BrainWare Safari with Special Education Students at Tavan Elementary 2010-2011 School Year

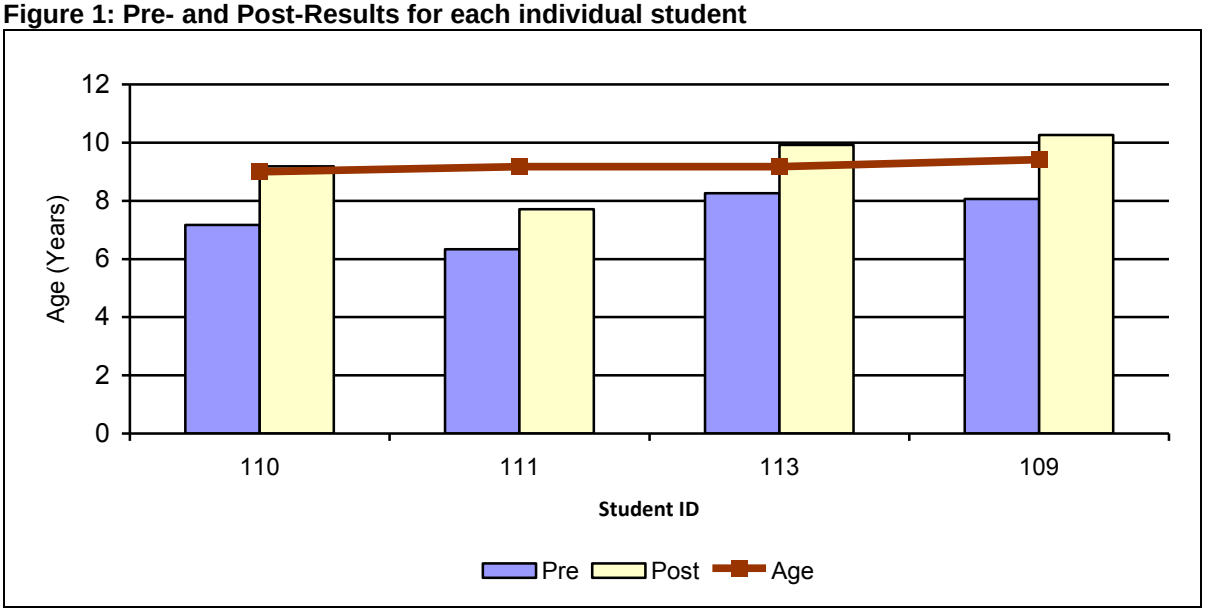
Ms. Madeline Papazian, a Special Education Teacher at Tavan Elementary School in Scottsdale, Arizona, used BrainWare Safari (BWS) during the 2010-2011 school year with eight special education students. These students, ages ranging from 7 to 10 years old, had a wide variety of Specific Learning Disabilities, and were academically and cognitively behind. BWS was incorporated into Ms. Papazian's intervention time with the students, as a daily 30-minute block of time (with some exceptions for special events).

As a cognitive assessment, the students were tested with specific sub-tests of the Woodcock-Johnson III Cognitive Battery: Visual Auditory Learning (VAL), Spatial Relations (SR), Concept Formation (CF), Visual Matching (VM), Numbers Reversed (NR), Auditory Working Memory (AWM) and Decision Speed (DS).

All eight students were tested prior to use of BrainWare Safari. Four were also post-tested after using BrainWare Safari for more than 50 sessions.[1] The four students completed an average of 56 ± 1 sessions, over 20 weeks, yielding an average of 2.7 sessions/week. They completed an average of 107.± 17 levels with a minimum of 86 and maximum of 128 levels. Considering their challenges, these students completed a commendable amount of BWS. All four of these students were 9 years of age.

With students of widely varying cognitive abilities, it is important to look at improvement in cognitive functioning on an individual basis, rather than averaging improvement. Figure 1 is a chart of the pre- and post- cognitive ability of the students as compared to their physical ages. Overall, as measured by these tests, all four started significantly behind their physical age and all of them improved over the 20 weeks of using BrainWare Safari. Three of the four reached or exceeded the cognitive performance expected for their ages. Two gained over 2 years in ability (ID 109 and 110), one gained 1 year 8 months (ID 113) and one gained 1 year 4 months (ID 111). Student 111 was 9 year old performing as a 6 year old on pre test and increased to 7 year 10 months in ability.

Figure 1: Pre- and Post-Results for each individual student



Students 109 and 113 both have a Specific Learning Disability in reading and written language. Both Students 110 and 111 have a Specific Learning Disability in reading, written language and mathematics

1 . The four students who were pre and post-tested remained in the program for the entire time. Three moved away and one was to unable to handle the challenge of the program (1st grade with SLD).

and receive speech services. In addition, Student 111 is also an ELL/ESL student who was retained in the 3rd grade for the 2011-2012 school year at the request of the student's parents.

Table 1 shows the four students' scores (in age equivalence) on individual subtests on the pre and post-tests. These changes show the individual response that occurs with BWS. The students experienced greater or lesser growth in different areas, depending on their areas of cognitive weakness, how they worked within BWS, and they were able to work with the test at the time it was given. As expected not all the students improved on every one of the measures used. However, all of the students improved in the area of Concept Formation and each student improve cognitively by more than 5 months (the elapsed time between the tests) in at least one area.

Table 1: Individual progress on subtests.

Student ID	Age (Y)	Subtest	Pre(Y.mo)	Post (Y.mo)	Differ (Y.mo)
109	9.42	VAL	7.10	9.2	1.4
110	9.0		5.2	7.2	2.0
111	9.12		4.11	4.6	-0.5
113	9.12		6.1	7.10	1.9
109	9.42	SR	8.0	8.9	0.9
110	9.0		7.5	8.5	1.0
111	9.12		7.2	5.11	-1.3
113	9.12		8.5	8.9	0.4
109	9.42	CF	8.1	9.1	1.0
110	9.0		7.3	7.6	0.3
111	9.12		5.3	7.0	1.9
113	9.12		8.3	9.9	1.6
109	9.42	VM	6.9	7.7	0.10
110	9.0		7.8	7.9	0.1
111	9.12		7.8	6.3	-1.9
113	9.12		7.0	6.10	-0.2
109	9.42	NR	8.2	8.4	0.2
110	9.0		7.6	7.0	-0.6
111	9.12		4.7	7.6	2.11
113	9.12		10.00	9.2	-0.10
109	9.42	AWM	8.3	8.7	0.4
110	9.0		5.7	8.4	2.9
111	9.12		6.3	7.4	1.1
113	9.12		9.8	9.0	-0.8
109	9.42	DS	9.4	10.1	0.9
110	9.0		9.4	8.11	-0.5
111	9.12		8.7	7.9	-0.10
113	9.12		8.5	8.2	-0.3

Ms. Papazian was asked to rate the students' performance as a group on 14 behaviors related to cognitive functioning. She could rate the group as not improved, improved, or improved a lot on each

behavior. She rated the class as improved or improved a lot on all 14 behaviors; not one of the 14 areas was unchanged.

Behaviors Rated as Improved a Lot	Behaviors Rated as Improved
Effective Thinking	Distractibility
Ability to Visualize	Fewer Careless Errors
Attention Span and Focus	Following Directions
	Ability to Complete Work
	Self-confidence
	Memory
	Attention to Details
	Desire to Perform/Put in Effort
	Ability to Recall Information for Tests
	Ability to Grasp New Concepts
	Communication with Parents, Peers & Teachers

There is also an opportunity on the post survey to highlight results for a particular student. One student (ID 109) was rated as improved a lot in 7 areas and improved in the other 7 areas.

Behaviors Rated as Improved a Lot	Behaviors Rated As Improved
Effective Thinking	Distractibility
Ability to Visualize	Ability to Complete Work
Desire to Perform/Put in Effort	Memory
Self-confidence	Attention to Details
Following Directions	Ability to Recall Information for Tests
Fewer Careless Errors	Ability to Grasp New Concepts
Attention Span and Focus	Communication with Parents, Peers & Teachers

Ms. Papazian reported, "What I like about the program is that the students, when they learn how to master a certain 'game'[2], pass on their knowledge to their peers. There was a new sense of cooperative learning going on in my classroom. They cheered each other on and when one or more became frustrated, they would either try and help them figure out what they were not doing well or else tell them to go to another "game" and come back to the one they were frustrated with later. They learned that this enabled them to be successful. I must state that the students began the program very competitive with each other and it ended as a very cooperative learning opportunity."

Summary

Following their use of BrainWare Safari, the students in this study, all of whom were performing significantly behind expectations for their chronological age and were struggling with a variety of Specific Learning Disabilities, saw significant growth in their overall cognitive performance, ranging from 1.4 years.months to 2.3 years.months over 20 weeks.

Previous investigations have demonstrated cognitive benefit for students who used BrainWare Safari[3] that continued beyond the time of BWS use. Further testing during the 2011-2012 school year would provide insight into the degree to which these students have retained and continued their cognitive growth following their use of the program. However, after the close of this year, Ms. Papazian moved to a different school and results of additional testing may not be available. Future studies with students of a similar profile should consider adding additional post-testing in the year following BrainWare Safari usage.

2. BWS is organized as a series of exercises, which student usually refer to as games. While they are structured in a video-game format, the exercises were developed from clinical therapy techniques.
3 . Case Study with Topeka, Kansas Elementary School. Report available at ttp://www.mybrainware.com/education/Research.htm.