-.355	.723
LEP	-.132	-2.472	.015
Ethnicity (Hispanic)	-.028	-.552	.582
Average completion rate	.120	2.272	.025

There were 102 Fast ForWord participants who took the Spanish language Aprenda test in both 2001 and 2002. Table 49 displays the mean NCE scores in reading for both years, comparing the Fast ForWord participants' results with those of a matched comparison group

whose members did not receive Fast ForWord training. As shown, the matched groups had identical 2001 scores. The comparison group's mean 2002 NCE score increased about 7 points over the previous year, while the mean of the Fast ForWord participants group remained largely the same, increasing only 0.05 points.

When looking at the results of these tests, it is important to remember that the *Stanford 9* and *Aprenda* are norm-referenced assessments, comparing Fast ForWord students to a sample that may not necessarily be representative. Nevertheless, the results indicate that students served by Fast ForWord made some improvements over last year.

Table 49

Mean *Aprenda* NCE Scores in Reading, 2001-2002

	Fast ForWord		Comparison Group	
	N	Mean	N	Mean
Reading NCE, 2001	102	55.409	102	55.409
Reading NCE, 2002	102	55.414	102	62.455
Mean raw gain	102	0.050	102	7.046

Texas Primary Reading Initiative (TPRI)

Table 50 displays TPRI results for 25 second grade students who underwent Fast ForWord this school year, and who took the test in the fall of 2001 and again in the spring of 2002. The first screening pertained to word identification. Students who successfully completed the screening were rated "developed," while those who did not were rated "still developing" and given additional tasks to complete. The 25 students took the fall TPRI in September or November of 2001, and all but one took the spring test in April 2002. The results in Table 50 should be interpreted cautiously, as 16 of the 25 students were still in Fast ForWord training when the spring TPRI was administered to them.

Table 50

TPRI Results, Grade 2 Fast ForWord Participants (N=25)

Result	Word ID screening, Fall 2001		Word ID screening, Spring 2002	
Developed	8	32%	14	56%
Still developing	17	68%	8	32%
N/A	0	0%	3	12%
Total	25	100%	25	100%

Table 51 displays the reading accuracy level results on the TPRI for the 25 second graders. A level of independent indicated that the student read at an accuracy rate of 95% or higher. A rate of 90-94% indicated that the student read at an instructional level, and a level below 90% indicated frustrational. The table displays Fall 2001 and Spring 2002 results. Because 16 of the 25 students were still in Fast ForWord training at the time the spring test was given, the results should be interpreted cautiously.

Table 51

TPRI Reading Accuracy Results, Grade 2 Fast ForWord Participants (N=25)

Level	Fall 2001		Spring 2002	
Independent	7	28%	10	40%
Instructional	3	12%	11	44%
Frustrational	9	36%	3	12%
N/A	6	24%	1	4%
Total	25	100%	25	100%

Table 52 displays the results of the TPRI word list exercise for the 25 second grade students. The students were rated on the number of words they read correctly from a 15-word list. Table 51 displays the mean number of words read correctly for Fall 2001 and Spring 2002.

Table 52

TPRI Word List Results for Grade 2 Fast ForWord Participants (N=25)

	Minimum	Maximum	Mean
N words read correctly, Fall 2001	0	12	3.96
N words read correctly, Spring 2002	2	16	8.96

TPRI results for first grade students who received Fast ForWord training are not shown here because results were not available for both Fall 2001 and Spring 2002. However, out of 10 first graders who underwent Fast ForWord and took the TPRI in Spring 2002, 6 had a reading accuracy level of independent, and one was rated frustrational. Three were rated not applicable or "NA."

SUMMARY AND RECOMMENDATIONS

The Scientific Learning Corporation of Oakland, Ca., developed a series of CD-Rom and Internet-based programs known as Fast ForWord. The programs, which vary in skill levels, help at-risk children build skills important for success in reading. The programs feature training exercises in video game-like formats. Speech sounds are stretched and emphasized at the lowest levels of training, progressing to natural speech at the highest level. The programs target phonemic awareness, auditory processing speed, memory, grammar, and other skills.

There were four programs in the Fast ForWord series. *Fast ForWord Language* is intended for younger children whose reading and language abilities are below basic. *Fast ForWord Language to Reading* is designed for students with basic reading skills. *Fast ForWord Middle and High School* is similar to *Fast ForWord Language*, but geared toward older students. *Fast ForWord Reading*, is designed for students in various stages of reading development.

Ten DISD campuses – nine elementary and one high school – used Scientific Learning programs in 2001-2002. The elementaries were Burnet, Chavez, Kennedy, Walnut Hill, Anne Frank, Lagow, Saldivar, Roberts, and Bowie. The high school was Barbara Manns. Schools using the programs pay $24,900 the first year, $19,900 the second year, and $9,995 in the third year. Most of the participating schools paid the program costs with Title I funds.

Because this is the first year in which the Scientific Learning/Fast ForWord program has been evaluated in DISD, program implementation was an important component. Scientific Learning's implementation guidelines recommended a training schedule of 90-100 minutes a day,

5 days a week.[2] Training sessions should last four to eight weeks and be consistent, avoiding interruptions for testing, and other breaks in the school year calendar. Scientific Learning's completion and compliance ratings gauged student participation and performance. Completion measured the percentage of training content mastered. Guidelines recommended a completion rate of 80% or higher. The compliance score, ranging from 0 to 10, measured intensity and duration of student training. Guidelines recommended a compliance score of at least eight.

Implementation data came from interviews, observations, and data from Scientific Learning. Data from the participating schools were uploaded to a Scientific Learning online database. However, because the data did not include the students' DISD identification numbers, matching them to the district's database was difficult, which made it harder to determine the exact number of participating students. The best estimate indicates that 1,349 students participated in Fast ForWord in 2001-2002. The students were mostly male (52.8%), Hispanic (73.1%), eligible for free or reduced-price lunch (62.9%), and had limited proficiency in English (55.2%). More than half of the students (55%) were in Grades 3-5. Most of the students selected for training had lower *TAAS* and *Stanford 9* scores than the averages for their respective campuses.

Observations revealed that the schools adhered to the recommended training session length of 90-100 minutes. The observed students trained for an average of 33.06 days, ranging from a minimum of 15 to a maximum of 81 days.

Students selected for Fast ForWord training during the school day were pulled from their regular classrooms to attend training and returned when their sessions ended. Schools used a combination of standardized test scores and teacher recommendations to select students for Fast ForWord. Many participating students trained on more than one program. A total of 646 students trained on *Fast ForWord Language*; 708, *Language to Reading*; 251, *Middle and High School*; and 432, *Fast ForWord Reading*. Students who used *Fast ForWord Language* trained for an average of 23.78 days. They had an average completion rate of 59.53% and an average

[2] Since the completion of this study, Scientific Learning has been testing other protocols, and recently released a Fast ForWord Middle & High School 48-minute protocol with suggested guidelines of 48 minutes per day, five days per week, for six to ten weeks. Other protocols of similar duration are undergoing evaluation.

compliance score of 6.39. On *Fast ForWord Language to Reading*, students trained an average of 19.94 days. They had a mean completion rate of 50.93% and a mean compliance score of only 4.81. Students who used *Fast ForWord Middle and High School* trained for an average of 18.3 days. They had mean completion and compliance scores of 50.61% and 5.54, respectively. Scientific Learning did not keep percent complete or compliance data for Fast *ForWord Reading*.

Classroom teachers were surveyed to gain their impressions about improvements seen in students who participated in Fast ForWord. The results were mixed, with some teachers noting improved listening skills, class participation, and reading abilities among many of their participating students, while others saw improvements in few or none of their students.

To gauge the impact of Fast ForWord on students' academic performance, scores on the *TAAS*, *Stanford 9/Aprenda*, and *TPRI* were used. With the *TAAS* and *Stanford 9/Aprenda*, the 2001 scores were used as a pre-test and the 2002 scores as a post-test. Fast ForWord participants who took the *TAAS* in both 2001 and 2002 had a mean *TLI* score in reading of 60.79 in 2001 and 68.43 in 2002, for a mean raw gain of 7.64. In mathematics, the mean 2001 *TLI* was 64.03 and 73.2 in 2002, for a raw gain of 9.17. The Fast ForWord students had larger raw gain scores than the district averages, but lower *TLI* scores, on average.

The 2001 and 2002 *TLI* scores in reading and mathematics were analyzed with a matched control group analysis of covariance. Fast ForWord participants were matched with other students on demographic variables and 2001 *TLI*s in reading. Fast ForWord participation had a statistically significant impact on *TLI* scores in both reading and mathematics. To take varying completion rates on Fast ForWord into consideration, the 2002 *TLI* scores in reading and mathematics were regressed on the 2001 scores, as well as demographic variables. Higher completion rates had a statistically significant correlation with higher reading scores.

On the 2002 *Stanford 9*, Fast ForWord participants showed improved NCE scores in reading, mathematics, language, and spelling. The students had average raw gains that were larger than those for the entire district. NCE scores on the Stanford 9 were subjected to a matched control group analysis of covariance. Fast ForWord participation had some correlation with higher NCE scores in reading, but the results were not statistically significant. Similar

analyses in which 2002 NCEs in mathematics, language, and spelling were dependent variables did not find a statistically significant relationship between Fast ForWord participation and gains in scores. To account for varying levels of program completion, 2002 NCEs in reading were regressed on several variables. Higher completion rates in Fast ForWord Language had a statistically significant correlation with gains in reading. Among Fast ForWord participants who took the *Aprenda* in 2002, the mean NCEs in reading were almost unchanged from last year, gaining only .05 points. A matched comparison group, in contrast, showed a mean gain of 7.046 points.

Second grade Fast ForWord participants demonstrated gains on the TPRI between the 2001 fall semester and the 2002 spring semester. More than 80% of the students tested in both semesters read at an independent or instructional level in 2002, compared to only 40% in fall 2001. The students also more than doubled the number of words read correctly between the fall 2001 and spring 2002 tests.

RECOMMENDATIONS

- Some schools conducted their Fast ForWord training sessions during the regular school day. Participating students were taken from their regular classrooms to go to Fast ForWord sessions, then returned. In interviews, Fast ForWord teachers indicated that there was some initial resistance to this from classroom teachers, but that it dissipated over time. However, students missing classroom content is a legitimate concern. It is therefore recommended that schools using Fast ForWord confine their training sessions to after school hours. Scientific Learning has recently released a 48-minute protocol for Fast ForWord Middle & High School and is evaluating other similar protocols. Because the new protocol requires only 48 minutes per day, it may be a better fit with student schedules.

- Related to the first recommendation, it is clear from the Scientific Learning training guidelines (90-100 minutes a day, five days a week) that implementing Fast ForWord requires a large time commitment from the schools that use it. A 100-minute training session consumes a sizable piece of the school day, and high completion and compliance scores for participating students depend largely on consistent, regular attendance at training sessions, and training for the allotted time. The low completion and compliance scores at some campuses, as well as information gathered in interviews, suggest that consistent attendance at training sessions has been a problem. It is recommended that participating schools act to encourage consistent attendance by students participating in this program.

- Fast ForWord teachers should include the DISD ID numbers of participating students in the data they upload to Scientific Learning. Doing this will create greater compatibility between the Scientific Learning and district databases, simplifying efforts to identify participating students and follow their progress in the program.

- Information gathered from interviews and surveys suggests that sometimes the effects of Fast ForWord training do not manifest themselves immediately in the participating student, but rather, appear some time after the training is completed. Another question is whether the program's effects are lasting over time. It is recommended that future evaluations employ a more longitudinal perspective, examining the academic performance of students training previously, as well as those who participated in the current school year.

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