

Improved Reading Abilities by Students in the Bethlehem Area School District in Pennsylvania who used the Fast ForWord[®] Language Product

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord Language product on the phonemic awareness and reading abilities of students who used the product in a school in the Bethlehem Area School District, Pennsylvania. **Study Design:** The design of the study was a single school, randomized, controlled study, using tests of phoneme awareness and reading. **Participants:** The 60 study participants were third through fifth graders in the Freemansburg Elementary School who had their skills evaluated before and after the experimental group used the Fast ForWord Language product. **Materials & Implementation:** Following staff training on the Fast ForWord products, students in this Pennsylvania school used the Fast ForWord Language product. Before and after Fast ForWord participation, student performance was evaluated by examining progress on the Yopp-Singer Test of Phoneme Segmentation and the Qualitative Reading Inventory-II (QRI-II). Univariate statistics, paired t-tests, and a series of analysis of covariance were used to analyze how the study participants performed before and after the Fast ForWord Language product was used. **Results:** On average, the students who used the Fast ForWord Language product made significantly greater improvements than the control group in both phonemic awareness and reading ability, and improved these skills at a faster rate than the control group.

Keywords: Pennsylvania, elementary school, urban district, experimental study, randomized study, comparison group, Fast ForWord Language, Yopp-Singer Test of Phoneme Segmentation, Qualitative Reading Inventory-II (QRI-II).

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). Cheryl Ann Slattery, of Widener University, was interested in evaluating the effectiveness of an optimal learning environment with a focus on early reading and cognitive skills as a way for improving reading skills of low-performing students in a school setting. As part of a dissertation, Cheryl Ann Slattery worked together with Freemansburg Elementary School in the Bethlehem Area School District to evaluate a commercially

available computer-based product (Fast ForWord Language) and its effectiveness at improving the reading abilities of students.

METHODS

Participants

This study took place at Freemansburg Elementary School, an urban elementary school in the Bethlehem Area School District in Pennsylvania. The student population of the school is multicultural, with a low socioeconomic makeup and a high percentage of Limited English Proficient students. The free or reduced-price lunch rate at Freemansburg Elementary School is 61%. Given the student population, the students at the school are considered at-risk within the district.

At the time of the study, Freemansburg Elementary School was one of 16 elementary schools in the district. It schooled 348 students in grades kindergarten through five. There were 182 students in grades three, four, and five, and 60 of them participated in the study. Seven third graders, nine fourth graders, and 14 fifth graders used the Fast ForWord Language product, while eight third graders, seven fourth graders, and 15 fifth graders served as the control group.

Three separate treatment sessions were conducted over the course of one year: winter and spring of one school year, and fall of the subsequent school year. In each of the three sessions, 10 students were randomly selected to use the Fast ForWord Language product, resulting in a total of 30 Fast ForWord Language participants. These students were chosen from the population of the third, fourth, and fifth graders who were reading below grade level. Thirty students were randomly selected from the same population of third, fourth, and fifth graders reading below grade level to serve as the control group. To match the number of Fast ForWord participants per treatment session, there were 10 control students per session.

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.

The 30 Fast ForWord Language participants were excused from their classrooms near the end of every school day and reported to the computer lab. Two qualified coaches were present in the computer lab daily during the Fast ForWord sessions. Coaches included two academic support teachers, a reading specialist, a speech therapist, and two first-grade teachers. The same people served as the coaches for all three treatment sessions.

Materials

The Fast ForWord Language product is a computer-based product that combines an optimal learning environment with a focus on early reading and cognitive skills. The product includes seven exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension. The product helps develop certain critical skills as detailed in the following exercise descriptions.

Circus Sequence: 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: Students hear a single syllable that is repeated several times, and then interrupted by the different syllable. They 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: 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.

Phonic Match: 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.

Phonic Words: 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: 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: 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.

Assessments

To determine the impact of using the Fast ForWord Language product, staff within Freemansburg Elementary School used pre- and post-tests to assess the skills of the students who used the product and the

students from the control group. The Yopp-Singer Test of Phoneme Segmentation and the Qualitative Reading Inventory-II (QRI-II) were the two assessments that were given.

The time between pre-test and post-test administration was 10 weeks. Tests were given in the reading specialist's classroom, providing a quiet place without interruptions.

Yopp-Singer Test of Phoneme Segmentation: This assessment measures a child's ability to separately articulate the sounds of a spoken word in order. Student scores indicate the number of items correctly segmented into all component phonemes. No partial credit is given. Students with scores of 16 or higher can be considered phonemically aware. Scores between 8 and 15 indicate emerging phoneme awareness, and scores of 7 or lower reflect a lack of appropriate levels of phoneme awareness.

Qualitative Reading Inventory-II (QRI-II): The Qualitative Reading Inventory-II is an informal reading inventory that is individually administered. It contains graded word lists and passages, both narrative and expository, designed to measure a student's oral reading, silent reading, and listening comprehension.

Analysis

Univariate tests were used to determine whether there were differences between the dependent variables (phonological awareness and reading ability level) of the groups at pre and post. Paired t-tests were used to determine pre and post differences within the groups. A series of analyses of covariance (ANCOVA) was performed to measure differences between the groups. Statistical analyses used a p-value of 0.05 to determine 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 Language protocol chosen by the school called for students to use the product for 100 minutes a day, five days a week for four to eight weeks.

During this study, a primary consideration of the coaches was to monitor compliance with the Fast ForWord protocol. All 30 participants used the Fast ForWord Language product for six weeks. Twenty-three (77%) of the thirty participants completed at least 80% of the content on four of the seven exercises. Twenty-one (70%) of the thirty participants had a participation level of at least 80%.

Assessment Results

Yopp-Singer Test of Phoneme Segmentation: At pre-test, the group of Fast ForWord Language participants had a mean level of phoneme awareness at the

emerging level, with a mean score of 11.9. The students in the control group also had a mean level of phoneme awareness at the emerging level, with a mean score of 10.2. Univariate tests indicated that these mean scores of the two groups at pre-test were not significantly different. At post-test, the students who used the Fast ForWord Language product made significant improvements, with their mean phoneme awareness level increasing into the phonemically aware level. These post-test scores were significantly higher than the scores of the control group ($t(59) = 5.7, p < 0.001$) and the mean improvement made by the Fast ForWord group was significantly greater than the mean improvement made by the control group ($t(59) = 5.5, p < 0.001$). See Figure 1 for details.

To analyze the differences in benefit between the two groups and to look for differential patterns of change, a series of analysis of covariance (ANCOVA) was performed. The covariate was the pre-test score. On average, the Fast ForWord Language participants improved their scores on the Yopp-Singer at a faster rate than the control group. The Fast ForWord Language group accounted for 37% of the differential patterns of change, signifying a moderate effect.

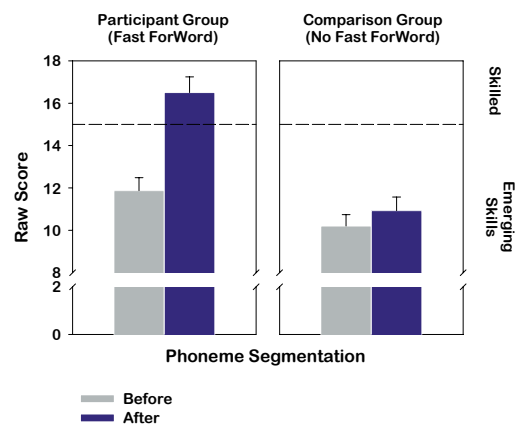


Figure 1. At pre-test, on average, the mean scores of the two groups were not significantly different. However, the mean post-test score of students who used the Fast ForWord Language product was significantly higher than that of the control group.

Qualitative Reading Inventory-II (QRI-II): Similar analyses were performed on the QRI-II. At the time of the study, the mean grade level for both groups of students was 4.2, shown as the dashed line in Figure 2. At pre-test, univariate analyses showed that the mean reading ability levels of the two groups were not significantly different. At pre-test both groups had a mean of a third grade reading level. At post-test, the Fast ForWord Language group showed significant gains, while the students in the control group remained at the third grade reading level. The Fast ForWord

group had post-test scores that were significantly higher than the scores of the control group ($t(59) = 4.0, p < 0.001$) and the mean improvement made by the Fast ForWord group was significantly greater than the mean improvement made by the control group ($t(59) = 5.4, p < 0.001$). See Figure 2 for details.

The ANCOVA that was used to study the differences between group performances on the QRI-II showed that the Fast ForWord Language group accounted for 34% of the variance, which again indicates a moderate effect.

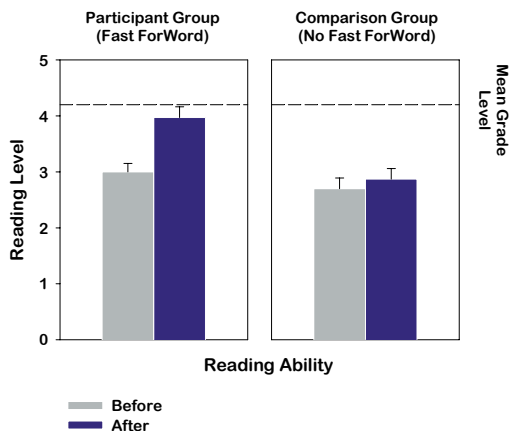


Figure 2. Students who used the Fast ForWord Language product had a significantly higher post-test than the control group, moving the participants closer to their mean grade level.

CONCLUSION

There is currently a widespread interest and a focus on students who are academically at-risk for failure, particularly in the area of reading. Phonemic awareness is a critical component of being a successful reader, and continues to be a weakness for students who read below grade level.

During the 2003 – 2004 school year, students from Freemansburg Elementary School used the Fast ForWord Language product. On average, students who used the product showed significant gains in their phoneme awareness skills after participating for six weeks, significantly outperforming a control group. The Fast ForWord group also showed significant improvements in reading level, reading at a significantly higher level than the control group at post-test.

These results support previous studies demonstrating that using the Fast ForWord Language product strengthens students' foundational skills and helps them benefit more from the classroom curriculum.

Notes:

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