

Improved Reading Skills by Students in Lawrence Public Schools who used Fast ForWord® Products

MAPS for Learning: Educator Reports, 12(11):1-8

ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord products on the reading skills of elementary and middle school students who used the products within the curriculum in a school setting. **Study Design:** The design of this study was a multiple school experimental study using nationally normed assessments. **Participants:** Study participants were students in the Lawrence Public Schools of Lawrence, Massachusetts. The participants were in one of two groups: a Fast ForWord group that used products and a comparison group that did not use products and served as a control group. **Materials & Implementation:** Following staff training on the Fast ForWord products, the Fast ForWord group of students used the products during the 2005-2006 and/or the 2006-2007 school year and had their reading abilities evaluated with the Massachusetts Comprehensive Assessment System (MCAS) and/or the Measures of Academic Progress (MAP) before and after Fast ForWord participation. **Results:** Two hundred ninety-nine students had MCAS scores from the year before and after initial Fast ForWord participation. In a longitudinal study of the students with scores from 2005 – 2007, participants improved more than a comparison group, and maintained their improvement. During the 2005 – 2006 school year, nearly 30% of the students who were in the “Warning” or “Needs Improvement” categories and who had results reported in terms of Levels rather than scores, improved one or more levels, compared to fewer than 20% of the students in the comparison group.

Keywords: Massachusetts, elementary, middle, high school, urban, two-group, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading Level 1, Fast ForWord to Reading Level 2, Massachusetts Comprehensive Assessment System (MCAS), Measures of Academic Progress (MAP), Reading Progress Indicator (RPI).

INTRODUCTION

Numerous research studies have shown that cognitive and oral language skills are under-developed in struggling readers, limiting their academic progress (Lyon, 1996). University-based research studies reported the development of a computer software product that focused on learning and cognitive skills, and provided an optimal learning environment for building the memory, attention, processing and sequencing skills critical for reading success (Merzenich et al., 1996; Tallal et al., 1996). This prototype of the Fast ForWord Language software showed that an optimal learning environment and focus on early reading and cognitive skills resulted in dramatic improvements in the auditory processing and language skills of school children who had specific language impairments (Merzenich et al, 1996; Tallal et al., 1996) or were experiencing academic reading failure (Miller et al., 1999). The Lawrence Public Schools was interested in evaluating the effectiveness of an optimal learning environment with a focus on early reading and cognitive skills as a way to improve the language achievement of their students in a school setting. In this study, commercially available

computer-based products (Fast ForWord Language Basics, Fast ForWord to Reading Prep, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 1, Fast ForWord to Reading 2, Fast ForWord to Reading 3, and Fast ForWord to Reading 4) were used to evaluate the effectiveness of this approach for improving the reading achievement of elementary through high school students.

METHODS

Participants

Lawrence, Massachusetts was originally a rural farming town but developed into a major industrial center when huge textile mills were developed in it by Boston entrepreneurs. Twenty-six miles north of Boston, the city has been home to many of the United States' changing immigrant populations resulting in a diverse population.

The Lawrence Public Schools are a pre-Kindergarten through twelfth grade district with 16 schools and a student population of more than 12,000. All schools in the Lawrence Public Schools are Title I schools. Across the district, more than 85% of the students are

Hispanic and more than 80% of the student population is eligible for free or reduced price lunches.

Students from all schools in the district participated in this study. The Fast ForWord group had 567 students in second through tenth grade with an average grade of 6.0. Eight hundred and twenty-eight students were in the comparison group; students were in second through seventh grade with an average grade of 5.0. Approximately 33% of the Fast ForWord participants were receiving services for special education and 25% were classified as Special Education/Formerly Limited English Proficient. Approximately 21% of the comparison students were receiving special education services and 27% were Limited English Proficient. About 24% were in general education.

Before and after the Fast ForWord group used the products, student reading skills were evaluated with the Massachusetts Comprehensive Assessment System (MCAS) and/or the Measures of Academic Progress (MAP). School personnel administered the assessments and reported scores for analysis.

Implementation

Educators were trained in current and established neuroscience findings on how phonemic awareness and the acoustic properties of speech impact rapid development of language and reading skills; the scientific background validating the efficacy of the products; methods for assessment of potential candidates for participation; the selection of appropriate measures for testing and evaluation; effective implementation techniques; approaches for using Progress Tracker reports to monitor student performance; and techniques for measuring the gains students have achieved after they have finished using Fast ForWord products.

Materials

The Fast ForWord products are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. The products used in this study (Fast ForWord Language Basics, Fast ForWord to Reading Prep, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 1, Fast ForWord to Reading 2, Fast ForWord to Reading 3, Fast ForWord to Reading 4) include three to seven exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension. While there are differences between the products, all help develop certain critical skills as detailed in the following exercise descriptions.

Inside the Tummy^{1, 2}: Participants click and drag colored shapes into matching shape outlines in pre-defined patterns. This task helps participants improve fine motor skills, hand-eye coordination, and computer mousing skills.

*Hungry Tummy*²: Participants follow spoken directions to feed shapes of different colors and sizes to “Hungry Tummy” the bear. This task develops knowledge of basic colors (red, blue, green, yellow, and white), shapes (square, circle, and triangle) and relative size (big and small). Participants also develop their working memory, verbal decoding skills, and mousing skills as they practice following spoken instructions.

*Flying Saucer*¹: Participants identify sounds presented in a sequence, then click on graphic icons associated with those sounds to reproduce the sequence. This task builds auditory discrimination ability, auditory working memory, and sequencing skills.

*Drag Racer*¹: Participants point and click on a (sometimes moving) graphic, then hold the mouse button down to hear a stream of identical sounds. Participants release the mouse button when there is a sound change. This task is designed to improve auditory discrimination and sustained auditory attention. It also develops mousing skills, and the ability to withhold a response until an auditory cue is presented.

*Packing Pig Goes to Work*²: The name of a letter is presented aurally, and then that letter, along with up to four other letters, is displayed on the screen. The participant must click on the letter that was aurally presented. This task develops letter-name knowledge, auditory working memory, and visual-spatial memory abilities.

*Packing Pig Has Lunch*²: Participants match upper and lower case letter tiles in progressively larger grids. At the easiest levels, the tiles are face-up, with the letters visible throughout the trial. At the hardest levels the tiles are face-down, and letters are only briefly visible when clicked, so that it becomes a memory challenge. This task develops letter-name knowledge, association of upper and lower case letters, auditory working memory, and visual-spatial memory abilities.

*Ghost Coaster*²: The participant works to associate a set of consonant phonemes (speech sounds) with the

¹ Exercise from the Fast ForWord Basics product.

² Exercise from the Fast ForWord to Reading Prep product.

letters that represent them. Each phoneme/letter pair is presented in several trials, along with examples of words that start with the phoneme. This task builds letter-sound association skills and understanding of the alphabetic principle in written English.

*Houndini*²: Participants listen to sets of words, and must select the odd-one-out based on either beginning sounds or ending sounds. This task improves phonological processing skills including phoneme analysis and phonological working memory.

*Circus Sequence*³ and *Trog Walkers*⁴: Students hear a series of short, non-verbal tones. Each tone represents a different fragment of the frequency spectrum used in spoken language. Students are asked to differentiate between these tones. The exercises improve working memory, sound processing speed, and sequencing skills.

*Old MacDonald's Flying Farm*³: Students hear a single syllable that is repeated several times, and then interrupted by a different syllable. Students must respond when they hear a change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

*Phoneme Identification*³, *Polar Cop*⁴, and *Treasure in the Tomb*⁴: Students hear a target phoneme, and then must identify the identical phoneme when it is presented later. These exercises improve auditory discrimination skills, increase sound processing speed, improve working memory, and help students identify a specific phoneme. *Polar Cop* also develops sound-letter correspondence skills. *Treasure in the Tomb* also develops grapheme recognition.

*Phonic Match*³ and *Bug Out*⁴: Students choose a square on a grid and hear a sound or word. Each sound or word has a match somewhere within the grid. The goal is to find each square's match and clear the grid. The *Phonic Match* exercise develops auditory word recognition and phoneme discrimination, improves working memory, and increases sound processing speed. The *Bug Out!* exercise develops skill with sound-letter correspondences as well as working memory.

*Phonic Words*³: Students see two pictures representing words that differ only by the initial or final consonant (e.g., "face" versus "vase", or "tack" versus "tag"). When students hear one of the words, they must click

the picture that matches the word. This exercise increases sound processing speed, improves auditory recognition of phonemes and words, and helps students gain an understanding of word meaning.

*Language Comprehension Builder*³: Students listen to a sentence that depicts action and complex relational themes. Students must match a picture representation with the sentence they just heard. This exercise develops oral language and listening comprehension, improves understanding of syntax and morphology, and improves rate of auditory processing.

*Block Commander*³: In *Block Commander*, a three-dimensional board is filled with familiar shapes that students select and manipulate. The students are asked to follow increasingly complex commands. This exercise increases listening comprehension, improves syntax, develops working memory, improves sound processing speed, and increases the ability to follow directions.

*Start-Up Stories*⁴: Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

*Bear Bags*⁵ and *Bear Bags: More Lunch*⁶: In these exercises, the participant is asked to help Mama Bear sort words (on pieces of toast) into phoneme-based categories (in lunch bags). They develop phonemic awareness and decoding of single-syllable words. *Bear Bags* also develops understanding of alphabetic principles (phonics) and *Bear Bags: More Lunch* also develops grapheme/phoneme associations.

*Magic Rabbit*⁵ and *Magic Bird*⁶: These exercises combine spelling and word-building practice with spelling patterns and word families commonly studied in 1st grade for *Magic Rabbit* and in 2nd grade for *Magic Bird*. The task is designed to emphasize the relationships between words by showing how one word can be turned into another by simply changing a single letter in any position. Using a click and drag interface, the participant must either select the missing letter to complete a partially spelled word or rearrange scrambled letter tiles to spell a word. These exercises develop spelling and sensitivity to letter-sound correspondences.

*Flying Fish*⁵ and *Fish Frenzy*⁶: In these exercises, a fishing pelican pronounces a word. Then a series of spoken and/or written words (on fish) fly across the pond and the participant clicks on the word when it

³ Exercise from the Fast ForWord Language product.

⁴ Exercise from the Fast ForWord Language to Reading product.

⁵ Exercise from the Fast ForWord to Reading 1 product.

⁶ Exercise from the Fast ForWord to Reading 2 product.

matches the pronounced word. These exercises develop decoding skills, identification of sight words, and auditory memory.

*Quail Mail*⁵: In Quail Mail, a squirrel mail carrier pulls words out of a mailbag and the participant sorts them into different categories by clicking on the appropriate mailbox. This exercise encourages flexibility during reading and automatic access to the various dimensions of vocabulary.

*Bedtime Beasties*⁵ and *Leaping Lizards*⁶: These exercises use the “cloze task,” in which a written and aurally presented sentence has a word missing. The participant must select the correct word to complete the sentence from four choices. Vocabulary skills and sentence comprehension are developed in these exercises.

*Buzz Fly*⁵ and *Dog Bone*⁶: In these exercises, the participant listens to a passage and answers comprehension questions relating to each passage. The questions are aurally presented and written, and the response choices are presented as pictures. Responses are presented as words or short phrases in *Dog Bone*. These exercises develop listening comprehension and working memory skills as measured by performance on multiple choice questions.

*Ant Antics*⁶: The participant will be presented with a picture and then asked to pick one of the four alternatives that best describes an aspect of that picture. This exercise improves vocabulary skills and sentence comprehension.

*Scrap Cat*⁷: In Scrap Cat, a series of words is visually presented and participants are asked to sort each word into the correct semantic, phonological, syntactic, or morphological category. For this exercise only, the participant can click a button to hear any word and see it defined. This exercise develops decoding, vocabulary, and word recognition skills.

*Canine Crew*⁷: In Canine Crew multiple words are presented together in a grid and participants are asked to find pairs that match on the basis of the current criterion. This criterion shifts from words that rhyme, to synonyms, to antonyms, to homophones, as the participant progresses. This exercise develops vocabulary, decoding, and automatic word recognition.

*Chicken Dog*⁷: Participants hear a word and see it partially spelled. They must complete the word by filling in the missing letter or letter group. Five

options are always provided, including options that represent common visual and phonological errors. This exercise develops basic spelling patterns, letter-sound correspondences, and decoding.

*Twisted Pictures*⁷: Participants are presented with a variety of pictures and asked to select the sentence that most accurately describes each picture from among four alternatives. The descriptive sentences incorporate a wide range of syntactic structures. As the participant progresses, the sentences get longer and more difficult vocabulary is included. This exercise builds sentence comprehension by developing syntax, working memory, logical reasoning, and vocabulary.

*Book Monkeys*⁷: Participants read narrative and expository passages and answer comprehension questions about each passage. The multiple-choice questions demand that the participant use memory for literal detail, generation of inferences, or grasp of among four alternatives. This task develops paragraph comprehension, inferential and cause-and-effect reasoning, working memory, flexible reading, and vocabulary.

*Hog Hat Zone*⁷: In Hog Hat Zone, short passages from classic children’s literature are presented, with occasional gaps in the text where words are missing. Participants are asked to fill in each gap with the correct word from among four alternatives. The missing words are morphologically important items such as pronouns, auxiliary verbs, and words with suffixes and prefixes. This task develops paragraph comprehension, complex morphology, flexible reading, and vocabulary.

*Hoof Beat*⁸: The participant is presented with a question and four possible answers. The participant must choose the most appropriate answer. The questions relate to semantics, phonology, morphology, orthography, and syntax. The exercise encourages flexibility during reading and automatic access to the various dimensions of vocabulary and is designed to build vocabulary by showing the participant how words function.

*Jitterbug Jukebox*⁸: The participant hears a word spoken aloud and letters appear on the keys of a jukebox. The participant must spell the word by clicking on the jukebox keys. Jitterbug Jukebox helps participants improve spelling and sensitivity to letter-sound correspondences. This exercise includes many of the 500 most commonly used words in written English including most word families found in 3rd and 4th grade content standards.

⁷ Exercise from the Fast ForWord to Reading 3 product.

⁸ Exercise from the Fast ForWord to Reading 4 product.

*Goat Quotes*⁸: In Goat Quotes four newspapers paraphrase a headline at the top of a news kiosk. The participant must select the correct paraphrase. The exercise is designed to sample the basic syntactic (i.e., grammatical) structures of spoken English generally mastered in the early elementary grades. The exercise develops logical thinking and working memory skills as well careful reading.

*Book Monkeys: Book Two*⁸: Participant reads a passage, chart, or schedule and then answers questions related to the material. This exercise develops a participants' ability to read for literal meaning, cause-and-effect relationships, and inferential comprehension. It also develops a participant's working memory as well as vocabulary skills, which are crucial for flexible, fluent reading.

*Stinky Bill's Billboard*⁸: Participants must select the word that accurately completes a sentence. In this exercise, participants improve sentence comprehension while practicing the decoding of words in realistic contexts. This exercise also helps build vocabulary and awareness of word structure.

*Lulu's Laundry Line*⁸: Short passages are presented with occasional gaps where punctuation is missing. The participant must read the words and understand the passage in order to determine the correct punctuation. The exercise develops punctuation skills as well as automaticity for decoding and sentence comprehension.

Assessments

Before and after Fast ForWord participation, student reading skills were assessed with the Massachusetts Comprehensive Assessment System (MCAS), the Measures of Academic Progress (MAP), and Reading Progress Indicator (RPI).

Massachusetts Comprehensive Assessment System (MCAS):

The MCAS is used to evaluate all public school students in Massachusetts, including students with disabilities and limited English skills. It is designed to measure student performance based on the Massachusetts Curriculum Framework learning standards. All students in Grades 3-10 take the MCAS in the spring of each year. As a condition for graduation, students must pass the 10th grade MCAS in English/Language Arts and in Math.

Measures of Academic Progress (MAP): Developed by the Northwest Evaluation Association, the MAP are state-aligned computerized adaptive tests that accurately reflect the instructional level of each student and measure growth over time. The MAP is appropriate for students in grades 2 through 10.

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

Analysis

Scores were reported in terms of grade equivalents, scale scores, percentiles, and normal curve equivalents. Data were analyzed using paired t-tests. All analyses used a p-value of less than 0.05 as the criterion for identifying statistical significance.

RESULTS

Participation Level

Research conducted by Scientific Learning shows a relationship between product use and the benefits of the product. Product use is composed of content completed, days of use, and adherence to the chosen protocol (participation and attendance levels). During the 2006-2007 school year, Lawrence Public Schools chose to use the 48-, 50-, and 90-Minute protocols. These protocols called for students to use the product for 48, or 50 minutes a day, five days per week for six to ten weeks. Detailed product use is shown in Table 1.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Language Basics	79	20	67	93%	93%	72%
Fast ForWord to Reading Prep	66	42	130	79%	96%	71%
Fast ForWord Language	527	52	132	65%	92%	73%
Fast ForWord Language to Reading	350	48	130	68%	91%	72%
Fast ForWord to Reading 1	214	21	65	84%	90%	74%
Fast ForWord to Reading 2	155	36	106	68%	86%	73%
Fast ForWord to Reading 3	73	47	129	51%	86%	73%
Total	567	109	298	-	-	-

Table 1. Usage data showing the number of students who used the Fast ForWord products, along with group averages for the number of days participated, the number of calendar days between start and finish, the percentage of product completed, the participation level, and the attendance level. Total values reflect the average total number of days that students used products. Note: Students often use multiple products. Products used by fewer than 10% of the participants are not shown.

Assessment Results

Massachusetts Comprehensive Assessment System (MCAS):

The MCAS is administered each year in late March. A total of 299 students have MCAS results from the year before and after Fast ForWord participation. Results are reported first for students who initially participated during the 2005 – 2006 school year, and then for students who didn't participate until the 2006 – 2007 school year.

For students who initially used the Fast ForWord products during the 2005 – 2006 school year, the 2005 administration of the MCAS was used as the pre-test while the 2006 administration was the post-test. If available, the 2007 administration was the follow-up. For students who used Fast ForWord products during the 2006 – 2007 school year, the 2006 administration of the MCAS was used as the pre-test while the 2007 administration was used as the post-test. The MCAS is administered to students in 3rd through 8th grades. Results for students in 3rd grade are reported in terms of level (Warning, Needs Improvement, Proficient, or Advanced.) Students in other grades are given a Score as well as a Level.

Two hundred six students used the Fast ForWord products during the 2005 – 2006 school year and were administered the MCAS in 2005 and 2006. Eighty participants had Scores from both 2005 and 2006, the rest were in third grade at the time of the 2005 MCAS administration and only a Level was available. The students with scores were between 4th and 7th grade at the time of the pre-test. On average, they made significant improvements in their scores with scores increasing from 217 to 221 (Table 2).

	n	Before		After		t-statistic
		Mean	SE	Mean	SE	
	80	217.2	1.1	221.5	1.2	3.5*

Table 2. Students who participated on Fast ForWord Products during the 2005 – 2006 school year significantly improved their scores on the MCAS. * $p < 0.05$.

Fifty-four of the 80 students reported in the previous analysis also had data available from the 2007

	N	2005		2006		2007		F-statistic	
		Mean	SE	Mean	SE	Mean	SE		
Fast ForWord Group	54	217.3	1.3	221.4	1.5	222.6	1.3	Time	12.7*
Comparison Group	123	220.3	0.8	220.6	0.7	222.6	0.7	Time x Group	3.4*
t-statistic		-2.03*		0.54		0.06			

Table 3: Students in the Fast ForWord group started out significantly lower on the 2005 administration of the MCAS. They improved, and there were not significant differences between the scores of the Fast ForWord group and the Comparison group in either 2006 or 2007. * $p < 0.05$.

administration of the MCAS – one year after they initially used the Fast ForWord products. These data show that the scores were maintained (Table 3).

The Lawrence Public Schools were able to supply data from low performing students who had not used the Fast ForWord products. These students formed a comparison group. One hundred twenty-three students in the comparison group had MCAS data available from 2005, 2006, and 2007. A Multivariate Analysis of Variance (MANOVA) showed that there was a main effect of time as well as a time by group interaction with the Fast ForWord participants improving more. Independent t-tests showed that there was an initial difference between the groups with the students who used Fast ForWord starting significantly lower than students in the comparison group. The students who used the Fast ForWord products made greater gains immediately after participation. These gains were maintained the following year (Figure 1). The difference between the two groups disappeared after Fast ForWord participation with the participant group having a slightly higher score in both 2006 and 2007 (Table 3).

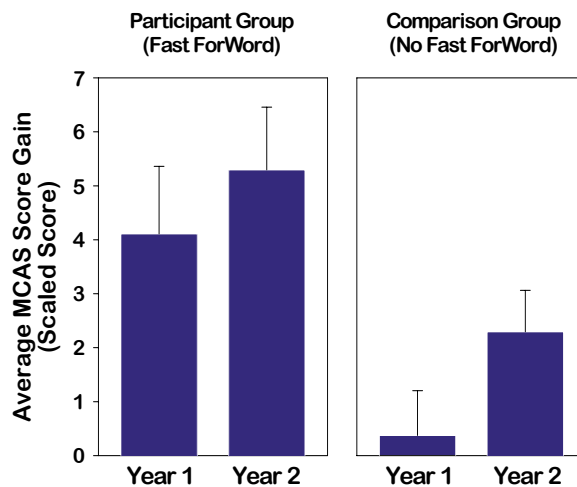


Figure 1. Longitudinal MCAS results from 54 students who used the Fast ForWord products and 123 students in the comparison group show that students who used the products made greater improvements, and those improvements were maintained.

One hundred twenty-six students used the Fast ForWord products during the 2005 -2006 school year but were not included in the previous analysis because they had only MCAS Level data available from the 2005 administration of the MCAS. Of those students, 94% were either at the Warning or the Needs Improvement level. The comparison group of students had 98% of the students at either the Warning or the Needs Improvement level. Of the 80 students at the Warning level, 23 (29%) moved to the Needs Improvement level or higher. Of the 39 students in Needs Improvement, 11 (28%) moved into Needs Improvement (high) or Proficient. In the comparison group, the number of students moving from Warning or Needs Improvement was 16% and 19% respectively (Table 4).

Initial Level	Percentage Increasing One or more Levels Between 2005 & 2006	
	Warning	Needs Improvement
Fast ForWord Group	29%	28%
Comparison Group	16%	19%

Table 4: Of the students who were at a "Warning" Level in 2005, the percentage that moved up one or more levels was nearly twice as high for the group that used Fast ForWord product (29% vs 16%). For the students that were initially at "Needs Improvement", the percentage moving up one or more levels was also much higher amongst the Fast ForWord participants.

An additional 93 students first used the Fast ForWord products during the 2006 – 2007 school year and took the MCAS in both 2006 and 2007. Most of those students were in the third grade at the time of the 2006 MCAS and received a Level, but not a Score. The 23 students who received a Score improved an average of one point between their pre- and post-test.

Of the 60 participants who did not have a Score at pre-test in 2006, 93% (53) received a Warning or Needs Improvement. Of the students who received a Warning, 31% moved up one or more levels while 14% of the students who received a Needs Improvement moved up one or more levels. For students in the comparison group, 24% of those who

received a Warning in 2005 moved up one or more levels while 4% of those who received a Needs Improvement moved up one or more levels (Table 5).

Initial Level	Percentage Increasing One or more Levels Between 2006 & 2007	
	Warning	Needs Improvement
Fast ForWord Group	31%	14%
Comparison Group	24%	4%

Table 5: Of the students who were at a "Needs Improvement" Level in 2006, the percentage that moved up one or more levels was more than twice as high for the group that used Fast ForWord product (14% vs 4%). For the students that were initially at "Warning", the percentage moving up one or more levels was also much higher amongst the Fast ForWord participants.

Measures of Academic Progress (MAP):

The MAP is administered three times each year. The scores available for analysis were from the winter administration. Therefore, the test was considered a pre-test of the students started Fast ForWord participation after January 1st. Four hundred fifty-five students had used the Fast ForWord products after January, 2005, and had scores available from at least one administration of the MAP. Comparison data was available from 828 students.

Of the participants, 220 had three years of data available, and had used the products between the 2005 and 2006 MAP administrations. They were in 4th – 7th grade at the time of the 2007 test. Four hundred students in the comparison group had three data points available. They were also in 4th through 7th grade at the time of the 2007 administration.

On average, the scores of the participants started out significantly below the scores of the students in the comparison group (4th vs 10th percentile). At the post-test (2006), the scores of both groups of students improved. At the follow-up, the scores of the participants continued to increase while the scores of the students in the comparison group returned to their original levels (Table 6).

	n	2005		2006		2007	
		Mean	SE	Mean	SE	Mean	SE
Fast ForWord Participants	220	12.6	0.8	16.6	0.8	19.5	0.7
Comparison Group	400	22.9	0.6	26.1	0.6	19.7	0.5

Table 6: Normal Curve Equivalents are reported for students who were assessed in 2005, 2006, and 2007 with the Measures of Academic Progress. The Fast ForWord participants initially used the products during the 2005 – 2006 school year.

Reading Progress Indicator (RPI):

Reading Progress Indicator was used during the 2007 – 2008 school year to evaluate students before and after Fast ForWord participation. The test is multi-choice and scores are considered invalid when a student does not demonstrate better than chance performance as determined by scoring at least 30% correct. Two or more valid scores were available for 108 students.

Sixty-five percent of the students (70 of the 108) showed improvements in their reading skills. The following results focus on the students who showed improvement after Fast ForWord use. The students' reading skills were initially in the below average range – towards the bottom of the 1st quartile. After an average of 4 months of Fast ForWord participation, the students' skills were reevaluated. The students made significant improvements with average student performance moving up into the top of the 1st quartile ($t = 10.39$; $df = 70$; $p < 0.001$). When presented as percentiles, the group's improvement corresponds to an increase from the 8th percentile to the 19th percentile.

DISCUSSION

Percentile scores are grade-corrected, and evaluate students relative to their peers. In order to maintain a constant percentile, students must improve their skills at a rate that is typical for students of their grade and achievement level. An increase in percentile level indicates that the students increased their achievement relative to their peers. These results show that students in the Lawrence Public Schools who used Fast ForWord products made statistically significant improvements in their reading scores relative to their peers. The Lawrence Public Schools went one step farther, and compared the achievement of the Fast ForWord participants to a group of students randomly selected from struggling students within the district who did not use the Fast ForWord products. Again, the Fast ForWord participants made greater gains than students who did not use the products.

Fast ForWord participants in the Lawrence Public Schools also showed marked improvement in their reading skills on the Reading Progress Indicator. For those students who had at least two valid test scores and benefitted from Fast ForWord product use, average improvement was from the 8th percentile to the 19th percentile.

These findings demonstrate that, within the Lawrence Public Schools, an optimal learning environment coupled with a focus on cognitive and early reading skills can help students attain a higher level of reading achievement.

CONCLUSION

Language and reading skills are critical for all students, impacting their ability to benefit from instruction, follow directions and participate in class discussions. Strong linguistic skills also provide a critical foundation for building reading and writing skills. After Fast ForWord use, students in the Lawrence Public Schools made significant gains in their reading ability. This suggests that using the Fast ForWord products strengthened the students' foundational skills and better positioned them to benefit from the classroom curriculum.

Notes:

To cite this report: Scientific Learning Corporation. (2008). Improved Reading Skills by Students in Lawrence Public Schools who used Fast ForWord® Products, MAPS for Learning: Educator Reports, 12(11)1-8

REFERENCES

- (2007) Reading Progress Indicator, Bookette Software Company.
- (2007) About MCAS – Massachusetts Department of Education. <http://www.doe.mass.edu/mcas/about1.html>.
- Lyon, G.R. (1996). Learning Disabilities. *The future of children: Special education for students with disabilities*. 6:54-76.
- Merzenich MM, Jenkins WM, Johnston P, Schreiner CE, Miller SL, & Tallal P (1996). Temporal processing deficits of language-learning impaired children ameliorated by training. *Science*, 271, 77-80.
- Miller, S.L., Merzenich, M.M., Tallal, P., DeVivo, K., Linn, N., Pycha, A., Peterson, B.E., Jenkins, W.M., (1999). Fast ForWord Training in Children with Low Reading Performance, *Nederlandse Vereniging voor Lopopedie en Foniatrie: 1999 Jaarcongres Auditieve Vaardigheden en Spraak-taal*. (Proceedings of the 1999 Dutch National Speech-Language Association Meeting).
- Northwest Evaluation Association. *Measures of Academic Progress (MAP)*. Lake Oswego, OR: Northwest Evaluation Association.
- Tallal P, Miller SL, Bedi G, Byma G, Wang X, Nagarajan SS, Schreiner C, Jenkins WM, Merzenich MM (1996). Language comprehension in language-learning impaired children improved with acoustically modified speech. *Science* 271:81-84.