



The Impact of Cognitive Skills Training on Reading Scores in a Bilingual Program August 18, 2010

Summary

The School City of Hammond Bilingual Program piloted BrainWare SAFARI cognitive training software in the spring of 2010. The Limited English Proficiency (LEP) students in the All-day Program who used BrainWare SAFARI showed significant improvement in their cognitive functioning, especially in behaviors reflective of attention, working memory and visualization skills. Improvement in academic performance was also seen for these students with early indications of improvement on the Scholastic Reading Inventory (SRI). While academic progress typically lags cognitive growth, ELL students rely more heavily than native English-speaking students on working memory (translation) and visualization. The improvements experienced by these students in key areas of cognitive function may, thus, have translated more quickly into performance on the reading test.

Pilot BrainWare SAFARI Usage

The School City of Hammond Bilingual Program began the pilot on April 11, 2010, with 39 school days remaining in the year. They committed to using BrainWare SAFARI every day with the LEP students¹ so the students could complete as many sessions in the program as possible. Table 1 shows the grade levels of the 39 LEP students, as well as the average levels and sessions completed over the 8 weeks of the pilot.

Table 1: BrainWare SAFARI Usage by Grade

Grade	# of Students	Avg Levels Completed	Avg Sessions Completed	Weeks	Avg Sessions/Week
6	12	130 ± 16	38 ± 2	8	5
7	13	151 ± 19	37 ± 2	8	5
8 & 9	14	139 ± 17	36 ± 3	8	5
All	39	140 ± 19	37 ± 3	8	5

Recommended usage of BrainWare SAFARI is 3 to 5 sessions per week for 10 to 12 weeks, which corresponds to 30 to 60 sessions in a 12-week period. Since the pilot was initiated so close to the end of the school year, the All-day Program committed to daily usage to ensure that the students would be able to complete the number of sessions that would typically be completed over a 10- to 12-week time frame. The 37 sessions completed on average during the pilot is an appropriate number of sessions to expect cognitive changes to begin to be apparent.

¹ Non-native English-speaking students in Indiana are classified into five levels: Beginning, Early Intermediate, Intermediate, Advanced and Proficient. The students in the Hammond All-day program fell into the Beginning and Early Intermediate categories.

The Impact of Cognitive Skills Training on Reading Scores in a Bilingual Program August 18, 2010

Cognitive Growth

The impact of BrainWare SAFARI on cognitive functioning was assessed using surveys completed by the four teachers in the All-day Program. The survey asks for ratings on 14 specific behaviors related to cognitive functioning. The classes in general and individual students were rated as with Improved a Lot, Improved, or No Change on each behavior.

As indicated in Table 2, all of the teachers noted improvement for their classes on all of the 14 behaviors to some degree. The strongest area of improvement noted was Attention Span and Focus, with three of the four teachers rating their classes as Improved a Lot.

Table 2: Observed Behavioral Changes

Behavior	# Classes Improved a Lot	# Classes Improved
Attention Span and Focus	3	1
Ability to Visualize	2	2
Desire to Perform or Put in Effort	2	2
Following Directions	2	2
Ability to Complete Work	1	3
Attention to Details	1	3
Distractibility	1	3
Memory	1	3
Parent, Peer and Teacher Communication	1	3
Ability to Grasp New Concepts	0	4
Careless Errors	0	4
Effective Thinking	0	4
Recall Information for Tests	0	4
Self-confidence	0	4

In addition to the general class ratings, the teachers were given the opportunity to rate individual students. Ten individual students were rated, with five of the ten (50%) rated as Improved a Lot on all 14 behaviors. The individual student ratings were similar to the overall classroom ratings in terms of the areas of strongest growth: Attention Span and Focus, The Ability to Visualize, Desire to Perform and Put in Effort and Following Directions. These areas are indicative of improvement in attention skills, working memory and visual processing (especially visualization).

Academic Growth

At the time of the pilot, the LEP students in the All-day Program had already taken their annual language proficiency assessment (LAS Links). Since the test will not be given until the 2010-11 school year, no progress data on English Language proficiency are available at this time.

Students in the LEP program, like all students in the district, take the SRI each trimester. Thus, student performance changes between the first and second trimesters (before using BrainWare) and the second and third trimesters (while using BrainWare) can be compared. Only those

The Impact of Cognitive Skills Training on Reading Scores in a Bilingual Program August 18, 2010

students who had scores for all three benchmark tests were used in this analysis (31 of the 39 students who used BrainWare).

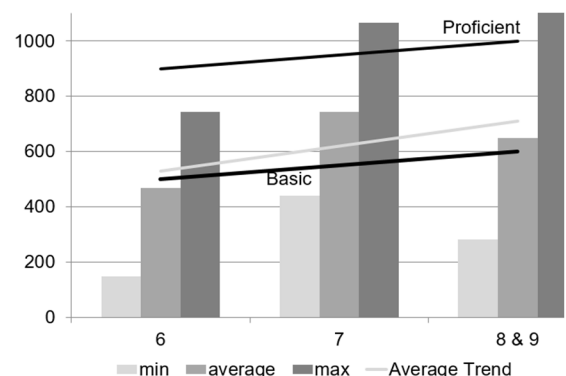
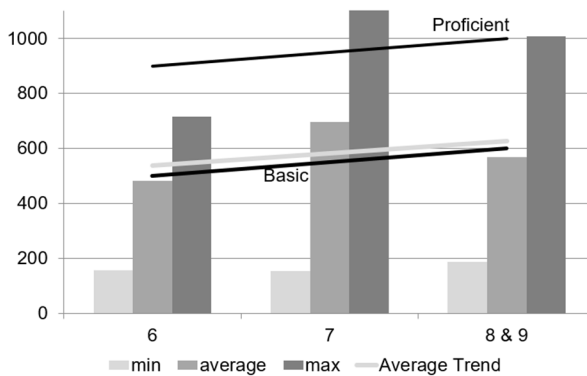
Scores on the SRI are nationally normed and student performance is used for instructional placement and benchmark monitoring. The SRI is considered to be challenging and the district sets high standards for performance. According to the administrators of the All-day Program, the SRI tests do not have any visual cues and require students to make inferences to successfully answer the questions. ELL students typically find the SRI even harder than other students, for these reasons.

Performance on the SRI is expressed as a lexile score and categorizes students into one of four categories: At Risk, Basic, Proficient or Advanced. The district's standards define Proficient on the SRI as an annual lexile score increase of 250 points (about 83 points per trimester). Most of the LEP students in the All-day Program started the school year in the At-Risk category.

Figure 1 presents average SRI scores by grade during the second trimester, along with the minimum and maximum scores achieved. Figure 2 presents the same information for the third trimester.

Figure 1: 2nd Trimester Lexile Average by Grade

Figure 2: 3rd Trimester Lexile Average by Grade



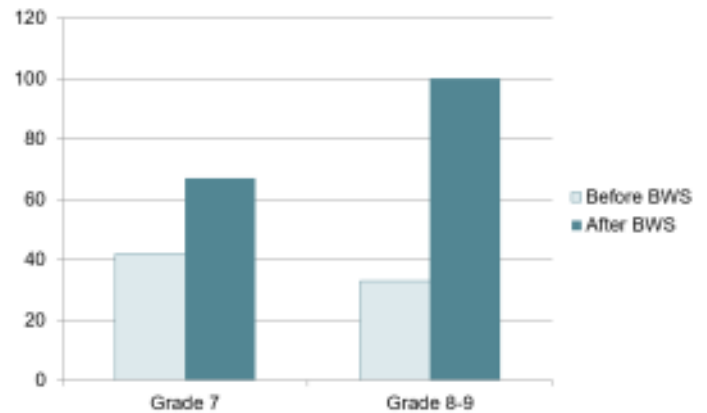
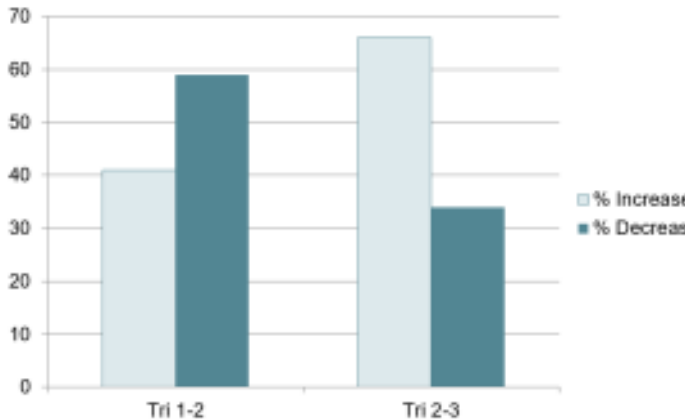
As seen in Figure 1, the students started the third trimester performing barely at the Basic level. The trend line (lighter gray line) indicates the difficulty students have of raising their performance on the SRI from year to year. The wide disparity between the lowest and highest scores in each grade is also apparent. Figure 2 shows the end-of-the-year SRI results, following a year of the All-day Bilingual Program combined with BrainWare SAFARI during the last 8 weeks of the trimester. The trend line is more positive and begins to separate from the Basic cutoff score.

There was also a noticeable difference in the number of students improving their scores from the prior term. Figure 3 compares the percentage of students improving their scores during the second trimester to the third trimester. 41% of the students increased their SRI score between the first two tests. That ratio improved to 66% for between the middle and end-of-year tests.

The Impact of Cognitive Skills Training on Reading Scores in a Bilingual Program August 18, 2010

The results for the 8th and 9th grade students were striking; all of the students at those grade levels improved their scores following their use of BrainWare SAFARI, compared to only 33% between the first and second trimesters (Figure 4).

Figure 3: Percentage Improvements by Trimester – All Figure 4: Percentage Improvements Grades 7-9



Teacher Comments

Some of the teachers provided comments on the students' experience with BrainWare SAFARI:

"This program has been a positive force in developing the students' abilities and potentials."

"I have noticed improvements academically with my students. There was more effort and they were more focused."

"I think this is an excellent way to improve memory, visualization and strategizing. All of my students thought of it as a game, it kept their focus, and they showed improvements all around."

Recommended Next Steps

Given the short duration of the pilot, the results are compelling. Ongoing performance of these students on language proficiency tests and other academic tests should be monitored, as stronger cognitive ability can enhance ongoing knowledge and skills acquisition. Usage of BrainWare SAFARI for LEP students within the district, especially for any students new to the bilingual program, should be sustained.