

# SQUARE PANDA CLASSROOM EFFICACY

## Randomized Field Trials and Survey Results

Vera Blau McCandliss, Ph.D.  
*Director of Educational Research and Curriculum, Square Panda,  
Former Research Fellow, Stanford University Neuroscience Program*

### Overview

This paper summarizes the preliminary findings of two randomized pilot studies and teacher surveys collected for students in PreK-1 classrooms in the Clark County Public Schools, Las Vegas, Nevada. The results of these small studies demonstrate encouraging trends to support the efficacy of Square Panda with large numbers of children in classroom environments. The Square Panda team is committed to studying the efficacy of Square Panda in schools.

### Clark County Public Schools

- 5th largest U.S. school district
- 322,770 students
- 357 schools
- 63.55% free and reduced lunch
- 25.4% ELL

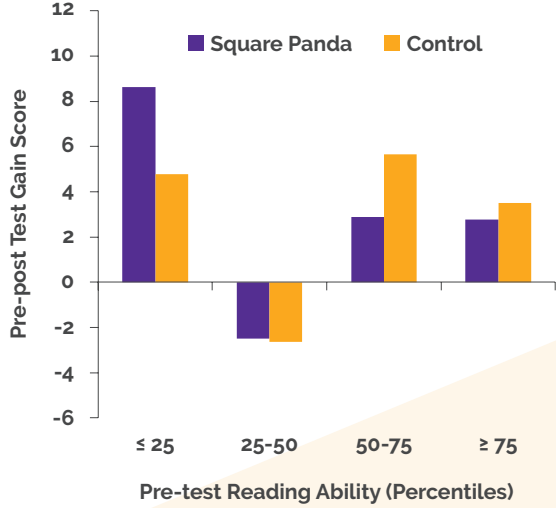
### The Square Panda Multisensory Phonics Learning System

Square Panda is a student-centered tool for enhancing early literacy skills among beginning readers and readers who need additional support. The Square Panda Bluetooth playset works with classroom tablets to create a supplementary phonics learning system with kinesthetic/tactile as well as visual/auditory components. Students choose from 45 Smart Letters, place them in the slots, and interact with sounds, words, and animations in an exploratory learning environment. Teachers personalize learning with 10 games, 14 levels of phonics instruction, and a teacher portal.

### PILOT STUDY 1: Andre Agassi College Preparatory Academy, Las Vegas, NV

This study enlisted 140 kindergartners and 1st graders across six classrooms.

In each classroom, half the students were randomly assigned to use the Square Panda literacy system during small-group instruction ("Square Panda group"), while the other half were engaged in regular early literacy instruction ("control group").



**Figure 1.** Pre-post gain scores on the NWEA MAP assessment. Students who scored low on pre-test NWEA tended to benefit more from using Square Panda (purple) compared to students in the control group (blue).



Students participated in these activities for 30 minutes a day for four weeks under the supervision of the classroom teacher. Teachers ensured that students were on task and provided technical assistance when needed but no instruction.

Students in the Square Panda group utilized the Square Panda Lagoon, Bowling, Bubbles, and Letterlab games. The NWEA MAP (Northwest Evaluation Association, Measures of Academic Progress) standardized assessment was administered by school staff just before the start of the Square Panda trial and immediately after as part of the school's own quarterly assessment routine.

The research was based on two central hypotheses:

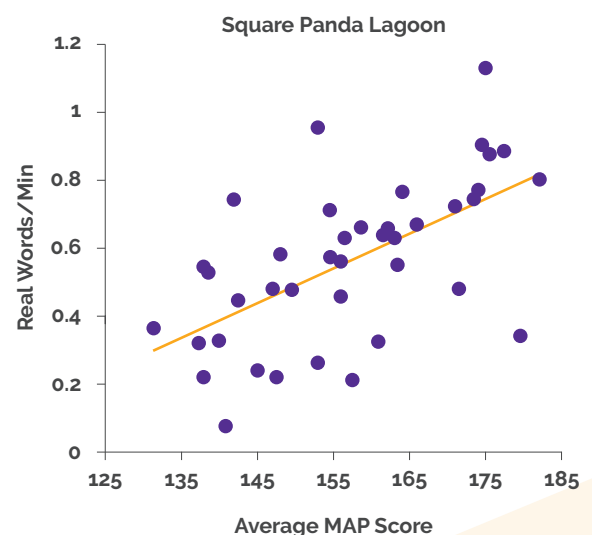
- Students in the Square Panda group would show greater improvements in literacy skills than the control group over the training period, after equating for time-on-task.
- Within the Square Panda group, pre-post gains would be mediated by the pre-test literacy scores. Students scoring at the lower end of the distribution would show larger pre-post literacy gains than those scoring at the upper end of the distribution.

Although the Square Panda group as a whole demonstrated improvements comparable to the control group on the NWEA MAP assessment, students who performed below the 25th percentile on the pre-test NWEA MAP tended to benefit more from using the Square Panda system (Figure 1). Within the group of lower-performing students, the Square Panda group gained 8.63 points while the control group gained an average of 4.77 points, or an additional 3.84 points (a nearly 80% increase).

An uncorrected post-hoc test of this effect revealed a significant result ( $\alpha = 5\%$ ,  $t(33) = 2.1$ ,  $p < .035$ ) but must be interpreted with caution. No significant interaction between group and pre-post literacy gains was found. Additional research is needed to specify the effects of Square Panda use for children performing at the lower end of the literacy skill distribution.

Due to the nature of the NWEA assessment, the foundational reading scores could not be broken down further into individual sub-test components. However, the study was able to evaluate how well individual gameplay predicted performance on the NWEA MAP assessment. Prior to the study it was not known whether any of the gameplay variables were significantly related to reading ability.

The results shown in Figure 2 demonstrate a significant correlation (Pearson's R) between the number of real words a student spelled in the Square Panda Lagoon game and his or her recorded performance on the NWEA MAP assessment ( $R^2 = .35$ ,  $p < .003$ ). As can be seen, students who spelled more real words per minute in the game also tended to obtain higher average scores on the NWEA MAP.



**Figure 2.** Correlation between the number of real words read per min in Square Panda Lagoon for students playing +1h total (y-axis) and the average foundational reading score on the NWEA MAP standardized assessment (x-axis). Each blue dot represents a student.

This finding suggests that a student's performance on standardized assessment can be predicted purely from Square Panda gameplay. When grades were entered into the model, it was found that this effect was driven by 1st grade student scores more than kindergarten student scores, likely due to kindergartners' limited ability to spell real words independently.

## PILOT STUDY 2: Gene Ward Elementary School, Las Vegas, NV

This study enlisted 66 PreK students from two classrooms in a Title 1 elementary school. In each classroom, half the students were randomly assigned to Square Panda ("Square Panda group") during small group instruction, while the other half participated in regular small group literacy instruction ("control group"). Students participated in the training for 10 minutes a day four times a week for six weeks under the direct supervision of a substitute teacher.

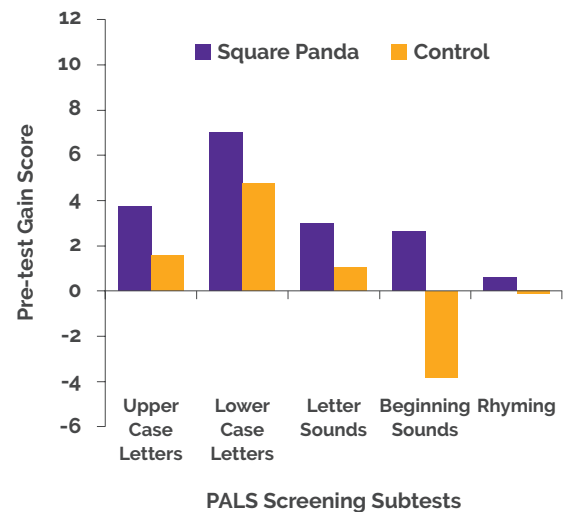
The Square Panda group used any of the ten Square Panda games depending on ability level, which was defined through a pre-training standardized early reading assessment. The Phonological Awareness Literacy Screening (PALS) standardized assessment was administered just before the start and immediately following the end of the six-week study period.

Five subtests of the PALS were administered individually by a trained teacher aid:

- Upper-case letter recognition
- Lower-case letter recognition
- Letter sounds
- Beginning sound awareness
- Rhyme awareness.

As in the previous study, the researchers hypothesized that students in the Square Panda group would show greater improvements in their literacy skills over the training period than the control group after equating for time-on-task. In addition, we hypothesized that the pre-post gains would be mediated by the pretest literacy scores.

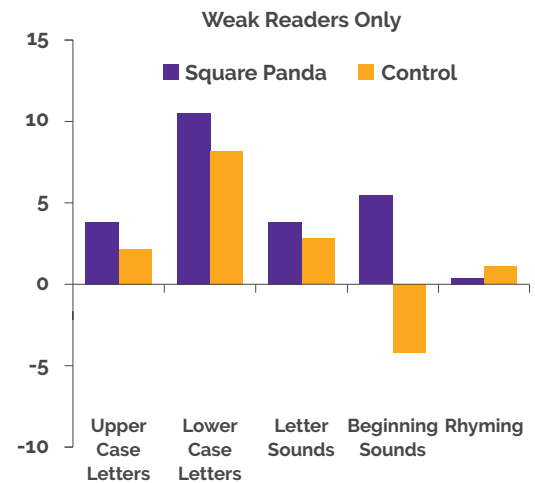
A comparison of pre-post assessment gains achieved during the study period revealed that PreK students in the Square Panda group tended to perform better on each of the PALS subtests after training compared to the control group (Figure 3). Pre-post gains were significant between groups for the beginning sound awareness subtest ( $t(32) = 4.77, p < .000$ ). None of the other sub-tests reached statistical significance.



**Figure 3.** Pre-post gain scores on the PALS assessment. Students using Square Panda show consistently higher pre-to-post test gains. However, only performance on beginning sounds was significantly different between the groups ( $p < .000$ ).

When students were divided into strong vs. weak readers (bottom 50% vs. top 50% of performers on the pre-test), a significant interaction was found for the beginning sound task ( $F(30) = 7.04, p < .05$ ). This effect was driven by larger improvements in the Square Panda versus the control group. In addition, main effects of literacy level were found for both the lower-case letters as well as letter-sound subtests, indicating that for those outcome measures weaker readers benefited more from instruction independent of its mode of delivery.

The final analyses looked at only the bottom 50% of performers as determined by the pre-test results, because of the hypothesis that literacy gains made by Square Panda students may be strongest for those most in need. Among the weak readers, the Square Panda group showed a tendency to outperform the control group on all five PALS subtests (Figure 4). This effect was significant for the beginning sound task ( $t(30) = 6.1, p < .000$ ).

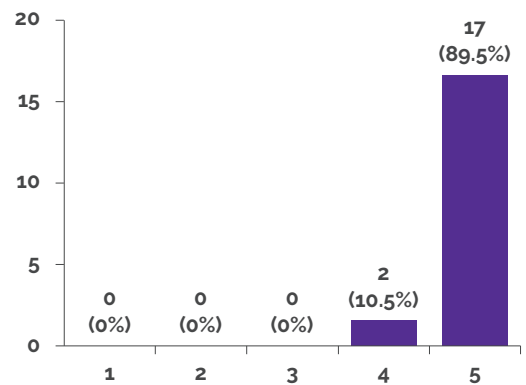


**Figure 4.** Pre-post gain scores on the PALS assessment for the weakest 50% of students.

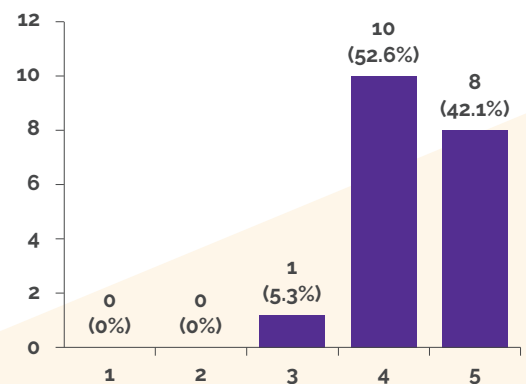
### Teacher Survey Results

For both studies, the researchers collected feedback from teachers in the form of a survey and a semi-structured interview. The overall response was positive. The results below are based on 19 responses from a teacher aid during the training period.

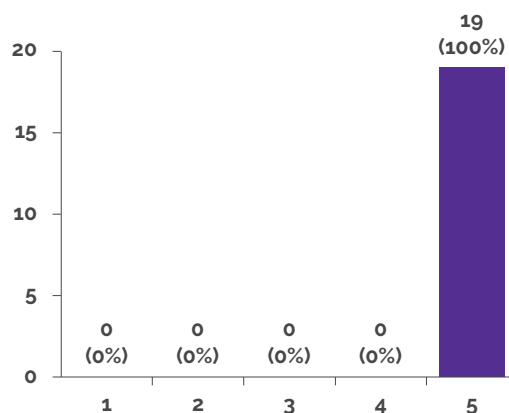
*On a scale from 1 to 5, where 5 is very well and 1 is not well at all, what was your experience with Square Panda in the classroom today?*



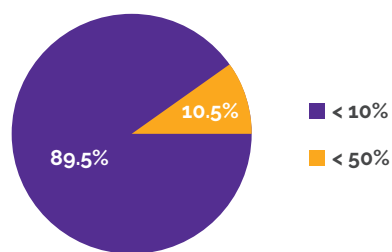
*On a scale from 1 to 5, where 1 is not engaged at all and 5 is highly engaged, how engaged were your students in Square Panda today?*



On a scale from 1 to 5, where 5 is very helpful and 1 is not helpful, how helpful was Square Panda as a supplement to classroom instruction today?



How many of your students wanted to end Square Panda before the session was complete?



***“Students who were struggling in the beginning are starting to recognize more letters.”***

— Bianca P., PreK Teacher, Clark County Public Schools

***“Square Panda gives another activity for centers and individual intervention periods.”***

— Michelle M, Kindergarten Teacher, Clark County Public Schools

## Summary of Findings

The findings in this report indicate encouraging trends in support of Square Panda as a supplemental early literacy tool. The treatment group outperformed the control group on measures of beginning sound awareness and showed a trend for improved performance for print knowledge and letter-sound knowledge.

Students at the lower tail of the literacy distribution tended to benefit more from the use of Square Panda than did those with higher average performance, indicating that Square Panda might be particularly suited to help students who struggle. Larger-sample studies are needed to further test this effect across different measures of reading ability. In addition, we found that gameplay with Square Panda is systematically related to student performance on a standardized test of reading, supporting the idea that literacy knowledge might be predicted from gameplay.

These findings will help guide future product iterations to increase efficacy for outcome measures that showed statistically discernable effects. They will also drive the development of new content that can be evaluated using larger student samples at the classroom and district level.

To learn more, contact [sales@squarepanda.com](mailto:sales@squarepanda.com).



**square  
panda™**

[www.squarepanda.com](http://www.squarepanda.com)