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A helping hand for literacy

Improvements on Reading Scores
Effects of Academy of READING® intervention program in Sweetwater Elementary School, Sweetwater, TN

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Background

"Since the Elementary and Secondary Education Act first passed Congress in 1965, the federal government has spent more than $321 billion (in 2002 dollars) to help educate disadvantaged children. Yet nearly 40 years later, only 32 percent of fourth-graders can read skillfully at grade level."[i]

There is a continuing need to improve children's basic reading skills through the use of innovative tools to reach those that are not fully benefiting from traditional teaching strategies. Shrinking education budgets have limited opportunities to improve student performance through more one on one instruction. Consequently innovative teaching tools must be employed to maximize the opportunity to help struggling readers. It is clear that computer technology has the potential to be a powerful and cost effective tool in promoting basic reading skills. However, not all teaching programs are created equal and the efficacy of each program must be established through scientifically based research.

The No Child Left Behind Act (NCLB) puts a special emphasis on determining what programs and practices have been clearly demonstrated to be effective through rigorous scientific research. Federal funding will be targeted to support these programs and teaching methods that improve student learning and achievement. [ii]

Academy of Reading Program

The AutoSkill Academy of Reading program promotes the acquisition of basic reading skills through a rigorous training program that is based upon ground-breaking research in the areas of neuroscience and neuropsychology. Students receive extensive training until they have mastered a range of basic reading skills to such a degree that the skills become "automatic". Much in the same way as one acquires the skills of tying one's shoelace, riding a bike or catching a ball. To begin with, these tasks require a high degree of cognitive effort to perform. However once learned, they become automatic and require minimal cognitive resources. "Automaticity" is established through repeated trials that strengthen the neural connections that are involved in the reading skill. To master an exercise, students must not only meet an accuracy criteria (percent correct), but they must also achieve a consistent and rapid response pattern that is a hallmark of a task that has been learned to an "automatic" level. Once a task has become automatic the student has more cognitive resources available to devote to other components of the reading process such as comprehension.

The current report examines the effectiveness of the AutoSkill Academy of Reading program in promoting the basic reading skills of a group of grade three students that were identified as having difficulty reading. The program was implemented within the framework of an innovative strategy to train basic reading skills using a number of reinforcement strategies and other motivating techniques. The original intent of this implementation was not to act as a vehicle for a scientific investigation. However the methodical and consistent nature of the program's implementation merited the analysis of the outcomes in a research- based framework.

Methods

Students were selected to participate in the Academy of Reading program by either scoring in the lower 40th percent of the reading composite score on the Tennessee Comprehensive Assessment Program (TCAP) or through teacher recommendations. The program was run from the fall of 2001 to spring of 2002.

Students used the Academy of Reading for 30 minutes a day for the school year. Instructors reinforced the effectiveness of the training through the use of certificates to mark the mastery of each exercise. An innovative strategy was used to maximize the impact of the Academy of Reading program by customizing the portions to fit into the instructor's training strategy. The Games Room was used as an on-line interactive instruction site for grammar lessons and vocabulary enhancement. It was also used to provide students with access to puzzles and match games to further challenge the students and for relaxation after periods of intense work in the Academy of Reading's Phonemic and Reading Rooms. The Results Room was used to train students to read graphs, draw conclusions and develop personal strategies for success. Training sessions ended with each student having an opportunity to select a sticker as a reward.

Prior to training, students were assessed on the STAR Reading®, Cloze Paragraph and Word Recognition Tests. Following training, students were reassessed on these instruments.

Results

A total of 29 students completed the Academy of Reading program. This group consisted of 17 boys and 12 girls with a mean age of 8.5 years. Ages ranged from 7.2 to 9.7 years. All students were registered at the third grade level.

Pair-wise comparison of students' scores on reading skills tests administered prior to training with those administered post-training revealed a statistically significant increase on all three reading measures. A statistically significant average gain of 2.3 grade levels was demonstrated on the cloze paragraph test (df = 28, $p \leq .0001$) with a concomitant 1.7 grade level gain on the word recognition test (df = 28, $p \leq .0001$;Table 1; Figures 1,2).

Table 1: Improvement on Reading Test Scores

	Pre-Training Average	Post-Training Average	Change	% Change	Statistical Significance
Cloze Paragraph Test	**.7**	**3.0**	**+2.3****	**429%**	**$p \leq .001$**
Word Recognition Test	**2.4**	**4.1**	**+1.7****	**171%**	**$p \leq .001$**
STAR Reading® Test*	**2.1**	**3.0**	**+0.9****	**150%**	**$p \leq .001$**

* n = 28 on STAR Reading data from one student could not be obtained

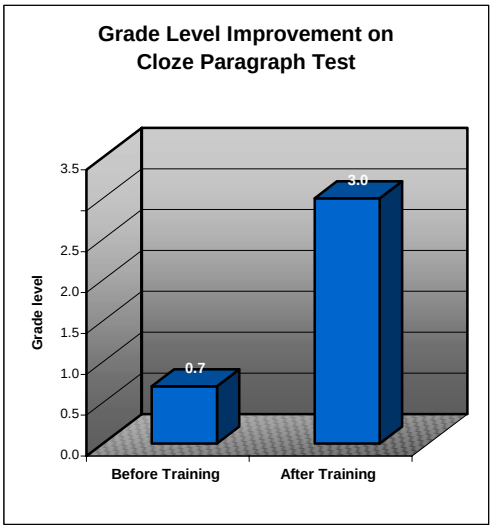

Figure 1: Cloze Paragraph Test Scores before and after Academy of Reading training

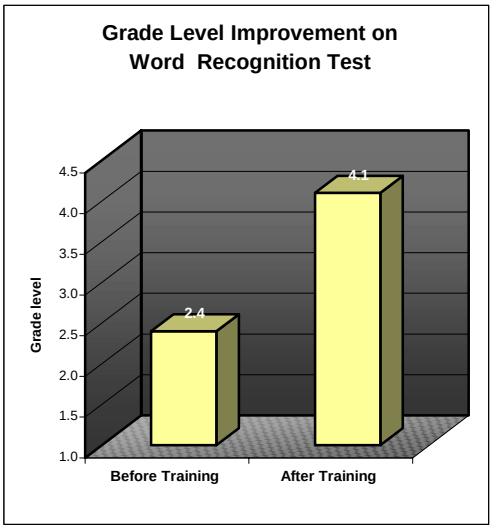

Figure 2: Word Recognition Test Scores before and after Academy of Reading training

Students also showed substantive gains on the STAR reading test with an average increase of 0.9 grade levels (d.f. = 27, $p < .0001$; Table 1; Figure 3).

Individual Student Gains

The gains in reading scores were well distributed among the students, Virtually all students demonstrated a marked increase on reading test scores. Ninety percent of students showed increases on the Cloze paragraph and Word Recognition Tests and 82% of student demonstrated increases on the *STAR Reading® Test* (Table 2). These results clearly demonstrate marked increases in test performance on all three tests.

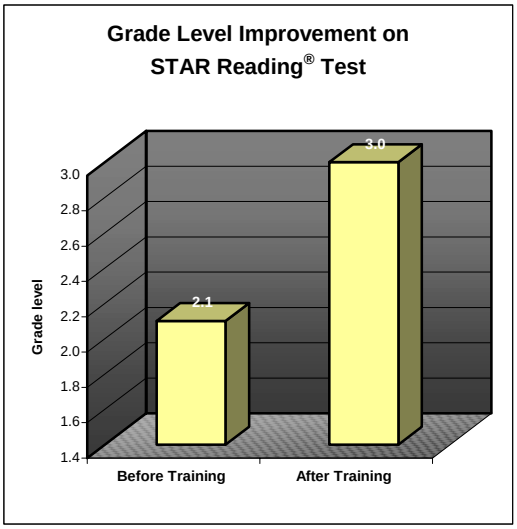

Figure 3: STAR Reading Test Scores before and after Academy of reading training

Another question was the extent of the students' improvement in terms of absolute grade level scores. The last three columns of Table 2 illustrate the success of the Academy of Reading in bringing students up to and above the third grade level in reading skills. For example, no student scored at or above the third grade level on the cloze test prior to training while 59% scored at or above the grade three level following training. Relatively more students scored at or above their grade level prior to Academy of Reading training on the word recognition test (45%) yet this too increased to 83% following training.

Finally, impressive increases were also found when the results from the third party *STAR Reading®* Test were examined. Prior to training, only one student (4%) scored at or above the third grade level. In fact, 39% of students scored below the second grade level. Following training 50% of all

students scored at or above the third grade level; 22% of students even scored at or above the fourth grade level!

Table 2: Individual Student Gains				
	Percentage of students that demonstrated an increase in test score	Percentage of students scoring at or above grade level.		
		Pre-training	Post training	Change in percentage
Cloze Paragraph Test	90%	0%	59%	+59%
Word Recognition Test	90%	45%	83%	+38%
STAR Reading® Test*	82%	4%	50%	+44%

Relationship between Internal and External Tests

A final analysis correlated the post training scores on the Cloze and Word recognition tests with those on the STAR reading test. Scores on Cloze Paragraph and Word Recognition tests were significantly correlated ($r = .45$, $p \leq .01$; $r = .49$, $p \leq .02$, respectively) with the STAR reading® Test. This correlation between the internal Cloze Paragraph and Word Recognition tests and the widely used STAR Reading® Test suggest that the internal tests provide a statistically reliable indication of performance on an external test.

Discussion

These results clearly show robust gains in students' performance on three measures of reading skills resulting from the use of the Academy of Reading intervention program. A statistically significant increase in the average score on all measures of reading skills was demonstrated (Table 1, Figures 1-3). The average score on the Cloze Paragraph test increased 429% while score on the Word Recognition and STAR reading tests increased 171% and 150% respectively.

The average increase in test scores was not a result of a few students doing remarkably well on the training program, but rather virtually all students showed significant benefits from the training. Ninety percent of all students showed increases in the grade level scores on the Cloze Paragraph and Word Recognition Test while 82 % of students showed improvements on the STAR Reading Test. The Academy of Reading program was able to improve the reading skills of a significant portion of students to, or above, the third grade level. Only one student did not show any improvement on any of the three measures following training.

A critical success factor for the improvements in reading skills demonstrated was the development of a structured and innovative training environment. The creative use of the games and message rooms capitalized on the flexibility of the program to create a supportive training environment geared toward the specific needs of the students. Reports from other schools confirm the importance of the development of a well-structured training environment with the proper support and participation by teaching staff to achieve the maximum results from AutoSkill Academy of Reading program.

Conclusions

- Learning disadvantaged students trained on the AutoSkill Academy of Reading program showed significant grade level gains ranging from 150% to 429% on three different tests of reading skills: Cloze paragraph test Word recognition test and the STAR Reading Test.

- Prior to training on the AutoSkill Academy of Reading program, only 4% of students scored at or above the third grade level on the STAR Reading Test®. Following training 50% of students scored at or above their grade level and 22% of students scored at or above the fourth grade level on the same test.

- The use of the AutoSkill Academy of Reading program in a properly structured environment with good teaching support can lead to impressive gains in the basic reading skills of learning disadvantaged readers.

No Child Left Behind moves the testing of educational practices toward the medical model. Whenever the results of scientifically controlled studies (like clinical trials) are available, educators are expected to consider their results before making instructional decisions. Under the new law, federally funded education programs or practices must be based on evidence that validates their usefulness in achieving the stated outcome specified in law.

[i] From No child left behind website stats and graphs section.
http://www.nochildleftbehind.gov/next/stats/

[ii] No Child Left Behind Desktop Reference 2002, page 11. Office of the Under Secretary On-line
http://www.ed.gov/offices/OESE/reference.pdf