

Improved Language and Early Reading Skills by Students who used Fast ForWord[®] Middle & High School

Maps for Learning: Product Reports, 8(2): 1-4

ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord Middle & High product on the language skills of adolescents. **Study Design:** The design of the study was a multiple site study with a control group. **Subjects:** Study participants were 208 students from 14 schools, a university-based learning center and a clinic. At one of the schools and at the learning center, students were assigned to either a Fast ForWord Middle & High School participant group or a control group that did not use the Fast ForWord Middle & High School product. **Materials and Implementation:** Following staff training on the product, students used the Fast ForWord Middle & High School product for an average of 24 days. To evaluate performance, student skills were measured with the Comprehensive Test of Phonological Processing (CTOPP) and the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3) before and after use of the Fast ForWord Middle & High product. **Results:** The statistical analysis indicated that, on average, there were significantly greater improvements in standard scores in the Fast ForWord group.

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). In this study, a commercially available computer-based product (Fast ForWord Middle & High School) was used to evaluate the effectiveness of improving the oral language and reading skills of adolescents.

METHODS

Participants

Two hundred and eight students from 14 schools in 10 districts, a university-based learning center and a clinic participated in the study on the Fast ForWord Middle & High School product.

Implementation

Educators and clinicians 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 except those students in the control group used the Fast ForWord Middle & High 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 that are critical for reading and learning, such as auditory processing, memory, attention, and language comprehension.

Sweeps: 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.

Streams: Students hear a single syllable that is repeated several times, and then interrupted by a different syllable. The 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.

IDs: 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.

Matches: 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. This exercise

develops auditory word recognition and phoneme discrimination, improves working memory, and increases sound processing speed.

Cards: 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 matching picture. This exercise increases sound processing speed, improves auditory recognition of phonemes and words, and helps students gain an understanding of word meaning

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

Assessments

Student performance was assessed using the Comprehensive Test of Phonological Processing (CTOPP) and the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3) before and after use of the Fast ForWord Middle & High School product. Clinicians and school personnel administered the assessments.

Comprehensive Test of Phonological Processing (CTOPP): The CTOPP measures a student’s awareness of, and access to, the phonological structure of oral language as well as phonological memory, ability to rapidly execute a sequence of operations, and ability to blend and segment words and non-words. The Institute for the Development of Educational Achievement recognizes the CTOPP as an appropriate assessment to measure improvement in the phonological awareness skills of children in early elementary school. Phonological awareness is an essential component of language and early reading skills.

Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3): The CELF-3 is a comprehensive language test widely used to measure a student’s overall language ability. The Institute for the Development of Educational Achievement, in accordance with the Reading First legislation, determined that the CELF-3 subtests are appropriate outcomes assessments for measuring improvement in the vocabulary skills of children in early elementary school. As defined by the Reading First legislation, vocabulary skills are an essential component of early reading. On the CELF-3, standard scores have a mean of 100 and a standard deviation of 15 (in this metric, scores from 85 to 115 are within the normal range). Performance on this test can be reported in terms of two composite scores: the *Receptive Language Score*, and the *Expressive Language Score*.

Analysis

Standard scores for all study participants were compared using a dependent t-test. The analysis used a p-value of 0.05 as the criterion for identifying statistical significance. Student scores were compared using ANOVA procedures to

determine whether the students who used the Fast ForWord Middle & High School product were differentially affected from those who did not use the product.

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 Middle & High protocol used in this study called for students to use the product for 90 minutes a day, five days a week, for four to eight weeks. On average, the students used the Fast ForWord Middle & High product for 24 days, achieving a participation level of 71% and completing an average of 79% of the product content (Table 1).

Product	Average Days of Product Use	Average Participation Level	Average Overall Percent Complete
Fast ForWord Middle & High School	24	71%	79%

Table 1. Usage data showing the number of students who used the Fast ForWord Middle & High School product along with group averages for the number of days of use, average participation level and average percentage of content covered.

Assessment Results

Comprehensive Test of Phonological Processing

(CTOPP): Phonological processing skills were reported for students before and after they used the Fast ForWord Middle & High School product. The results of an ANOVA (Table 2) show that, on average, after participation on the Fast ForWord Middle & High School product, students in the Fast ForWord group showed significantly greater improvements in phonological processing than students who did not use the product (Figure 1).

Clinical Evaluation of Language Fundamentals-3:

CELF-3 Receptive and Expressive Language standard scores were measured before and after students used the Fast ForWord Middle & High School product. The results of an ANOVA (Table 3) show that, on average, students in the Fast ForWord group had significantly greater gains in language skills after using the Fast ForWord Middle & High product than students who did not use the product (Figure 2).

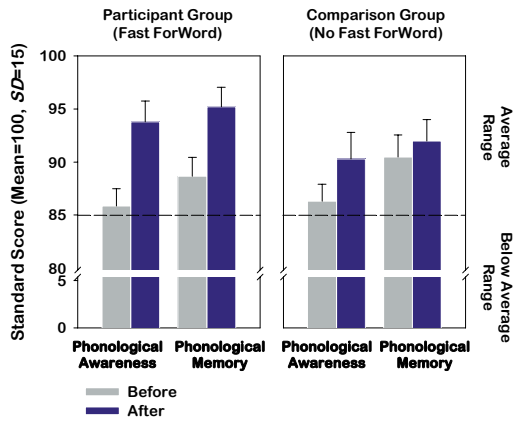


Figure 1. Standard scores on the CTOPP before and after Fast ForWord Middle & High participation show that, on average, 69 students who used the Fast ForWord Middle & High product had significantly greater gains in phonological processing, an essential part of early reading skills, than 35 students who did not use the product.

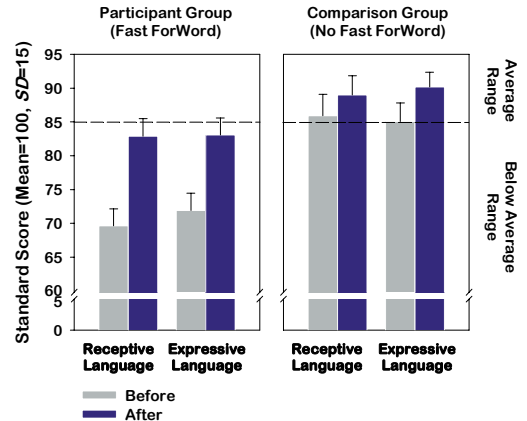


Figure 2. Standard scores of students on the CELF-3 before and after Fast ForWord Middle & High participation show that, on average, the 63 students in the Fast ForWord group had significantly greater gains in language (including vocabulary) skills than the 36 (receptive) or 37 (expressive) students in the comparison group.

CTOPP		Phonological Awareness				Phonological Memory				ANOVA
		Before		After		Before		After		
	n	Mean	SE	Mean	SE	Mean	SE	Mean	SE	
Fast ForWord	59	85.86	1.62	93.8	1.95	88.66	1.78	95.22	1.83	
Control	35	86.11	1.62	90.14	2.54	90.31	2.14	91.86	2.05	
Time X Group										2.87*

Table 2. On average, students who used the Fast ForWord Middle & High product had significantly greater gains in phonological processing than students who did not use the product. * $p < 0.05$

CELF -3		Receptive Language				Expressive Language				ANOVA
		Before		After		Before		After		
	n	Mean	SE	Mean	SE	Mean	SE	Mean	SE	
Fast ForWord	59	69.65	2.5	82.9	2.6	71.9	2.55	83.08	2.49	
Control	35	85.97	3.13	89.03	2.82	85.11	2.73	90.22	2.18	
Time X Group										5.43*

Table 3. On average, students who used the Fast ForWord Middle & High product had significantly greater gains in language skills, including vocabulary, than students who did not use the product. * $p < 0.05$

DISCUSSION

Results from this report include two groups of students: one group used the Fast ForWord Middle & High School product and the other served as a control group. All study participants were assessed using the Comprehensive Test of Phonological Processing (CTOPP) and the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3) before and after use of the Fast ForWord Middle & High product.

On average, following participation in the Fast ForWord Middle & High School product, students in the Fast ForWord group made significantly greater improvements in their early reading skills (vocabulary and phonological awareness) and overall language abilities than students who did not use the Fast ForWord Middle & High School product. These findings demonstrate that 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

Receptive and expressive 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. On average, the students who participated on the Fast ForWord Middle & High School product made significant gains on both the Receptive and Expressive Language composites of the CELF-3 as well as on phonological processing assessments of the CTOPP. After using the Fast ForWord Middle & High School product, students improved their critical early reading and cognitive skills and increased their ability to benefit from the classroom curriculum.

Notes:

To cite this report: Scientific Learning Corporation. (2004). Improved Language and Early Reading Skills by Students Who Used Fast ForWord Middle & High, MAPS for Learning: Product Reports, Vol. 8, No. 2: 1-4.

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