Improved Listening Comprehension by Middle School Students in the Waupun School District who used Fast ForWord® Middle & High School

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord Middle & High School software on the language skills of middle school students performing at grade-level. The software was implemented within the standard curriculum in a school setting. Study Design: The design of this study was a single school experimental study with a control group. Analysis of variance procedures and dependent t-tests were used to evaluate changes in student test performance. Participants: Study participants were 46 students performing at grade-level at Waupun Middle School, in the Waupun School District of Waupun, Wisconsin. Of these students, 32 used the Fast ForWord Middle & High School product, and 14 served as a control group. Materials & Implementation: Following staff training on the Fast ForWord products, a group of Waupun Middle School students, including the study participants, used Fast ForWord Middle & High School for an average of 21 days over a period of 31 calendar days. A comparison group used the regular classroom curriculum. Before and after Fast ForWord Middle & High School participation, student performance was evaluated by examining standard scores on the two subtests from the Woodcock-Johnson III Tests of Achievement (WJ III) that make up the Listening Comprehension cluster: Understanding Directions and Oral Comprehension. Results: On average, the students who used the Fast ForWord Middle & High School product made significant improvements in the Listening Comprehension cluster relative to the comparison group, and improved their scores by nearly two-thirds of a standard deviation (from 101.2 to 110.3).

Keywords: Wisconsin, middle school, suburban district, experimental study, Fast ForWord Middle & High School, Woodcock-Johnson III Tests of Achievement (WJ III).

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 Waupun School District was interested in evaluating the effectiveness of this approach for improving their curriculum and instruction for middle school students by enhancing language skills. In this study, a commercially available computer-based product (Fast ForWord Middle & High School) was used to evaluate the effectiveness of this approach for improving the language skills of students performing at grade-level in a middle school setting.

METHODS

Participants
During the fall of 2002, 91 students at Waupun Middle School, in Waupun, Wisconsin, used the Fast ForWord Middle & High School product. School personnel assigned 32 of those students (from one classroom) to participate in this study. School personnel also assigned 14 students from another classroom to participate in the study as a control group. The students were selected on the basis of being in the standard curriculum. The experimental group used the Fast ForWord Middle & High School software in addition to their school’s standard curriculum, while the control group received the standard curriculum alone. All study participants were administered the same assessments at the same time points, before and after the experimental group used the Fast ForWord Middle & High School software.

Implementation
Educators at Waupun Middle 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 product candidates; 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 the product.

**Materials**
Fast ForWord Middle & High School, a computer-based product combining an optimal learning environment with a focus on early reading and cognitive skills, was used in conjunction with the school curriculum. It 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 then asked to differentiate between these tones. This exercise improves working memory, sound processing speed, and sequencing skills.

**Streams:** Students listen to a stream of syllables. First a dummy syllable is repeated, then it changes to the target syllable. Students must click the mouse when they hear that the syllable has changed. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

**IDs:** Students listen to a target syllable, and then listen to two comparison syllables. They must identify which comparison syllable matches the target. This exercise improves phoneme discrimination skills, develops working memory, and increases rate of auditory processing.

**Matches:** Students click on a tile from a grid and hear a sound or word. Each sound or word has a match somewhere within the grid. The goal is to match all the tiles and clear the grid. This exercise develops auditory word recognition and phoneme discrimination, improves working memory, and increases rate of auditory processing.

**Cards:** Students are presented with two pictures representing words that differ only by initial or final consonant (e.g., “tack” versus “tag”). After hearing the target word, they must click the matching picture. This exercise improves rate of auditory processing, phoneme discrimination, and word recognition.

**Stories:** Students listen to an episode from a story, then complete several tasks: answering comprehension questions, following instructions, and selecting the picture that best depicts a sentence. This exercise improves listening comprehension, rate of auditory processing, understanding of syntax and morphology, and sequencing skills.

**Assessments**
The students’ comprehension skills were assessed using the listening comprehension cluster of the Woodcock-Johnson III (WJ III) Tests of Achievement. All study participants were assessed (before and after the experimental group used the Fast ForWord Middle & High School product). School personnel administered the assessment, and reported the scores for analysis.

**Woodcock-Johnson III (WJ III) Tests of Achievement:** The Listening Comprehension cluster of the WJ III is designed to assess a student’s listening ability and verbal comprehension. The cluster score is a composite based on two subtests: Understanding Directions and Oral Comprehension. The WJ III is a standardized, nationally-normed test. Student performance on this test can be reported in Standard Scores, using a mean of 100 and a standard deviation of 15 (in this metric, scores from 85 to 115 are within the normal range).

**Analysis**
Standard Scores from all study students were compared using a repeated measures analysis of variance (ANOVA), with one within-subjects factor (time) and one between-subjects factor (group). In addition, t-tests were conducted to compare before and after scores within each group. 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 Middle & High School protocol used at Waupun Middle School called for students to use the product for 90 minutes a day, five days a week, for four to eight weeks.

During the fall of 2002, 91 Waupun Middle School students, including 32 study participants, used the Fast ForWord Middle & High School product. On average, the students used the software for 21 days over a period of 31 calendar days, completing 80% of the product content, and achieving a participation level of 87% (Table 1). Average daily progress through the exercises for the first 21 days of use is charted for all students in Figure 1. (For students who used the product fewer than 21 days, percent complete is maintained at the level achieved on their final day of product use.)

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<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Average Days of Product Use</th>
<th>Average Number of Calendar Days</th>
<th>Average Overall Percent Complete</th>
<th>Average Participation Level</th>
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<tbody>
<tr>
<td>91</td>
<td>21</td>
<td>31</td>
<td>80%</td>
<td>87%</td>
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</table>

Table 1. Usage data showing the number of Waupun Middle School students who used the Fast ForWord Middle & High School product in the fall of 2002. Also shown are the group averages for the number of days of use, calendar days between start and finish, percentage of content covered, and participation level (the percentage of 90 minutes per day, five days per week, that the students actually used the Fast ForWord Middle & High School product).

Daily Progress in Fast ForWord Middle & High School for Waupun Students

Figure 1. Average daily progress over the first 21 days of use for 91 Waupun Middle School students who used the Fast ForWord Middle & High School product in the fall of 2002.

Assessment Results

Woodcock-Johnson III Tests of Achievement

WJ III Standard Scores for Listening Comprehension were reported for all study students. The results of a repeated measures ANOVA (Table 2) showed that, on average, the students who used the Fast ForWord Middle & High School product made significantly greater gains than students in the control group (Figure 2).

<table>
<thead>
<tr>
<th>WJ III - Listening Comprehension</th>
<th>Before</th>
<th>After</th>
<th>ANOVA F</th>
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<tr>
<td></td>
<td>n</td>
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Table 2. On average, 32 middle school students who used the Fast ForWord Middle & High School product significantly outperformed a comparison group in gains on the Listening Comprehension cluster of the WJ III.

*p < 0.05.
Figure 2. In this experimental study, the listening comprehension skills of both groups were evaluated before and after the students in the experimental group used the Fast ForWord Middle & High School product.

Furthermore, t-tests comparing the pre- and post-participation scores for each group showed that only the students who used the Fast ForWord Middle & High School product made statistically significant gains (t=7.46). While the control group made gains, the change in their scores did not meet the criterion for significance (t=2.09).

DISCUSSION

Listening comprehension skills are critical for all students, impacting their ability to follow directions and to benefit from lectures and class discussions. Because there is a close correlation between listening comprehension and reading comprehension, strengthening these linguistic skills also creates a foundation for improved reading achievement. In this study, most of the students started out with listening skills within one standard deviation of the mean on a nationally normed test (ranging from 84 to 122 on a test that has a mean of 100 and standard deviation of 15). Overall, after using the Fast ForWord Middle & High School product, the students became even stronger in their listening skills. In addition, the students made significant gains on the listening comprehension cluster of the WJ III, relative to students exposed to the standard curriculum alone. These findings, combined with the students’ progress through the Fast ForWord Middle & High School product, demonstrate that, within the Waupun School District, an optimal learning environment, coupled with a focus on cognitive and early reading skills, can help middle school students performing at grade-level make significant improvements in listening comprehension.

CONCLUSION

The results found in this study confirm the original studies on improved language skills, and demonstrate that using the Fast ForWord Middle & High software also benefits average-performing students in a middle school environment.

Notes:
1. Thirty-two of these 91 students participated in the study. (Due to the nature of the data provided by Waupun Middle School, it was not possible to disaggregate the usage data of the study participants from that of the larger group of Fast ForWord Middle & High School users.)

REFERENCES


