Improved Reading Achievement by Students in the Pawhuska and Harlandale School Districts who used Fast ForWord® to Reading 3

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord to Reading 3 product on the language and early reading skills of elementary school students when used within the curriculum in a school setting. **Study Design:** The design of the study was a multiple school experimental study using a standardized, nationally normed assessment. A repeated measure analysis of variance was used to evaluate changes in student performance and determine whether students who used the Fast ForWord to Reading 3 product outperformed those who did not. **Participants:** Study participants were 112 third grade students who were attending either Pawhuska Elementary School in the Pawhuska School District, Pawhuska, OK or Gilbert Elementary School in the Harlandale Independent School District, San Antonio, TX. Seventy students used the Fast ForWord to Reading 3 product and 42 students served in a comparison group. **Materials & Implementation:** Following staff training on the product, 70 students used the Fast ForWord to Reading 3 product for an average of 18 hours for 26 days over a period of 7 weeks. Before and after participation, student performance was evaluated with the TerraNova Survey Plus. **Results:** On average, across the subtests used, students had significant improvements in their assessment scores following participation, with the Fast ForWord participants improving by over 60% more points than the comparison group.

Keywords: Oklahoma, Texas, elementary schools, suburban district, urban district, experimental study, Title I, Fast ForWord to Reading 3, TerraNova Survey Plus.

INTRODUCTION

Early laboratory tests of a prototype of a computer-based product combined an optimal learning environment with a focus on early reading and cognitive skills. The results were dramatic improvements in the auditory processing and language skills of elementary school children who had specific language impairments (Merzenich et al., 1996; Tallal et al., 1996) or were at-risk for academic failure (Miller et al., 1999). Educators in the Pawhuska and Harlandale School Districts were interested in evaluating the effectiveness of this approach for improving their curriculum and instruction for elementary school students. In this study, a commercially available computer-based product (Fast ForWord to Reading 3) was used to evaluate the effectiveness of this approach for improving the reading achievement of students.

METHODS

Participants

A total of one hundred twelve students from the Pawhuska School District in Pawhuska, Oklahoma and the Harlandale Independent School District in San Antonio, Texas, participated in this study. Seventy students used the Fast ForWord to Reading 3 product and 42 served as a comparison group. Students were in the third grade and most of them used the product during their regularly scheduled reading instruction.

Implementation

Educators in both schools were trained in current and established findings on the neuroscience of 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 monitoring student performance; and techniques for measuring the gains students have achieved after they finished using the product.

Materials

All of the study participants used the Fast ForWord to Reading 3 product, 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.

Scrap Cat: Students are asked to sort a series of visually-presented words into the correct semantic, phonological, syntactic, or morphological categories. For this exercise only, students can click a button to hear any word and see it defined. This exercise develops decoding, vocabulary, and word recognition skills.

Chicken Dog: Students hear a spoken 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, with foils representing common visual and phonological errors. This exercise develops basic spelling patterns, letter-sound correspondences, and decoding.

Canine Crew: Students are asked to match pairs of words within a grid. Grid size increases as the student develops mastery, and the matching criterion shifts from rhyming words to synonyms, antonyms, and, finally, homophones. This exercise develops vocabulary, decoding, and automatic word recognition.

Twisted Pictures: Students are presented with a series of pictures and visually-presented sentences. They are asked to select the most accurate description of each picture from the four accompanying sentences. The descriptive sentences incorporate a wide range of syntactic structures. As the student 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: Students read narrative and expository passages and answer comprehension questions about each passage. The multiple-choice questions demand that the student uses memory for specific details, to generate inferences, or to grasp causal relationships. The student selects the best answer from among four alternatives. This task develops paragraph comprehension, cause-and-effect reasoning, working memory, flexible reading, and vocabulary.

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

Assessments

Student achievement was evaluated before and after using the Fast ForWord to Reading 3 product with the TerraNova Survey Plus. School personnel administered the assessment and reported the scores for analysis.

TerraNova Survey Plus: The TerraNova is a standardized, nationally normed test of achievement that is multiple choice and classroom administered. In this study, the relevant Language Arts and Reading subtests (Word Analysis, Spelling and Vocabulary) were administered. Language Mechanics was not included since it assesses knowledge of written language conventions that are not developed by the product. The content in the Language and Reading subtests is aligned with contemporary classroom curricula, standards for English/Language Arts, and the conceptual frameworks of the National Assessment of Educational Progress.

Analysis

Prior to conducting the planned analyses, the data were cleaned to remove scores that were considered unreliable. It was noted that in some instances, students left large sections of a subtest blank, or otherwise rendered multiple items unscorable. It was also noted that the reliability of the TerraNova Survey Plus drops markedly at extreme scores. In order to minimize the noise in the measure, scores were included in the analysis only if they met the following criteria of reliability. First, no more than one item on the subtest was left blank or made unscorable (e.g., multiple marks). Second, the raw score on the subtest was associated with a Standard Error of the Measure of 20 or less. The cutoffs for this latter criterion varied by subtest. The range of acceptable raw scores was 7 to 18 for Language Mechanics, 7 to 16 for Spelling, 5 to 17 for Vocabulary, and 6 to 18 for Word Analysis. The maximum raw score possible on each subtest was 20, and it should be noted that a score of 5 points on any subtest would indicate performing at chance. The cutoffs roughly correspond to the 7^{th} and 92^{nd} percentiles.

Using the cleaned data, a repeated measure analysis of variance was performed and all analyses used a p-value of 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). The Fast ForWord to Reading 3 protocol used by the Pawhuska and Harlandale School Districts called for students to use the product for a total of 40 hours over 8 weeks.

Seventy students from the third grade used the Fast ForWord to Reading 3 product during the spring of 2001. On average, they used the Fast ForWord to Reading 3 product for a total of 18 hours for 26 days over a period of 7 weeks. They achieved a participation level of 60% and completed 44% of the product content (Table 1).

Number of Students	Average Hours of Product Use	Average Number of Calendar Days	Average Participation Level	Average Overall Percent Complete
70	18	26	60%	44%

Table 1. Usage data showing the number of students who used the Fast ForWord to Reading 3 product along with group averages for the number of hours of use, calendar days between start and finish, participation level and the percentage of content covered.

Assessment Results

TerraNova Survey Plus: Student performance was evaluated with the TerraNova Survey Plus before and after participation in the Fast ForWord to Reading 3 product. The Spelling, Vocabulary and Word Analysis subtests were used.

After cleaning the data by removing unmatched tests and potentially unreliable scores, the following matched tests were available: Vocabulary (48 participants; 23 comparison), Word Analysis (62 participants; 35 comparison), and Spelling assessments (32 participants; 20 comparisons). On average, the students scored below the national average for third grade students (the national average for spelling = 598; vocabulary = 619; word analysis = 634).

Figure 1 shows the pre- and post-participation scores for the experimental and control groups. A significant interaction was found between time and group ($F(1,35)=4.30$; $p<.045$), indicating that students who used the Fast ForWord to Reading 3 product averaged significantly greater gains in reading achievement across the three assessments. On average, across the three subtests, the students who used the product gained over 60% more points than the students who did not (i.e., 15.1 vs. 9.4 points).

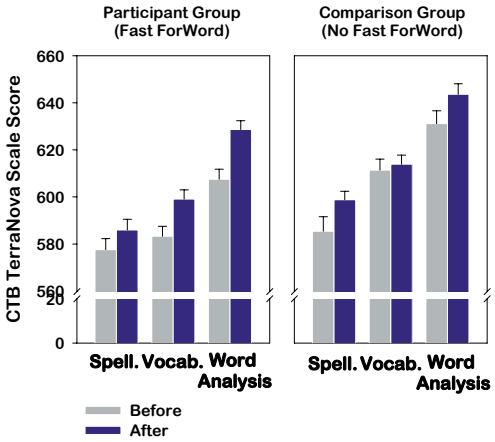

Figure 1. TerraNova scores from before and after participation in the Fast ForWord to Reading 3 product. Students who used the product, on average, had greater gains in reading achievement across the three subtests.

DISCUSSION

During the spring of 2001, seventy third grade students in the Pawhuska and Harlandale School Districts used the Fast ForWord to Reading 3 product. Following product use, the Fast ForWord participants, on average, made significant improvements in their reading achievement. These findings demonstrate that, within the Pawhuska and Harlandale School Districts, an optimal learning environment coupled with a focus on cognitive and early reading skills, can help students attain a higher level of academic achievement.

CONCLUSION

Reading and language skills are critical for all students, impacting their ability to benefit from instruction, follow instructions, and participate in class discussions. On average, the students who used the Fast ForWord products made significant gains in their scores on the TerraNova Survey Plus. These students improved their critical early reading and cognitive skills, strengthened their vocabulary and increased their ability to benefit from the classroom curriculum.

Notes:

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