



**Study Design**

The purpose of this study was to continue to evaluate BrainWare Safari (BWS) in additional settings and populations, following an earlier controlled study at the Christian Heritage Academy in Northfield, Illinois during the spring and summer of 2005<sup>1</sup>. The subjects of this study were students in the after-school program at the Xilin Community Center<sup>2</sup> in Naperville, Illinois. The study involved nine students and their parents who agreed to participate in an 11-week program, working with BWS in the home. The students who participated were 5 males and 4 females ages 7 to 11.

All students were pre-tested at the beginning of the 11 weeks using a subset of the Woodcock Johnson<sup>®</sup> III Cognitive Battery and Tests of Achievement.<sup>3</sup> The students used BWS in their homes for 4 to 5 hours a week, with parents serving as coaches. At the end of 11 weeks of use of BWS, the students were tested a second time with the same Woodcock Johnson III Cognitive Battery and Tests of Achievement.

**Measured Use**

BWS is a software program designed to comprehensively develop the cognitive skills that are most important for learning, delivered in a fun and entertaining video-game format. Set in a South American jungle, it consists of 20 exercises designed to develop various cognitive skills. In 18 of the exercises, each with seven levels, levels are progressively more difficult; each level must be passed before the user can progress to the next level. The two logic and reasoning exercises have 21 levels each and are of approximately the same level of difficulty, allowing the player to see the right answer and move on after two incorrect answers.

BWS requires an Internet connection. It is designed as a rich-client application to enhance the user’s experience, but log-in and progress through the program are controlled by LEC’s server. This enables the player to always begin in the exercises where he or she left off, regardless of whether he or she is on the same computer.

Parents reported that BWS did not change their child’s activity schedule for the most part in the summer, but was a bit of a juggle to fit as much time in once school started. Usually, BWS took the place

ID	grade	Total Levels completed	Cognitive Improvement years/months
40	2	165	2.8
41	1	164	2.0
42	7	118	3.3
43	6	158	2.11
44	1	151	3.0
45	2	152	3.5
46	2	145	1.2
47	4	162	3.11
48	3	140	2.10
average		151	
max		165	
min		118	

<sup>1</sup> D.Helms. S.Sawtelle. Submitted to *the Journal of Vision Development*. Under Review.  
<sup>2</sup> LEC is indebted to Linda Yang and Laura Gao at the Xilin Community Center for their assistance in coordinating parent and student communications and testing sessions to make this study successful.  
<sup>3</sup> Cognitive Battery Subset: Visual-Auditory Learning, Spatial Relations, Concept Formation, Visual Matching, Numbers Reversed, Incomplete Words, Auditory Working Memory, Decision Speed, Planning, and Pair Cancellation. Achievement Test subset: Letter-Word Identification, Reading Fluency, Understanding Directions, Math Fluency, Passage Comprehension.



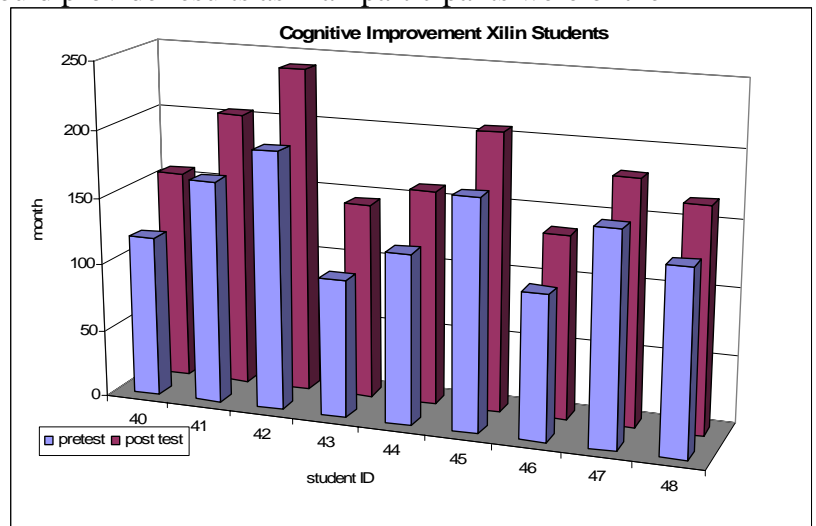
of computer game time that was already part of the child’s day. The children became more independent once they were comfortable with the exercises and had a better idea of what they had to do to advance within the program. Most time spent by parents was reported as involved in helping the children read the instructions and understand what the particular level required. Parental encouragement when the tasks became more difficult was also a key component.

Actual use of the program was monitored through data collected by BWS. The players completed an average of 151 of the 168 levels in the program. The maximum number of levels completed by one player was 161 while the minimum completed by one player was 118.

### Woodcock Johnson Test Results

Since a wide range of ages were represented in the study group, an analysis of average pre and post-test ages would not be as useful, as it would provide results as if all participants were of the same chronological age or in the same grade in school.

The students in this study showed an average of 3 years and 6 months cognitive improvement over the 11 weeks of the study. In addition, the students showed an average of 2 years and 4 months improvement on the tests of achievement. On the 15 individual tests administered, some of the students scored the maximum score possible both on pre-test and post-test so any improvements could not be measured.<sup>4</sup> Eight of the 9 students tested showed improvement or stayed the same on all 15 of the tests administered. The chart demonstrates the individual student growth based on the pre- and post- age equivalent results on the tests administered.



### Parent Feedback

Of the parents who completed the questionnaire, there were reported improvements in following directions, ability to complete school work, self-confidence, memory, information recall, visualization and communication with parents, peers and teachers. Children noted that they had noticed an improvement in attention, memory, following directions, listening and understanding.

### Implications for further feedback

Students in this study, as in the earlier study, experienced significant improvement in cognitive skills as measured by the Woodcock Johnson III tests administered. This particular group of students also showed significant improvement in academic ability. Further investigations on other populations and settings will continue to demonstrate that the program’s value as a tool for cognitive skill development.

<sup>4</sup> These individual results were not included in the average improvement for those tests.