THE EDTECH COLLECTIVE
Instructure Partner Ecosystem

BRAINSCIENCE WORKS

Spring 2025 Implementation Study

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INSTRUCTURE
LEVEL 3 ESSA
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EXECUTIVE SUMMARY

BrainScience Works contracted with Instructure to examine the relationship between usage of their program and students' literacy achievement. Literacy achievement is defined broadly in this report to include both letter recognition and letter writing outcomes. Instructure designed the study to satisfy Level III requirements (Promising Evidence) according to the Every Student Succeeds Act (ESSA, 2015).

Study Sample and Methodology

The *BrainScience Works* program engages students in systematic, digital literacy instruction that incorporates multisensory activities such as building letters with clay, writing in journals, and playing interactive games. Educators support student learning by monitoring usage through the platform, documenting student work, completing training modules, and participating in coaching sessions.

This study draws on data from the spring 2025 semester and includes 46 students in pre-kindergarten through grade 3 across two elementary schools in a California public school district. Of these, 14 students in grades 2 and 3 at School A, six pre-kindergarten students at School B, and 26 students in kindergarten through grade 2 at School B participated in the *BrainScience Works* program. An additional six pre-kindergarten students at School B served as a comparison group. Due to the limited sample sizes for the School A and pre-kindergarten groups, inferential statistical analyses were not appropriate. Instead, exploratory findings for these two samples are presented in the appendices to offer preliminary insights and highlight areas for potential future investigation.

Researchers used two key measures to provide insights into *BrainScience Works* implementation and potential impacts of the program on student literacy outcomes: usage data from the digital platform and composite scores for their letter recognition and letter writing assessments.

Researchers employed a variety of quantitative analytic methods. First, descriptive statistics were used to summarize participant characteristics and inform implementation analyses. Partial correlations were then conducted to examine the relationship between students' use of the *BrainScience Works* program and their literacy achievement from the beginning to the end of the pilot study (6 weeks). Finally, comparative analyses using linear regression were conducted with the small subsample of pre-kindergarten students.

Conclusions

Given the statistically significant positive correlation between students' use of the *BrainScience Works* program and literacy outcomes for the K–2 sample at School B, as measured by the BSW letter recognition assessment scores, this study meets the criteria for ESSA Level III (Promising Evidence).

TABLE OF CONTENTS

INTRODUCTION

Effective interventions for dyslexic students should not only provide phonics instruction but should also target visual-spatial skills. However, the primary focus of many interventions for dyslexic students is on phonemic awareness. To address this gap in education for dyslexic individuals, *BrainScience Works* provides a structured program that systematically builds literacy skills by implementing visual-spatial instruction to support reading fluency and comprehension, through explicit instruction and tailored assessments to ensure mastery and success in reading and writing.

As part of their ongoing efforts to demonstrate the efficacy of the *BrainScience Works* program, the team contracted with Instructure to examine the relationship between the use of the *BrainScience Works* program and student achievement. After co-developing an updated logic model (see Appendix A) for *BrainScience Works* (Lee & Shah, 2024), researchers designed the study to satisfy Level III requirements (Promising Evidence) according to the Every Student Succeeds Act (ESSA) standards.

The following research questions guided this study:

Implementation

1. On average, how many *BrainScience Works* modules were completed by students during the spring 2025 semester?
2. On average, how much time did students spend in the *BrainScience Works* program during the spring 2025 semester?

Student Outcomes

3. After controlling for students' prior achievement, how was the use of the *BrainScience Works* program related to students' spring 2025 literacy achievement?

Exploratory Questions

4. Among pre-kindergarten students, what is the impact of the *BrainScience Works* program on students' literacy outcomes among students randomly assigned to receive the program?

This report details the study design and methods, implementation, findings, and conclusions.

STUDY DESIGN AND METHODS

This section of the report briefly describes the study participants, measures, and analysis methods.

Study Design

This study used a correlative design to align with ESSA Level III evidence standards. It included all students in the district who were enrolled in classes that used the *BrainScience Works* program during the spring 2025 semester.

Setting and Participants

This study draws on data from the spring 2025 semester and includes 46 students in pre-kindergarten through grade 3 across two elementary schools in a California public school district. Of these, 14 students in grades 2 and 3 at School A, six pre-kindergarten students at School B, and 26 students in kindergarten through grade 2 at School B participated in the *BrainScience Works* program. An additional six pre-kindergarten students at School B served as a comparison group. Due to the limited sample sizes for the School A and pre-kindergarten groups, inferential statistical analyses were not appropriate. Instead, exploratory findings for these two samples are presented in the appendices to offer preliminary insights and highlight areas for potential future investigation.

Measures

This study included the following measures to provide insights into *BrainScience Works* implementation and evidence about the potential impacts of the *BrainScience Works* program on students' literacy outcomes.

BrainScience Works Usage Metrics. Researchers utilized spring 2025 student-level usage (i.e., total modules completed, total time spent on modules, average time spent on each module). These usage data informed the extent to which students used the *BrainScience Works* program during the pilot study and whether students' use of the *BrainScience Works* program was related to learning outcomes on the letter recognition and letter writing assessments.

Standardized Student Assessments. To assess students' literacy development, researchers used a combination of standardized and program-specific measures, adapted to the assessment practices at each participating school. At School A, students did not complete baseline assessments for letter recognition or letter writing. Therefore, researchers used raw scores from the Test of Word Reading Efficiency (TOWRE) subtests—Sight Word Efficiency and Phonemic Decoding Efficiency—as pretest indicators of early literacy skills. At the end of the pilot, School A students completed internal assessments developed by *BrainScience Works* (BSW) that were aligned with the program's instructional focus.

In contrast, School B administered both pre- and post-tests using the internal BSW assessments, providing a more complete view of student growth over the course of the program.

The ***BSW Letter Recognition*** score was calculated using four subtests: uppercase ordered, lowercase ordered, uppercase mixed order, and lowercase mixed order. For each subtest, students' performance was scored as the ratio of correctly identified letters out of 26 possible, and the overall average was computed across all four subtests.

The ***BSW Letter Writing*** score was similarly based on four subtests: eight targeted uppercase letters (Q, A, T, B, D, S, P, K), eight targeted lowercase letters (f, j, l, r, h, e, m, g), all uppercase letters, and all lowercase letters. Students' scores reflected the proportion of correctly written letters out of the total possible for each subtest, and an average score was calculated across the four components.

Given the variation in assessment tools and time points between schools—and the absence of vertically scaled measures—analyses were conducted within schools to ensure appropriate interpretation.

Data Analysis

Researchers employed a variety of quantitative analytic methods. First, descriptive statistics were used to summarize participant characteristics and inform implementation analyses. Partial correlations were then conducted to examine the relationship between students' use of the *BrainScience Works* program and their literacy achievement from the beginning to the end of the pilot study (6 weeks). Finally, comparative analyses using linear regression were conducted with the small subsample of pre-kindergarten students.

IMPLEMENTATION

The charts below highlight the use of the *BrainScience Works* program during the spring 2025 semester based on their student-level internal usage data (Table 1). Figures 1 and 2 provide examples of student work that was completed off-platform using clay. Figure 1 shows student work after completing the lowercase letters program and beginning the uppercase letters program, reflecting successful letter mastery. In contrast, Figure 2 shows student work from the lowercase letters program only, providing visual feedback to the teacher that the student needed additional support with *f*, *u*, and *j*.

Table 1. Average use of the *BrainScience Works* program by grade and school

School A; Grades 2 & 3 (*n* = 14)	**Mean**	**SD**	**Minimum**	**Maximum**
Total time in minutes	155	60	24	281
Total modules completed	7	2	2	10
Average time spent per module	21	6	12	31
School B; Pre-kindergarten (*n* = 6)	**Mean**	**SD**	**Minimum**	**Maximum**
Total time in minutes	264	22	245	302
Total modules completed	10	0	10	10
Average time spent per module	26	2	24	30
School B; Grades K–2 (*n* = 26)	**Mean**	**SD**	**Minimum**	**Maximum**
Total time in minutes	259	63	153	476
Total modules completed	10	0	9	10
Average time spent per module	26	6	15	48

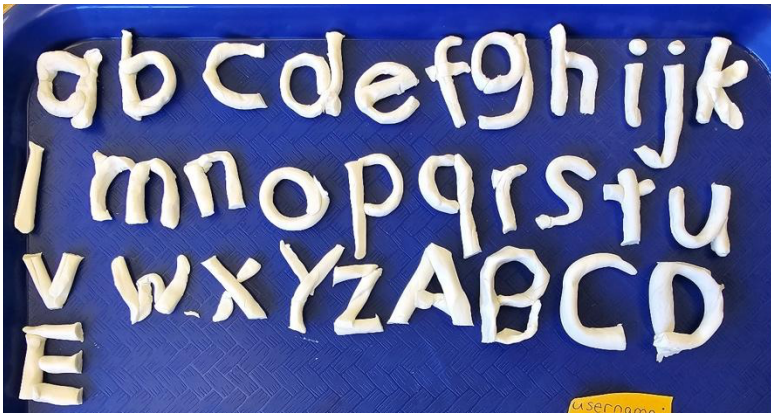


Figure 1. Student's clay models after completing the lowercase letters program and beginning the uppercase letters program; reflects successful letter mastery.

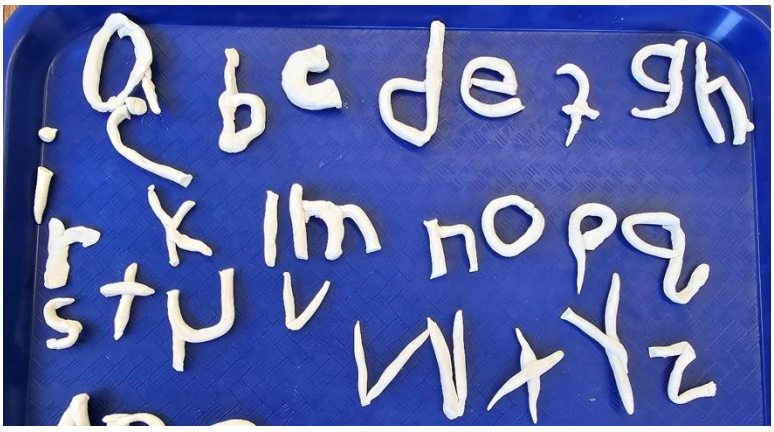


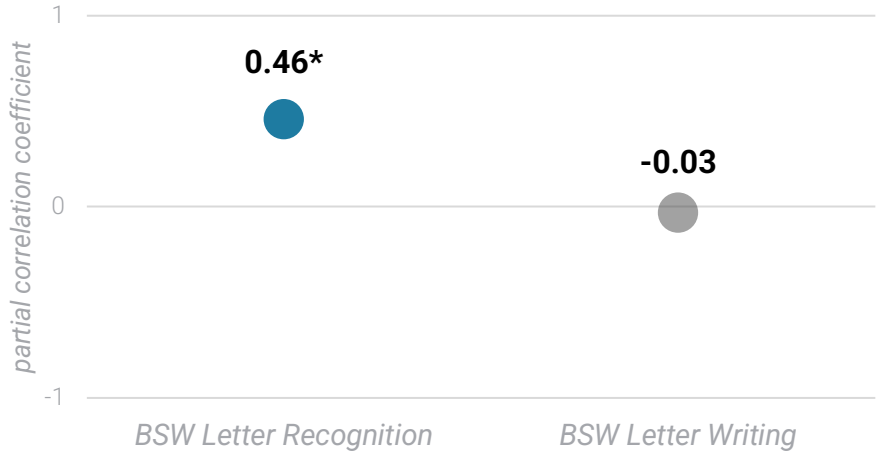
Figure 2. Student's clay models after completing the lowercase letters program; shows need for additional support with *f*, *u*, and *j*.

OUTCOME FINDINGS FOR SCHOOL B STUDENTS

Researchers examined whether greater usage of the *BrainScience Works* program—measured by average time spent on each module[1]—was associated with higher posttest scores on the ***BSW Letter Recognition*** and ***BSW Letter Writing*** assessments. Partial correlation models were used for this analysis, controlling for baseline literacy skills as measured by the respective BSW pretest scores. We conducted the same analyses with the sub-sample of pre-kindergarten students from School B and students from School A as exploratory analyses (see Appendices B and C), acknowledging the fact that these sample sizes are not large enough for inferential statistics.

Association Between Average Time Spent per BSW Module and Grades K–2 Students' Outcomes on the BSW Letter Recognition and Writing Assessments in School B

Among Grades K–2 students with complete BSW pre- and post-test data (n = 26), greater time spent on modules was significantly associated with higher letter recognition posttest scores (p = .020), but not with letter writing scores.



[1] Calculated as total time spent on all completed modules divided by the number of modules completed.

CONCLUSIONS AND RECOMMENDATIONS

The findings support a positive association between students' use of the *BrainScience Works* program and improved literacy outcomes for a small sample (n = 26) of kindergarten to grade 2 students.

This study provides results to satisfy ESSA evidence requirements for Level III (Promising Evidence). Specifically, this study met the following criteria:

- ✔ Correlative design
- ✔ Proper design and implementation
- ✔ Statistical controls through covariates
- ✔ At least one statistically significant, positive finding

To strengthen future evaluations and better understand the impact of the *BrainScience Works* program, we offer the following recommendations:

- **Increase Sample Size.** The current study's small sample limits statistical power and generalizability. A larger sample would allow for more precise estimates and more robust statistical analyses.
- **Incorporate a Comparison Group.** The treatment-only, correlational design for the main set of analyses restricts causal inference. Future studies should consider using a matched comparison group or a quasi-experimental design aligned with ESSA Level II standards to better isolate the effects of the intervention.
- **Minimize Missingness in Assessment Data**. While we recognize that some factors contributing to missing assessment data may be outside the team's control, the relatively small groups of students they typically serve make it especially important to capture complete data for all participating students. Even minor gaps in assessment completion can significantly affect analyses and limit the strength of conclusions in small-sample studies. Ensuring consistent administration and recording of assessments will improve data quality and strengthen findings.
- **Use Standardized Outcome Measures.** While internal assessments provide valuable information, incorporating standardized literacy assessments as key outcomes will align the evaluation with the measures that district administrators are most interested in improving.

Continued evaluation with improved methodological rigor will be essential to fully understand the program's effectiveness across diverse educational contexts.

REFERENCES

What Works Clearinghouse. (2022). *What Works Clearinghouse procedures and standards handbook, version 5.0*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance (NCEE). This report is available on the What Works Clearinghouse website at URL

APPENDIX A. BRAINSCIENCE WORKS LOGIC MODEL

BrainScience

Problem Statement: Students with dyslexia benefit most when instructional strategies emphasize visual-spatial learning skills. Unfortunately, today's reading instruction uses predominantly phonics strategies that are most effective for the neurotypical or non-dyslexic brain. BrainScience Works provides a structured program that systematically builds literacy skills by implementing visual-spatial instruction to support reading, spelling, comprehension, as well as math, through explicit instruction and tailored assessments to ensure mastery and success in reading, writing, and math.

BrainScience Works
Logic Model

Inputs
What does BrainScience Works provide?:

BrainScience Works PROVIDES:

- AI-powered online learning platform delivering specialized curriculum informed by research on how people with reading difficulties including dyslexia learn to read, spell, comprehend, and perform in both reading and math:
  - Virtual teachers leverage students' visual and spatial learning capacities through systematic and explicit instruction of visual-spatial skills where students use physical manipulatives
  - AI assesses students' reading fluency using interactive speech recognition to recommend next lessons, based on student performance
- Online teacher training modules
- Ongoing coaching and implementation support

DISTRICT PROVIDES:

- Internet-enabled chromebooks or equivalent computers, headphones, and microphones
- Funding for purchasing the program and materials
- Dedicated time and space to implement in the classroom

Participants
Who uses BrainScience Works?

- K-4 students with reading difficulties including dyslexia
- K-4 teachers
- Educators, including special education teachers and reading/learning specialists
- Parents/caregivers of students with reading difficulties including dyslexia

Activities
How are participants using BrainScience Works?

STUDENTS

- Use computer to access digital platform for literacy lessons
- Complete lesson progression systematically beginning with letters
- Interact with virtual teacher and lesson content following "Say, Build, See, Write" process:
  - "Say": verbalize letter names, words, and numbers
  - "Build": build letters, words, and numbers with clay
  - "See": see models of letters, words, and numbers, and explore those models' position and orientation
  - "Write": write letters, words, and numbers with pencils in paper journals
- Demonstrate learning by imagining the order and sequence of letters and oral reading of words recorded in their journals
- Play games that reinforce letter and word learning
- Complete periodic assessments of learning in the program

EDUCATORS

- Log in to digital platform to facilitate student engagement
- Monitor product usage and provide support to students as needed
- Document students' progress using photos of their work
- Receive program implementation support
- Complete program training modules
- Participate in coaching sessions

Outputs
What are the measurable results of implementing BrainScience Works?

STUDENTS

- Total number of logins
- Total number of sessions
- Total number of active minutes
- Average weekly minutes
- Average duration of sessions
- Number and nature of lessons completed
- Number of letters, words, and numerical symbols read accurately
- Number and nature of games played

EDUCATORS

- Total number of platform logins/sessions
- Number of student sessions implemented
- Number of implementation supports received
- Nature of student support provided
- Number of photos of students' work
- Number of training modules completed
- Number of coaching sessions attended

Outcomes
What are the expected changes or impacts of using BrainScience Works?

SHORT-TERM

Students
- Improved letter, word, and numerical symbol recognition through ongoing instruction

Educators
- Learn to implement BrainScience Works curriculum effectively and efficiently to better serve learners and save instructional time

INTERMEDIATE

Students
- Improved word recognition, oral reading fluency, and reading comprehension
- Increased enjoyment and confidence in reading and writing
- Greater willingness to experiment with more advanced reading and writing

Educators
- Improved understanding of how students with dyslexia learn
- Increased confidence in students' ability to make significant literacy gains

LONG-TERM

Students
- Growth, one grade level or higher in essential literacy skills in the first year of the program
- Narrow specific reading achievement gaps between participating and neurotypical students
- Unlock full potential of participating students as learners

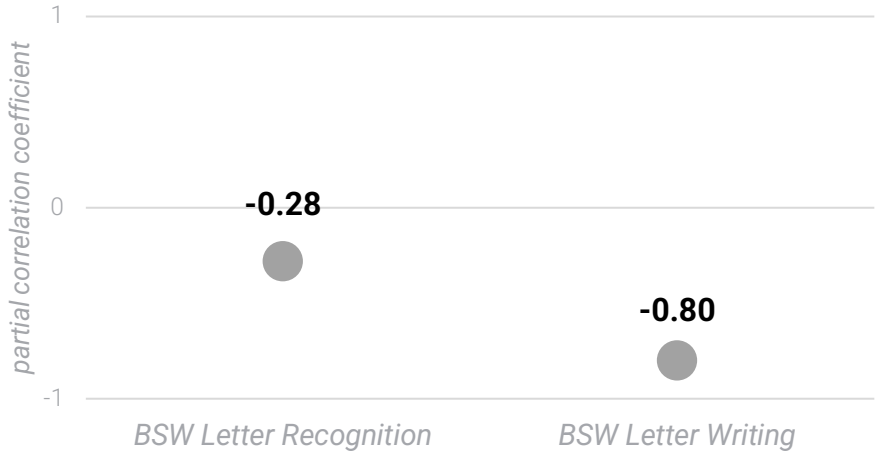
Educators
- Facilitate more effective, inclusive, and supportive learning environments for students with reading difficulties including dyslexia
- Gain a deeper understanding of the strengths and challenges associated with learning as a person with reading difficulties including dyslexia
- Empower students with reading difficulties including dyslexia to recognize and build on their strengths

APPENDIX B. EXPLORATORY FINDINGS FOR PRE-KINDERGARTEN SAMPLE AT SCHOOL B

Researchers examined whether greater usage of the *BrainScience Works* program—measured by average time spent on each module—was associated with higher posttest scores on the ***BSW Letter Recognition*** and ***BSW Letter Writing*** assessments. Partial correlation models were used for this analysis, controlling for baseline literacy skills as measured by the respective BSW pretest scores.

Association Between Average Time Spent per BSW Module and Pre-kindergarten Students' Outcomes on the BSW Letter Recognition and Writing Assessments in School B

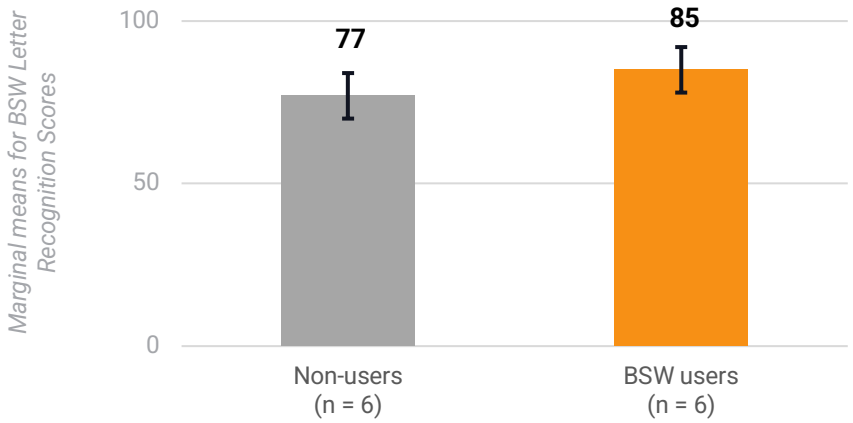
Among pre-kindergarten students with both pre- and post-test BSW assessment data (n = 6), partial correlations indicated a negative, but **not** statistically significant (at the $p < .05$ level), association between average time spent per module and posttest scores in both letter recognition and letter writing, after controlling for pre-test performance.



Additionally, regression analyses were conducted to compare posttest outcomes between the six program users and the six non-users in the pre-kindergarten comparison group, controlling for pretest scores. Given the very small sample size for this analysis, statistical power was extremely limited, and results should be interpreted as exploratory rather than confirmatory.

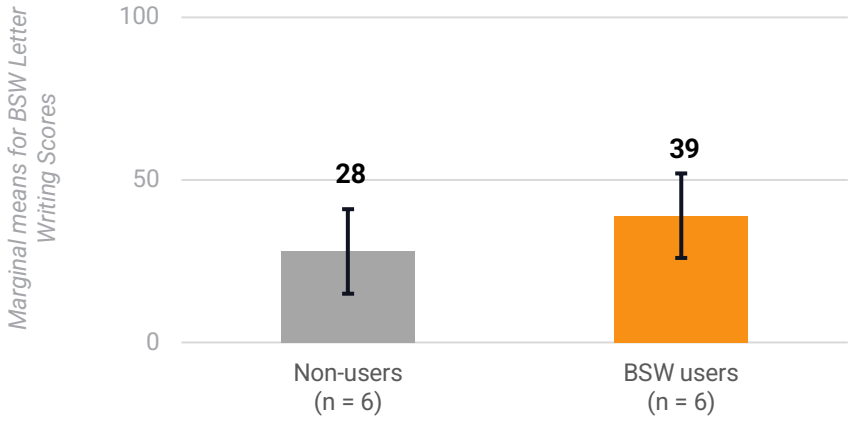
Impact of BSW Program on Pre-kindergarten Students' Outcomes on the BSW Letter Recognition Assessment in School B

Students who used the *BrainScience Works* program had higher adjusted posttest scores in letter recognition compared to non-users, though this difference was **not** statistically significant (p = .151), after controlling for pre-test performance.



Impact of BSW Program on Pre-kindergarten Students' Outcomes on the BSW Letter Writing Assessment in School B

Students who used the *BrainScience Works* program had higher adjusted posttest scores in letter writing than non-users, but this difference was **not** statistically significant (p = .282).



APPENDIX C. EXPLORATORY FINDINGS FOR SCHOOL A STUDENTS

Researchers examined whether greater usage of the *BrainScience Works* program—measured by average time spent on each module—was associated with higher posttest scores on the ***BSW Letter Recognition*** and ***BSW Letter Writing*** assessments. Partial correlation models were used for this analysis, controlling for baseline literacy skills as measured by the Test of Word Reading Efficiency (TOWRE) subtests: Sight Word Efficiency and Phonemic Decoding Efficiency.

Association Between Average Time Spent per BSW Module and Students' Outcomes on the BSW Letter Recognition and Writing Assessments in School A

- Partial correlations showed no statistically significant association (at the $p < .05$ level) between average time spent per module and ***BSW Letter Recognition*** posttest scores when controlling for TOWRE pretest scores.
- Partial correlations suggested a modest, though not statistically significant, positive association (at the $p < .05$ level) between average time spent per module and ***BSW Letter Writing*** posttest scores, after controlling for TOWRE pretest scores.

Analyses	**Covariate**	**Partial Correlation Coefficient**	***p* - value**
Association between average letter recognition posttest score and average time per module	TOWRE Sight-word pretest	0.03	.920
Association between average letter recognition posttest score and average time per module	TOWRE Decoding pretest	-0.11	.717
Association between average writing posttest score and average time per module	TOWRE Sight-word pretest	0.34	.261
Association between average writing posttest score and average time per module	TOWRE Decoding pretest	0.34	.261