Improved Academic Achievement by Students in the Manchester City School District, Tennessee, who used Fast ForWord® Products

ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord products on the language and reading skills of students who used the products within the curriculum in a school setting. **Study Design:** The design of the study was a single school case study using nationally-normed tests. Dependent t-tests were used to evaluate changes in student test performance. **Subjects:** Study participants were 329 students above kindergarten grade who were attending Westwood Elementary School in Manchester, Tennessee. One hundred thirty-seven students had assessment data available at two time points. **Materials & Implementation**: Following staff training on the Fast ForWord products, 274 Westwood Elementary School students used the Fast ForWord Language product for an average of 19 days during an average period of 34 calendar days. Fifty-five students used the Fast ForWord Middle & High School product for an average of 13 days during an average period of 22 calendar days. Of these 329 students, 107 also used the Fast ForWord Language to Reading product for an average of 17 days over an average period of 37 calendar days. To evaluate performance, student skills were assessed with the Terra Nova before and after use of the Fast ForWord products. **Results:** On average, students made significant improvements in their academic skills as measured by the Terra Nova subtests, with scores improving more than expected on many of the subtests including Reading, Language, Social Studies, Science, and Math.

Keywords: **Tennessee, elementary school, rural district, observational study, Title I, Fast ForWord Language, Fast ForWord Middle & High School, Fast ForWord Language to Reading, Terra Nova.**

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). The Westwood Elementary School was interested in evaluating the effectiveness of this approach for improving their curriculum and instruction for elementary school students. In this study, commercially available computer-based products (Fast ForWord Language, Fast ForWord Middle & High School, and Fast ForWord Language to Reading) were used to evaluate the effectiveness of this approach for improving the academic achievement of children.

METHODS
Participants
From the spring of 2000 to the spring of 2001, 329 first through sixth grade students in Westwood Elementary School in Manchester, Tennessee used the Fast ForWord products. Two hundred and seventy-four used the Fast ForWord Language product and 55 used the Fast ForWord Middle & High School product. One hundred and seven of the 329 students also used the Fast ForWord Language to Reading product. All study participants were above kindergarten grade. One hundred thirty-seven of those students, in fourth through sixth grades, had assessment data available from before and after they used Fast ForWord products.

Implementation
Educators at Westwood Elementary School 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 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 have finished using the product.

Materials
All of the study participants used either the Fast ForWord Language or the Fast ForWord Middle &

High School product. One hundred and seven of these students also used the Fast ForWord Language to Reading product. All three of these are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. The products include five 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 these products, all help develop certain critical skills.

Circus Sequence[1], Sweeps[2], Trog Walkers[3]: 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[1] and Streams[2]: Students hear a single syllable that is repeated several times then interrupted by a different syllable. Students must respond when they hear the change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

Phoneme Identification[1], IDs[2], Polar Cop[3], and Treasure in the Tomb[3]: 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[1], Matches[2], and Bug Out[3]: 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* and *Matches* exercises develop auditory word recognition and phoneme discrimination, improve working memory, and increase sound processing speed. The *Bug Out!* exercise develops skill with sound-letter correspondences as well as working memory.

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[1] Exercise from the Fast ForWord Language product
[2] Exercise from the Fast ForWord Middle & High School product
[3] Exercise from the Fast ForWord Language to Reading product

Phonic Words[1] and Cards[2]: 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. These exercises increase sound processing speed, improve auditory recognition of phonemes and words, and help students gain an understanding of word meaning.

Language Comprehension Builder[1]: 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[1]: 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.

Stories[2] and Start-Up Stories[3]: Students follow increasingly complex instructions, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

Assessments
As part of the Tennessee Comprehensive Assessment Program (TCAP), the Manchester City School District administered the TerraNova before and after Fast ForWord participation. Scale scores were reported for the analyses, and students were compared to an expected scale score. The subtests used to evaluate student performance were Language, Reading, Math, Science, and Social Studies.

The Terra Nova is a standardized, nationally normed test of achievement that is multiple choice and classroom administered. Subtests include Language, Reading, Social Studies, Math, and Science. The content in the Reading and Language subtests is aligned with contemporary classroom curricula, standards for English/Language Arts, and the conceptual frameworks of the National Assessment of Educational Progress.

Analysis
Dependent t-tests were conducted to determine if using the Fast ForWord products significantly improved a student's academic achievement. 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).

Between the spring of 2000 and the spring of 2001, 329 students in Westwood Elementary School used the Fast ForWord products. Two hundred and seventy-four of these students used the Fast ForWord Language product for an average of 19 days over an average period of 34 calendar days. They achieved an average participation level of 79% and completed an average of 80% of the product content. The remaining 55 students used the Fast ForWord Middle & High School product for an average of 13 days over an average period of 22 calendar days. They had an average participation level of 89% and completed an average of 84% of the product content. Of the 329 students, 107 also used the Fast ForWord Language to Reading product for an average of 17 days over an average period of 37 calendar days. They achieved an average participation level of 68% and completed an average of 68% of the product content (Table 1).

Product	Number of Students	Average Days of Product Use	Average Number of Calendar Days	Average Participation Level	Average Overall Percent Complete
Fast ForWord Language	274	19	34	79%	80%
Fast ForWord Middle & High School	55	13	22	89%	84%
Fast ForWord Language to Reading	107	17	37	68%	68%
Overall	436	18	33	78%	77%

Table 1. Usage data showing the number of students who used the Fast ForWord products between the spring of 2000 and the spring of 2001, along with group averages for the number of days of use, calendar days between start and finish, participation level, and percentage of content covered.

Assessment Results
<u>Terra Nova</u>: Five subtests of the Terra Nova (Language, Reading, Social Studies, Math, and Science) were used to assess student skills before and after participation on the Fast ForWord products. Since students in the third through sixth grades are assessed each year, scores from before and after participation were available for students in the fourth, fifth, and sixth grades. For each subtest, matched scores from before and after participation were available for 45 students in the fourth grade, and 46 in the fifth and sixth grades – except for sixth grade Social Studies for which only 45 scores were available.

On average, after using the Fast ForWord products, 5th and 6th graders had improvements that were significantly greater than expected in the Language subtest (Figure 1).

On the Reading and Social Studies subtests, after using the Fast ForWord products, 6th graders, on average, had improvements that were significantly better than expected (Figures 2 and 3).

After using the Fast ForWord products, fourth, fifth and sixth graders, on average, all had improvements that were significantly better than expected on the Science subtest (Figure 4).

On average, 4th and 6th graders had improvements that significantly exceeded expectations in the Math subtest after participation on the Fast ForWord products (Figure 5).
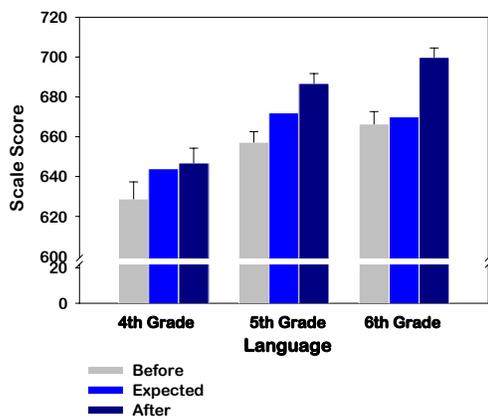
Figure 1. Scores on the Language subtest show 5th and 6th graders had, on average, significantly higher than expected scores after using the Fast ForWord products.
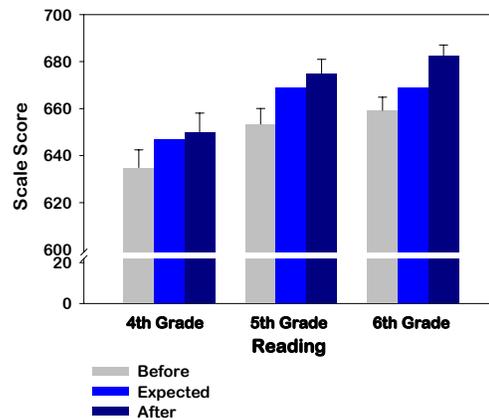

Figure 2. Scores on the Reading subtest show that 6th graders, on average, significantly exceeded expectations after using the Fast ForWord products.
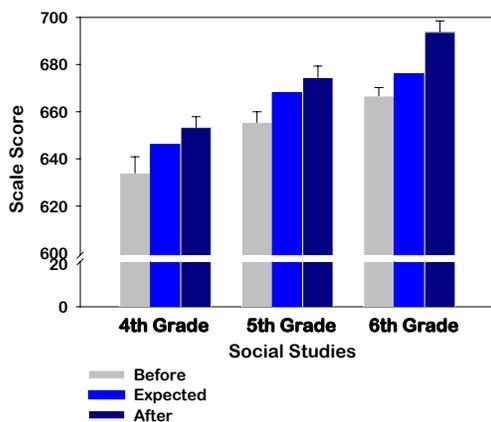

Figure 3. Scores on the Social Studies subtest show that, on average, 6th graders significantly exceeded expected scores after using the Fast ForWord products.
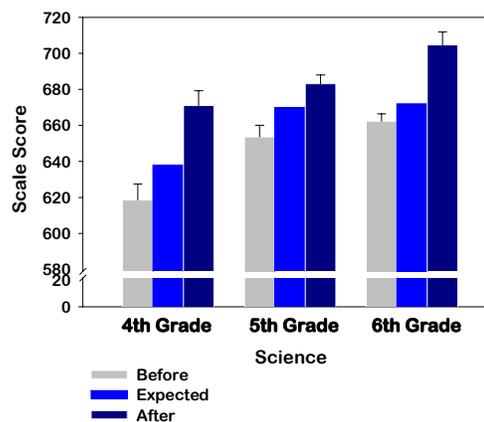

Figure 4. Scores on the Science subtest show that, on average, 4th, 5th, and 6th graders significantly exceeded expectations after using the Fast ForWord products.

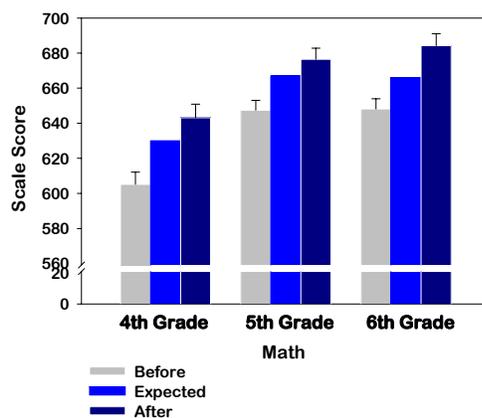Figure 5. Scores on the Math subtest show that 4th and 6th graders, on average, had scores significantly exceeding expectations after using the Fast ForWord products.

DISCUSSION

After Fast ForWord participation, on average, Westwood Elementary School students in each grade evaluated showed improvements in their Language, Reading, Social Studies, Science, and Math abilities. For each of those subtests, average student performance exceeded that which was expected. In particular, on average, after using Fast ForWord products, 5th and 6th graders significantly exceeded expectations on the Language subtest, 6th graders significantly exceeded expectations in the Reading and Social Studies subtests 4th and 6th graders significantly exceeded expected scores on the Math subtest, and 4th – 6th graders significantly exceeded expected scores on the Science subtest.

CONCLUSION

Language skills are critical for all students, impacting their ability to benefit from instruction, follow instructions, and participate in class discussions. Strong linguistic skills also provide a critical foundation for building reading and writing skills. Scores from before and after participation show that, on average, after using Fast ForWord products, students at Westwood Elementary School demonstrated substantial increases in their academic achievement. This suggests that using Fast ForWord products strengthened the students' foundational skills and helped them benefit more from the classroom curriculum.

Notes:

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