Improved Early Reading Skills by Students in Three Districts who used Fast ForWord® to Reading 1

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord to Reading 1 product on the early reading skills of elementary school students who used the product within the curriculum in a school setting. **Study Design:** The design of this study was a randomized control trial with students from three different schools, from three different school districts. A nationally-normed test was used to evaluate effectiveness. **Participants:** Study participants were 208 first- and second-grade students from three schools in three districts in different states. Students were randomly assigned to one of two groups: half of the students used the Fast ForWord to Reading 1 product while the other half served as a comparison group and did not use the product. **Materials & Implementation:** Following staff training on the Fast ForWord to Reading 1 product, a group of students started to use the product during the spring semester of the 2004 – 2005 school year. Before and after Fast ForWord participation, students' early reading skills were evaluated with the Test of Phonological Awareness (TOPA). **Results:** On average, students made significant improvements after Fast ForWord use, with the Fast ForWord participants significantly outperforming the comparison group and gaining over half a standard deviation in measures of phonological awareness.

Keywords: public school, urban district, rural district, experimental study, randomized control group, Fast ForWord to Reading 1, Test of Phonological Awareness (TOPA).

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). Three school districts were interested in evaluating the effectiveness of an optimal learning environment with a focus on early reading and cognitive skills as a way of improving the reading abilities of students in a school setting. In this study, a commercially available computer-based product (Fast ForWord to Reading 1) was used to evaluate the effectiveness of this approach at improving the early reading skills of first and second graders.

METHODS

Participants

Students from first and second grades from three different schools participated in this study: 158 first graders and 50 second graders. The school districts ranged from urban to rural districts. Teachers at the schools rated the students academically compared to their peers on a scale of 1 to 5 (1 being the lowest, 5 being the highest). Across the schools, on average, these students were rated as 2.7, falling between "below average" and "average".

All of the study participants were eligible to be assigned to either group. Using computer-generated random numbers, random assignment was performed within each school's group of students. Half of the study participants from each school were randomly assigned to either the Fast ForWord group or the comparison group. At one of the schools, students from first and second grades participated, whereas only first graders participated from the other two schools. At the school with both first and second graders, random assignment was done within grade level, ensuring that an equal number of first and second graders were in each group. All students in the Fast ForWord group, including the second graders, used the Fast ForWord to Reading 1 product, a product designed using first-grade curriculum standards. The other half of the study participants was

assigned to a comparison group and took part in the regular school curriculum.

Seven participants (six from the comparison group and one from the Fast ForWord group) had used the Fast ForWord Basics product before participating in the study. The remaining students had not previously used any Fast ForWord products.

All students had their phonemic awareness skills, an early reading skill, evaluated with the Test of Phonological Awareness (TOPA) before and after the Fast ForWord group used the product. School personnel administered the assessments and returned the tests for analysis and reporting.

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 to Reading 1 product is a computer-based product that combines an optimal learning environment with a focus on early reading and cognitive skills. The product includes six exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension.

Bear Bags: 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).

Magic Rabbit: These exercises combine spelling and word-building practice with spelling patterns and word families commonly studied in 1st grade. 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. This exercise develop spelling and sensitivity to letter-sound correspondences.

Flying Fish: In this exercise, 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 matches the pronounced word. This exercise develops decoding skills, identification of sight words, and auditory memory.

Quail Mail: 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: This exercise uses 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: In this exercise, 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. This exercise develops listening comprehension and working memory skills as measured by performance on multiple-choice questions.

Assessments
School personnel evaluated all students with the Test of Phonological Awareness (TOPA) before and after the Fast ForWord group participated on the product. Tests were returned for scoring and analysis.

Test of Phonological Awareness (TOPA): The TOPA is a nationally-normed, group-administered measure of phonological awareness. Its two subtests are Phonological Awareness and Letter-Sounds. The Early Elementary version of the assessment is appropriate for first and second graders.

The Phonological Awareness subtest measures the child's ability to isolate individual phonemes in spoken words. In the Early Elementary version of the assessment, the child is asked to isolate initial and final phonemes.

The Letter-Sounds subtest measures the student's ability to understand the relationships between letters and phonemes in English. It requires the children to spell simple pseudowords that are given as the names of "funny animals". The words vary from two to five phonemes in length, and they are all single-syllable.

The Institute for the Development of Educational Achievement, in accordance with the Reading First legislation, determined that the

TOPA subtests are appropriate outcome assessments for accurately measuring improvement in phonemic awareness, an early reading skill, of children in early elementary school.

Analysis

Normal Curve Equivalents (NCE's) were used for the analyses. NCE's have a mean equal to 50 and a standard deviation approximately equal to 21. Data were analyzed using a repeated measures multivariate analysis of variance (MANOVA). All analyses used a p-value of less than 0.05 as the criterion for identifying statistical significance.

RESULTS

Participation Level

Research conducted by Scientific Learning shows a relationship between product use and the benefits of the product. Product use is composed of content completed, days of use, and adherence to the chosen protocol (participation level). During the spring semester of the 2004 – 2005 school year, the three elementary schools used the 48-Minute Fast ForWord to Reading 1 Protocol. This protocol calls for students to use the product for 48 minutes per day, five days a week for eight to 12 weeks.

Across the three schools, 208 students participated: 103 students (78 first graders and 25 second graders) were randomly assigned to the Fast ForWord group, and 105 students served as a comparison group (80 first graders and 25 second graders). One hundred and ninety-seven students were included in the final analyses of the study: 75 first graders and 23 second graders in the Fast ForWord group, and 78 first graders and 21 second graders in the comparison group.

Four students (two from the comparison group, two from the Fast ForWord group) were older than nine years old at one or both testing times, which is too old for the norms of the TOPA. Therefore, their scores were not included in the analyses. Three additional students from the Fast ForWord group and four additional students from the comparison group moved during the study.

Random assignment to either the Fast ForWord or comparison group was designated using SPSS statistical software. Only the Fast ForWord group used the Fast ForWord to Reading 1 product during the study. Detailed usage information for the Fast ForWord group is shown in Table 1.

Figure 1 shows the average daily progress through the Fast ForWord to Reading 1 product exercises for the students who used the product. The final day shown is determined by the maximum number of days that at least two-thirds of the students participated. For students who used the product fewer than the number of days shown, percent complete is maintained at the level achieved on their final day of product use.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level
Fast ForWord to Reading 1	98	24	37	81%	80%

Table 1. Usage data showing the number of students who used the Fast ForWord to Reading 1 product along with group averages for the number of days participated, the number of calendar days between start and finish, the percentage of product completed, and participation level. Results are shown by grade level.

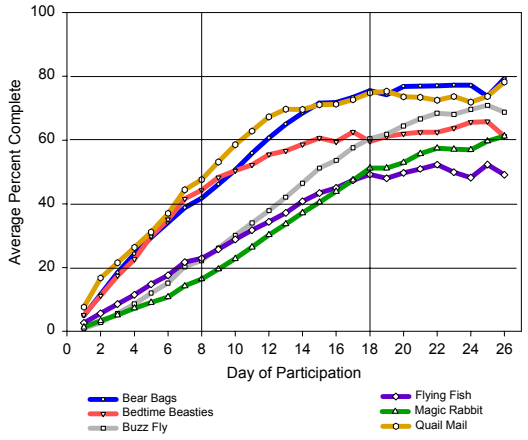

Figure 1. Average daily progress through the Fast ForWord to Reading 1 product exercises. Results from 98 students are shown.

Assessment Results

Test of Phonological Awareness (TOPA): The TOPA was used to evaluate the phonemic awareness skills of the students in this study, both before and after the Fast ForWord group used the Fast ForWord to Reading 1 product. Normal Curve Equivalents (NCE's) from the TOPA were used in the analyses.

Both groups of students were performing within the average range on both subtests of the TOPA before Fast ForWord use and pre-test scores between the groups were not significantly different.

On the Phonological Awareness subtest, the Fast ForWord group of students improved their average score by 12.8, over half of a standard deviation, compared to an improvement of 6.9 by the comparison

group. The Fast ForWord group had an average gain of 5.5 on the Letter-Sounds subtest, more than double the improvement made by the comparison group (Table 2).

A MANOVA (Table 3) showed a significant difference by time by group, indicating the first and second graders in the Fast ForWord group had significantly greater improvements over time than the first and second graders in the comparison group. This time by group difference was consistent across the three different schools and the two different subtests, as the time by school by group effect and the time by test by group effect were not statistically significant. The entire model was estimated, and the effects of the model are shown in Table 3.

To examine the effect of grade, an analysis was performed for the one school that had both first and second graders. Adding grade into the overall model weakened the effects. Inspection of effects by grade showed that first graders who used the Fast ForWord to Reading 1 product had significant improvements in early reading skills (F=4.38, df=47, p=0.04), but second graders did not (F=0.63, df=42, p=0.43).

Group	Subtest	n	Before		After	
			Mean	SE	Mean	SE
Fast ForWord	Phonological Awareness	98	42.0	2.4	54.8	2.5
	Letter-Sounds	98	37.9	1.7	43.4	1.9
Comparison	Phonological Awareness	99	38.9	2.3	45.8	2.6
	Letter-Sounds	99	36.3	1.8	38.2	1.9

Table 2. First and second graders made significant gains and outperformed a comparison group of their peers on the TOPA after using the Fast ForWord to Reading 1 product.

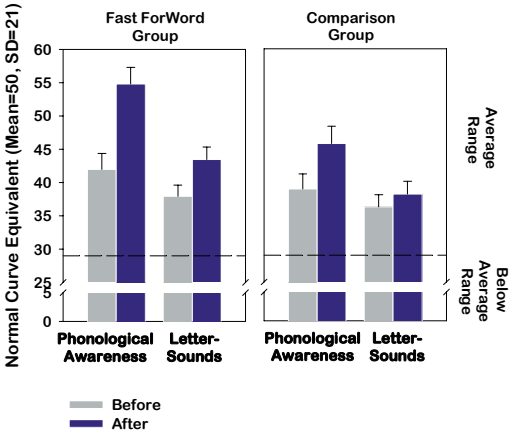

Figure 2. Fast ForWord participants significantly outperformed a comparison group in phonemic awareness skills after using the Fast ForWord to Reading 1 product.

	MANOVA	
	df	F
time	(1, 191)	48.5*
time x school	(2, 191)	0.5
time x group	(1, 191)	5.9*
time x school x group	(2, 191)	0.4
test	(1, 191)	25.0*
test x school	(2, 191)	2.6
test x group	(1, 191)	0.3
test x school x group	(2, 191)	1.6
time x test	(1, 191)	10.5*
time x test x school	(2, 191)	2.0
time x test x group	(1, 191)	0.9
time x test x school x group	(2, 191)	0.5
school	(2, 191)	20.6*
group	(1, 191)	2.4
school x group	(2, 191)	0.7

*Table 3. A MANOVA showed that students who used the Fast ForWord to Reading 1 product had significantly greater improvements on tests of phonemic awareness than a comparison group. *p<0.05.*

DISCUSSION

During the spring of the 2004 – 2005 school year, over 200 students from three districts across the country participated in a study to test the effectiveness of the ForWord to Reading 1 product. Overall, students who used the product made significant improvements on phonemic awareness, a critical early reading skill, and significantly outperformed a comparison group of their peers who did not use the product. These findings were consistent across the three schools that participated, demonstrating that, across different school environments, a focus on cognitive and early reading skills can help students attain a higher level of early reading achievement.

CONCLUSION

Strong cognitive and linguistic skills provide a critical foundation for building reading and writing skills. The Fast ForWord to Reading 1 product builds this foundation through development of auditory memory, attention, and sequencing, and by exercising early reading skills including phonics, vocabulary, fluency and comprehension. This study demonstrates that students who used the Fast ForWord to Reading 1 product improved their phonemic awareness skills more than a comparison group that used the standard curriculum. These results suggest that using the Fast ForWord product strengthened the students' foundational and early reading skills and will allow them to benefit more from the classroom curriculum.

Notes:

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