Efficacy of the Zoo-phonics Multisensory Language Arts Program for First Grade Children Ohio County School District, Kentucky

2014 - 2015

E3 RESEARCH

An Independent Study Conducted by E3 Research

Efficacy of the Zoo-phonics Multisensory Language Arts Program for First Grade Children Ohio County School District

Introduction:
This research study was designed to analyze the efficacy of the *Zoo-phonics® Multisensory Language Arts First Grade Program*. This program has demonstrated high potential as an integrated, active, multisensory curriculum in previous studies. Ohio County School District, in Kentucky, was chosen for this study because it had not previously used the *Zoo-phonics Program* before its initial training, had lower-than-expected student performance in previous years, and offered a low SES and rural setting for the study, common to many schools in the United States.

The initial studies of a multi-sensory approach to early literacy, the *Zoo-phonics* methodology was determined to be efficacious (Griffith, 2014; Liu, 2014) and founded in current neuroscience research. It uses pictorial mnemonics (Ehri, et al, 1984; Asher, 1993), movement (Asher, 1993; Jensen, 2000; Medina, 2008; Ratey, 2009), sensory exploration and novelty (Medina, 2008). Zoo-phonics quickly gains and keeps children's attention. As a result, new learning is quickly embedded into long term memory (Jensen, 2000). Children learn more effectively when they purposefully move. Exercise and movement maximize attention, understanding, memory, utilization and transference to all areas of the language arts process (American Academy of Pediatrics, "The Crucial Role of Recess in School," 2012).

Earlier studies on the *Zoo-phonics Multisensory Language Arts Program* indicate that little boys learned language arts skills at the same rate as little girls, providing them confidence and a strong foundation for more advanced learning (Scott, Spielmans, & Julka, 2012). Children with less enrichment and economic stability learned alphabetic skills just as quickly and easily as more affluent children (Kimmons and Staff, 2009). Additionally, English Language Learners and students with academic delays learned at the same or similar rate as traditional students in the area of alphabetic knowledge and other literacy skills. (Wrighton, 2010; Liu, 2014).

Zoo-phonics Multisensory Language Arts Program Description

The *Zoo-phonics Multisensory Language Arts Program* is a developmental, sequential and comprehensive phonics- and literature-based language arts program for early and primary education: toddlers, preschoolers, kindergarten and first grade, as well as for various ages of English Language Learners (ELL) and Special Needs students. Beginning with the teaching of the alphabet, phonemic and print awareness, the curricula move children playfully, developmentally, and physically into each of the early reading, spelling and writing domains.

Children *first* learn through the *Lowercase Animal Alphabet* where animals are drawn directly into the shape of each lowercase letter. Each Animal Letter has a related body movement, called a Signal, that acts as the catalyst that cements the letter sounds to the letter shapes (alligator's jaws open and close, /a/; bear reaches for honey, /b/; cat washes her face, /c/, etc.). This transforms abstract symbolism into the concrete realm for student understanding and access.

Each animal letter has an Alliterative Animal Name that helps children master the sounds of the letters quickly: allie alligator, bubba bear, catina cat, etc. The children "see, say, hear and do" as well as touch, sing, dance, pantomime, toss, catch, slither, jump and run. The *Capital Animal Alphabet* is comprised of the capital letters with the same animals as the lowercase alphabet, which provides an associative affect for easy mastery.

Zoo-phonics teaches the alphabet as a whole entity and in alphabetical order. *Zoo-phonics* focuses on the lowercase letter shapes and their sounds first because 95% of text is written with lowercase letters. Children sound-blend words with sounds, not letter names. Letter names and capital letters are taught next. Children learn the shapes, sounds and Signals of the letters so quickly that there is no need to teach the most frequently used letters first. Within two months, most children have mastered the entire alphabet.

A variety of instructional curricula and materials supports each step of the language arts process, including both Animal Alphabets (pictorial mnemonics for lower and uppercase letters), grade-specific decodable readers, music that teaches the alphabet and phonetic concepts, puppets for letter sound reinforcement, mini-books and readers, interactive technology, alphabet and phonics games, and a complete handwriting program. An assessment inventory provides quick tests for the teacher and tools help to remediate, accelerate, and set goals and objectives for each student. A strong parent component

is included in the daily lessons. The curricula are digitized for Smart Boards. *Zoo-phonics* also offers *Zoo-phonics en español, a Spanish Multisensory Language Arts Program.* Arabic and Danish versions are being developed.

As children learn the alphabet, playful, physical and relevant instruction is directly connected through each letter sound in the areas of literature, math, music, art, sensory-drama, science, social sciences, cooking and nutrition, and physical education. These lessons are available in the *Zoo-phonics Adventuresome Kids Manual on CD* for preschool and kindergarten.

Once the alphabet is mastered, initial, ending and medial sounds are taught. These letters can then be strung together to form simple vowel-consonant (VC) and consonant-vowel-consonant (CVC) words. Children are taught to segment, blend, and rhyme at this time. They continue to use their bodies to Signal out the sounds in the words, inputting new information into long term memory. Soon, more complex phonetic concepts are sequentially taught (blends, digraphs, schwa, long vowels, r controlled vowels, silent letters, soft sounds etc.) still using the Signals, until mastery and independence is achieved. Children will now have strategies to decode large, unfamiliar words. They learn to read words and simple-to-more-complex sentences as they master phonetic skills. Close reading experiences help children explore text that is read to them as well as when they later read independently.

The Essences of Zoo-phonics

1. The pictorial *Animal Alphabets* (upper and lowercase) helps children remember the shapes and sounds of the letters.

2. Letter sounds are taught before letter names. You cannot sound-blend with letter names.

3. Lowercase letters are taught before capital letters, as lowercase letters are used 95% of the time in text.

4. An animal-related body movement (called a Body Signal or Signal) for each Animal Letter helps "cement" the graphemic and phonemic information into memory (connecting sounds to letter shapes) and adds a physical response for inputting and retrieving information.

5. The alphabet is taught sequentially and as a whole entity, "a – z." The alphabet is not fragmented.

6. Short vowels are taught before long vowels because there are many short vowel words for children to master, including many High Frequency Words.

7. Phonemic patterns (at, bat, fat, sat) are taught first. High frequency words that are easy to sound-blend are also taught (up, on, at, not, did, etc.). More challenging high frequency words (of, it, was, etc.) are taught through their phonetic word families (rimes) later. **Children's brains need patterns in order to learn.**

8. The *Zoo-phonics* curricula are fully integrated with other academic subjects (math, art, music, science, physical education, social studies, cooking, sensory-drama and self-help skills) daily.

Definitions

1. A*lphabetic Domain:* The Alphabetic Domain is defined as a combination of alphabet knowledge: lower- and uppercase letter shapes, sounds, letter names (in Zoo-phonics, Animal Alphabets, Signals and Alliterative Animal Names are included); beginning, ending and medial sounds in words.

2. *Phonics Domain:* For these studies, this domain includes segmenting, blending, adding and subtracting sounds (phonemic manipulation); schwa, blend and digraph knowledge.

3. *Reading Fluency Domain:* This domain includes sound blending and reading vowel-consonant words (VC) and consonant -vowel-consonant words (CVC); sound blending and reading High Frequency Words.

4. *Comprehension Domain:* Understanding of the written word.

5. *First Grade:* Children, on average, begin first grade at 6 years of age. Rules vary by state.

6. *Phonological Awareness Literacy Screening (PALS 1-3*) instrument. This instrument was developed by the University of Virginia and measures several indicators of early literacy. *PALS 1-3* is well-respected and is used with all students in the states of Virginia and Wisconsin and around the United States. It was the primary assessment instrument used in this study.

7. *STAR Early Literacy Computer-Based Diagnostic Assessment* assesses these eight key domains of early literacy and numeracy. The domains and skills are grouped into three major areas that relate to state standards. This test is used nation-wide and is used to give an indication of how districts and states compare to each other.

8. *Benchmarks.* Benchmarks provide a learning target for a span of grades. The state benchmarks are aligned with state content standards in most states. Assessments help determine whether benchmarks have been reached.

9. *Baseline:* Also called Pre-Test. This is the test given at the beginning of the year to determine alphabetic knowledge, phonics, word knowledge, and comprehension.

10. *Assessment Periods:* The school year is divided into 3-month blocks of time. Assessments occur at the Baseline or Pre-Test, the 1st Trimester (also called the Mid-Term), and 3rd Trimester (or Post-Test).

11. *"Business as Usual" Model:* This refers to the manner in which the *Zoo-phonics Language Arts Program* was taught. It was "business as usual." All aspects of language arts were taught as a part of the normal teaching routine.

12. *Social-Economic Status (SES):* This is the economic and ethnic make-up of participants in the study group.

13. *Merged Animal Alphabets: Zoo-phonics* uses animals drawn in the *exact* shape of the lowercase letters. They sit on top of the lowercase letters for a visual and mnemonic effect. The capital letters contain the same animals for a visual, associative and mnemonic affect.

14. *Signals:* The animal-related body movements that connect the sounds and shapes of the *Zoo-phonics* lower- and uppercase Animal Alphabets.

15. *Alliterative Animal Names: Zoo-phonics* uses Alliterative Animal Names (example: Bubba Bear) to teach the sounds of the letters. This has a strong effect on memory when connected with the lower- and uppercase Animal Alphabets and the body movements called Signals.

The Study

Purpose:
The purpose of this study was to determine the efficacy of the *Zoo-phonics Multisensory Language Arts First Grade Curriculum* in authentic first grade settings in six elementary schools in the Ohio School District in rural Kentucky.

Research Questions:
RQ1: Do first grade students receiving the *Zoo-phonics Multisensory Language Arts Program* demonstrate greater growth in reading skills outcomes (alphabetics, phonics, reading fluency, comprehension)?

RQ2: Are there differences in literacy skill levels between sub-groups (ethnic groups, low SES, gender) after receiving *Zoo-phonics Multisensory Language Arts Instruction* treatment as measured by the *PALS 1-3* and *STAR* assessment tests?

RQ3: Do students who have received the *Zoo-phonics Multisensory Language Arts* instruction reach benchmarks established by *PALS 1-3* and *STAR* assessment tests?

Methodology:
A study of the efficacy of the *Zoo-phonics Multisensory Language Arts Program* for first grade children was conducted during the 2014-2015 school year by E3 Research, LLC. The study was conducted in Ohio County, Kentucky, using 356 first grade students in six elementary schools.

Instruments:
Two test instruments were used to collect data during the study. The primary assessment instrument used in the study was the *Phonological Awareness Literacy Screening, Grades 1-3 (PALS 1-3*) instrument. This instrument was developed by the University of Virginia and measures several indicators of early literacy. *PALS 1-3* is used with all students in the states of Virginia and Wisconsin and is well-respected throughout United States. Additionally, students were assessed three times during the school year using *STAR Early Literacy Assessment Tests*. Using an additional testing instrument insured that any key learning not assessed by *PALS 1-3*

would be assessed by *STAR* assessment tests. Additionally, using a second assessment instrument would give comparative data and perspective to the results measured by the *PALS 1-3* test instrument.

Data were collected:

1) at the beginning of school year using *PALS 1-3* and *STAR*,
2) mid-way through the year (January) using *STAR*,
3) at the end of the school year (June), using *PALS 1-3 and STAR*.

***Participants*:**

Eighteen teachers participated in the study. All first grade teachers were credentialed by the state of Kentucky and received intensive training and ongoing support in the techniques and curriculum developed for the *Zoo-phonics Multisensory Language Arts Program*. Instructional assistants received training in *Zoo-phonics* at the same time and intensity of their teachers. In addition, instructional aides were trained to administer the *PALS 1-3* tests. Teachers, instructional assistants and school administrators agreed to implement and use the *Zoo-phonics Program* with fidelity, using the curriculum, materials and instructional techniques as designed.

Participating in the study were 356 students with a gender mix of nearly equal numbers; 52.8% were boys (188) and 47.2% girls (168). The majority of the students were eligible for free or reduced-cost lunches, indicating a community composition that is largely economically disadvantaged.

The racial composition of the study group was relatively homogeneous with 81% of the students identified as White, 10% Hispanic, 4% American Indian/Alaska Native, 1% Black or Black-White mixed and 4% Other. Many of the Hispanic students were from families that have resided in the area long enough to self-identify English as their family's primary language. Only 5% of the students in the study were reported to have English as their second language. Students in the study ranged between 6.1 years old and 6.9 years old, indicating an average of 6 years old.

Two primary disability categories are identified. 2.5% of the students were reported to have speech and language disabilities while 5.1% of the students were reported to have developmental delays. Both groups were included in the assessment process.

Procedures:

Prior to the beginning of the school year, all first grade teachers and instructional assistants received intensive training in the use of *Zoo-phonics* instructional techniques and materials. Each class room was supplied with a complete set of instructional materials and teaching aids.

The first grade students in this study had not been introduced to *Zoo-phonics* prior to the instruction. During the first two weeks of class, all students were assessed using *PALS 1-3*. Data were collected manually and entered into the *PALS 1-3 Online* System at a later date. The *PALS 1-3* assessments were repeated at the end of the school year to demonstrate gains in reading skills over the course of first grade. *STAR* testing was administered three times during the year, at the beginning, at the mid-year and at the end of the year.

Analysis:

The findings of this study were derived primarily through *PALS 1-3* assessments. Supplementary findings from *STAR* assessments provided an additional set of benchmarks to validate student achievement and identify students in need of additional support. The data were analyzed using:

- Descriptive statistics (means, frequencies, standard deviations and gains between assessments
- T-Tests to measure the significance between pre-and-post mean scores
- Analysis of Variance (ANOVA) to test differences in means (for groups or variables) for statistical significance
- Group Statistics
- Independent Samples Tests (Levine's Test for Equality of Variance and Test for Equality of Means to test for variability between scores
- Cohen's *d* to test for effect size; used to indicate the standardized difference between two means

The significance level for all tests was set at $p \leq .05$. This means that test scores did not arrive by chance.

Findings:
The findings of this study were derived primarily through *PALS 1-3*. Supplementary findings resulted from *STAR*. *PALS 1-3* was used to benchmark groups of students as a measure of growth throughout the year and for identification of students needing early or targeted interventions. *STAR* benchmarks provided similar corroborative information.

PALS 1-3 Analysis:
PALS 1-3 is a leveled instrument used to (a) screen and identify students in need of additional instruction based on their Entry Level task scores, and (b) diagnose specific skill deficits in students whose Entry Level scores do not meet a benchmark that represents minimum grade-level criteria. Diagnostic levels of *PALS 1-3* include Level A: Oral Reading in Context, Level B: Alphabetics, and Level C: Phonemic Awareness.

Study Group:
The population for this study consists of three hundred-fifty six (N=356) first grade students enrolled in six public elementary schools (Table 1). Schools enrolled between 29 and 102 students. There were 18 classes that enrolled between 13 and 31 students.

Table 1 - Participating Schools

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fordsville	29	8.1	8.1	8.1
	Wayland	99	27.8	27.8	36.0
	Beaver Dam	102	28.7	28.7	64.6
	Southern	51	14.3	14.3	78.9
	Horse Branch	31	8.7	8.7	87.6
	Western	44	12.4	12.4	100.0
	Total:	356	100.0	100.0	

PALS 1-3 Assessment Tests

PALS 1-3 is comprised of four assessment scales and eleven subscales. The subscales are aggregated into four composite scale scores. Three of scales are benchmarked, and the fourth is used as a measure of proficiency.

The following scales are presented below. The subscales and benchmarks are listed for each scale.

Concept of Word (COW) **-** Entry level Concept of Word (COW) total is a composite score consisting of three subscales: Pointing at Words, Word Identification, and Concept of Word List. These combined make COW Benchmark, which is 25.

Entry Level Summed Scores **-** Entry Level Summed Scores are composite scores that use different subscales for fall and spring. The benchmarks for fall (Total Spelling Score, Pre-Primer Word List and Letter Sounds) is 39. The benchmark for spring (Total Spelling score and first grade Word List) is 35.

Level B Summed Scores **-** Level B Summed Scores are a composite of three subscales (Alphabet Recognition, Letter Sounds, and Concept of Word Total Score) for both fall and spring. The fall benchmark is 65, and the spring benchmark is 74.

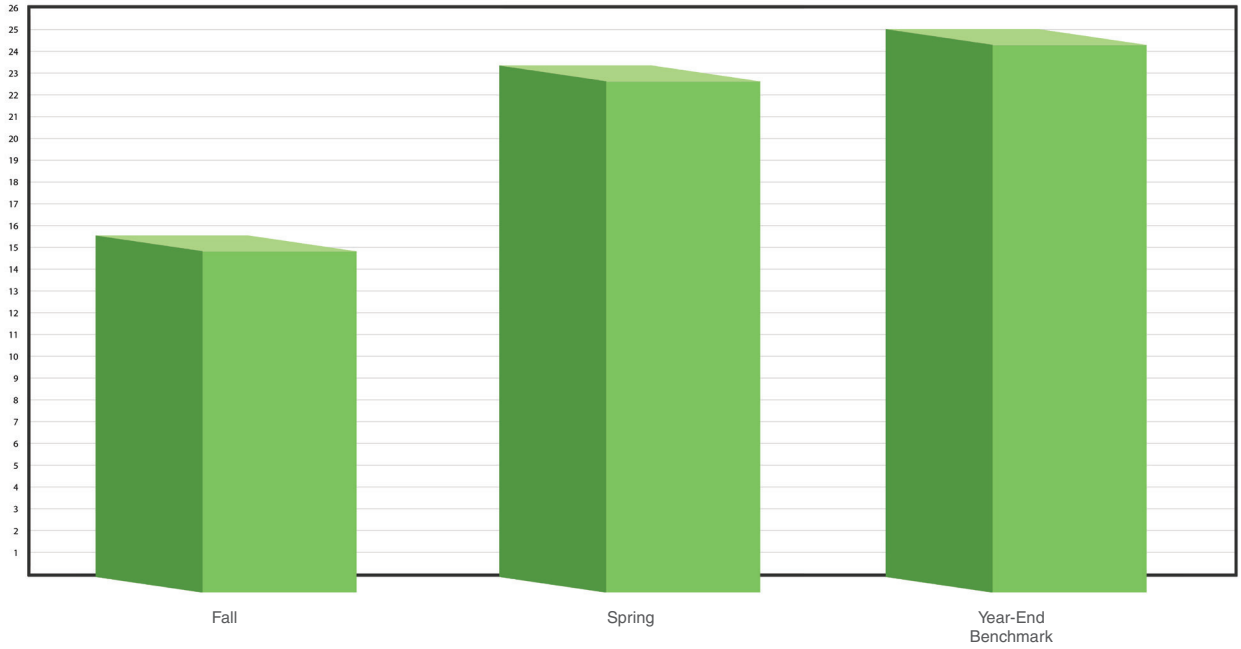
Level C Summed Score **-** Level C Summed Scores are composite scores of two subscales (Blending and Sound-to-Letter). This scale is not benchmarked; however, a proficiency level can be calculated based upon the maximum score of 60.

PALS 1-3 - Summed Score Gains (Fall to Spring):
PALS 1-3 tests are grouped to produce four composite scores. T-tests were used to compare the Concept of Word (COW), Entry Level Summed Scores, Level B Summed Scores and Level C Summed Scores. Fall and spring mean scores were compared to determine the gains made by the study group. These scores were also used to compare with *PALS 1-3* benchmarks and to determine instructional reading levels.

T-Test: Concept of Word (COW) TOTAL:

A paired-samples t-test was conducted with 307 students to compare Pre-Test and Post-Test Concept of Word Total scores. There was a significant difference between the fall scores (M=15.45, SD=7.25) and spring scores (M=23.19, SD=3.82) conditions; t(306)=21.23, p=.000. With a mean score of 23, nearly all students met the COW benchmark of 25 by the end of the school year.

Graph 1 - Concept of Word (COW) TOTAL

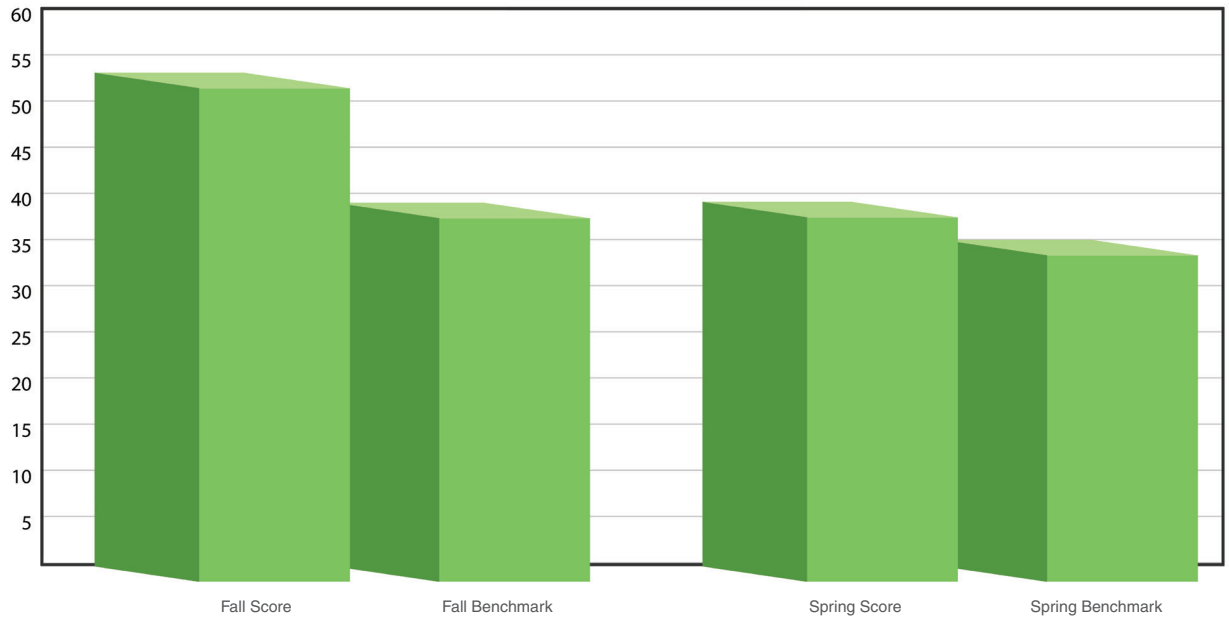


The Concept of Word (COW) Total is composite score of three sub-tests: Pointing at Words, Word Identification, and the Concept of Word List. Graph 1 indicates that with a significant gain of 8 points between fall and spring assessments, first grade students gained COW skills throughout the year and fell just short of the year-end benchmark as an averaged group.

T-Test - Entry Level Summed Scores for Fall and Spring:

A paired-samples t-test was conducted with 307 students to compare Pre-Test and Post-Test Entry Level Summed Score. There was a significant difference in the fall scores (M=.52.49, SD=13.98) and spring scores (M=38.91, SD=15.32) conditions; t(306)=-22.44, p=.000. Fall and spring Summed Scores are based upon different factors and have different benchmarks. As a result, a high fall mean score was anticipated. The mean spring Entry Level Summed Score of 39 meets the *PALS 1-3* fall benchmark.

Graph 2 – Entry Level Summed Scores for Fall and Spring

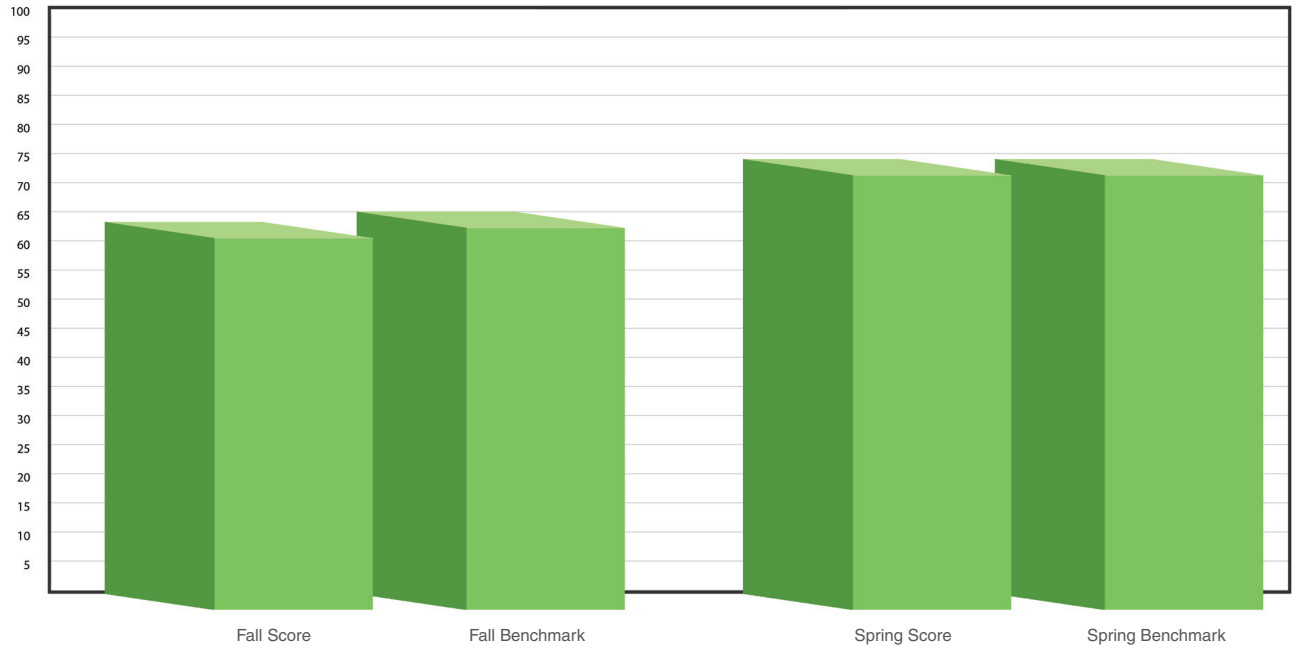


The fall and spring Entry Level Summed Scores are presented in Graph 2. Fall and spring benchmarks are comprised of different sub-tests. The fall scores are based upon a composite of Letter Sounds, Total Spelling scores, and the Pre-Primer Word List and are benchmarked at 39. The spring scores are a composite of the Total Spelling score and the 1st Grade Word List and are benchmarked at 35.

Graph 2 demonstrates that students outperformed the fall benchmark of 39 with a score of 52.5 and the spring benchmark of 35 with a score of 39. A large number of students were at the Pre-Primer reading level at the beginning of the school year, and this is reflected in the above-average Entry Level Summed Score for the fall. During the school year, as students gained skills in the alphabetic domain and reading fluency, fewer students were performing at the pre-primer level. Due to *Zoo-phonics* instruction, the narrowing of the gap between the assessment scores and the benchmark in the spring indicated that many students advanced beyond this level.

T-Test - Pre-Test and Post-Test Level B Summed Score:
A paired-samples t-test was conducted with 306 students to compare Pre-Test and Post-Test Level B Summed score. There was a significant difference in the fall scores (M=.63.23, SD=11.52) and spring scores (M=74.00, SD=5.61) conditions; t(305)=-20.51, p=.000. Both fall and spring mean scores met the *PALS 1-3* fall and spring benchmarks.

Graph 3 – Pre-Test and Post-Test Level B Summed Score

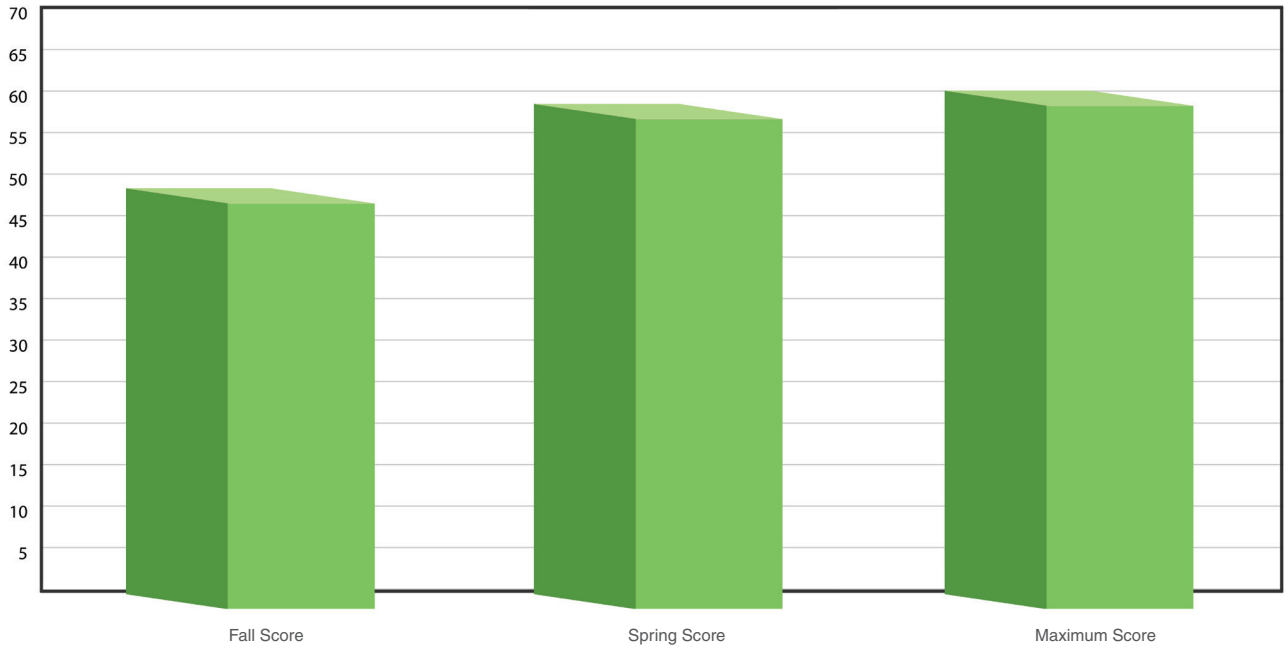


Graph 3 presents the fall and spring Level B Summed Scores which are a composite of Alphabet Recognition, Letter Sounds, and the COW Total Score. The fall benchmark is 65, and the spring benchmark is 74. At the beginning of the year, the first grade students scored below the fall benchmark, due in part to the below-grade level reading of many students. Mean scores show that significant improvement in reading proficiency was gained and benchmarks where met, due to the *Zoo-phonics* instruction.

Pre-Test and Post-Test Level C Summed Scores:
A paired-samples t-test was conducted with 303 students to compare Pre-Test and Post-Test Level C Summed score. There was a significant difference in the fall scores (M=.47.41, SD=13.53) and spring scores (M=56.83, SD=7.76) conditions; t(302)=-20.51, p=.000. The spring mean score of 57 compares favorably with the *PALS 1-3* spring maximum score of 60.

"Brain-derived Neurotrophic Factor (BDNF) is…Miracle-Gro® for the Brain…a crucial link between thought, emotions, and movement…. Eric Kandel [found] that repeated activation, or **practice**, causes the synapses themselves to swell and make stronger connections…exercise sparks the master molecule of the learning process…a direct biological connection between movement and cognitive function."
- *Spark*, (Ratey, 2008, pps. 40- 43).

Graph 4 - Pre-Test and Post-Test Level C Summed Scores



The Level C Summed Score is a composite of two sub-tests: Sound-to-Letter Matching and Sound-Blending. This score is not benchmarked, but when viewed as an indicator of proficiency, a mean score of 95% was achieved.

Graph 3 indicates that students made significant gains between the fall and spring assessments. The spring score of nearly 57 compares very well with the maximum score of 60. At the end-of-the-school year, students clearly understood sound/letter associations and sound-blending, both key components of reading fluency.

Gender Comparison:
Gains in each of the composite scores are presented in Table 2. Gains represent growth in each concept area that can be compared to *PALS 1-3* benchmarks. Boys and girls are compared to determine if there are gender differences in conceptual growth.

With nearly equal numbers of boys and girls in the study, an examination of the Summed Score gains reveals that in each category there are no discernable differences in mean Summed Score performance between boys and girls. Between the fall and spring assessments, boys and girls increased their reading skills equally and significantly.

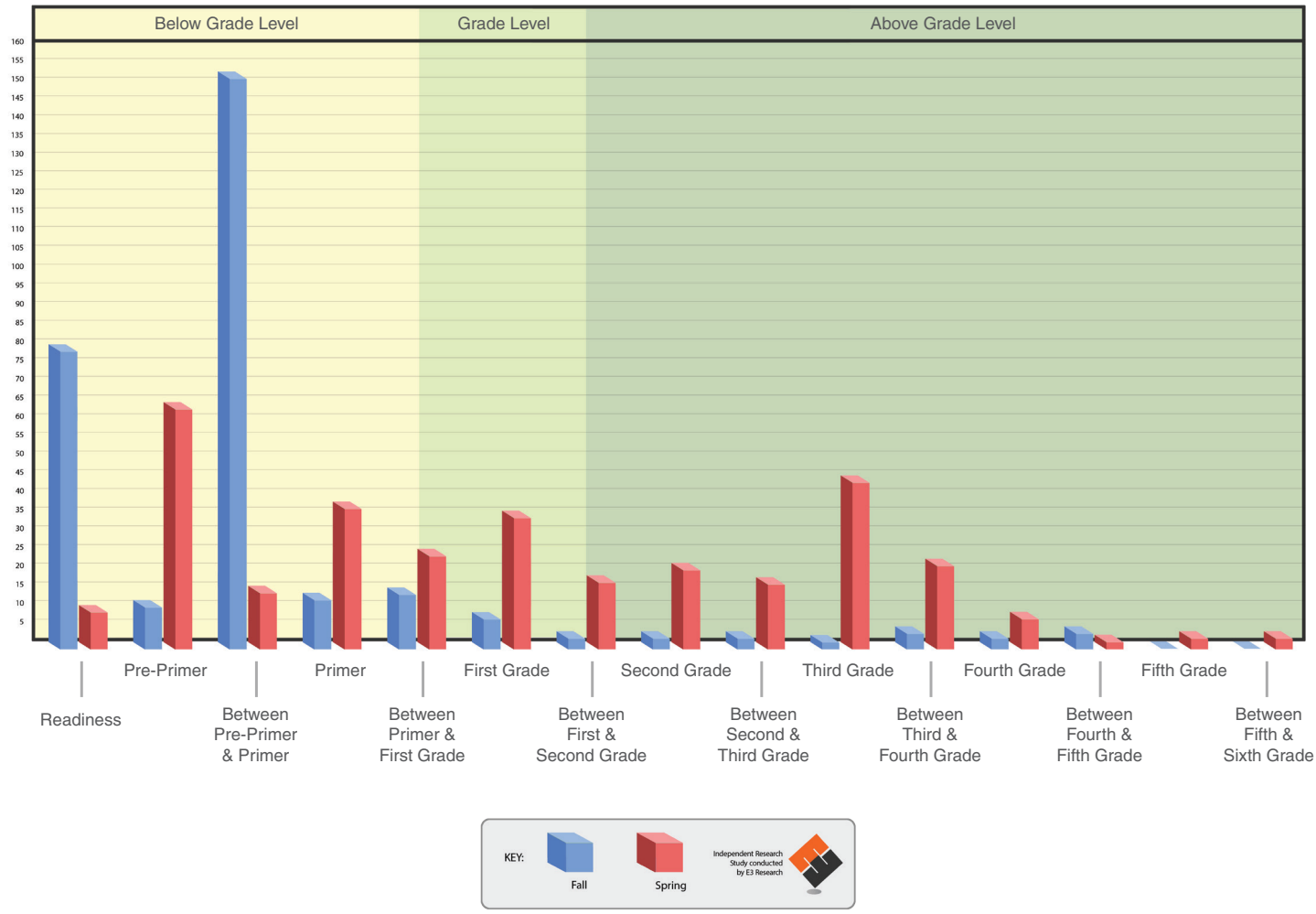
Table 2 - Group Statistics – *PALS 1-3* Composite Scores by Gender

	Student Gender	N	Mean	Std. Deviation	Std. Error Mean
Concept of Word Total (Gain)	Boy	166	7.4036	6.60209	.51242
	Girl	141	8.1206	6.11144	.51468
Entry Level Summed score (Gain)	Boy	166	-13.2229	10.64774	.82642
	Girl	142	-13.9930	10.60342	.88982
Level B Summed score (Gain)	Boy	165	10.6121	9.05847	.70520
	Girl	141	10.9433	9.35168	.78755
Level C Summed score (Gain)	Boy	164	9.4390	13.44162	1.04961
	Girl	139	9.3957	11.68526	.99113

Reading Levels:
Instructional reading levels are set by *PALS 1-3* from reading-readiness through sixth grade. Fall mean scores indicated that 70% of first grade students were between Readiness and Primer levels. The rest of the students were dispersed in small numbers between Primer and fourth grade. The spring assessment revealed a significant shift in reading levels for this group of students with only 24% being below the Primer level. 44% of the students advanced between first and fourth grade levels.

Notably, one hundred first graders (nearly 1/3) were reading at the second to fourth grade levels by the end of first grade because of the *Zoo-phonics Program.* There was a large shift from most students being below the Primer level when entering first grade to 60% of the first graders now reading at grade level, with strong numbers of students reading at the second, third and fourth grade levels.

Graph 5 – A Comparison Between Fall and Spring Reading Levels Distribution

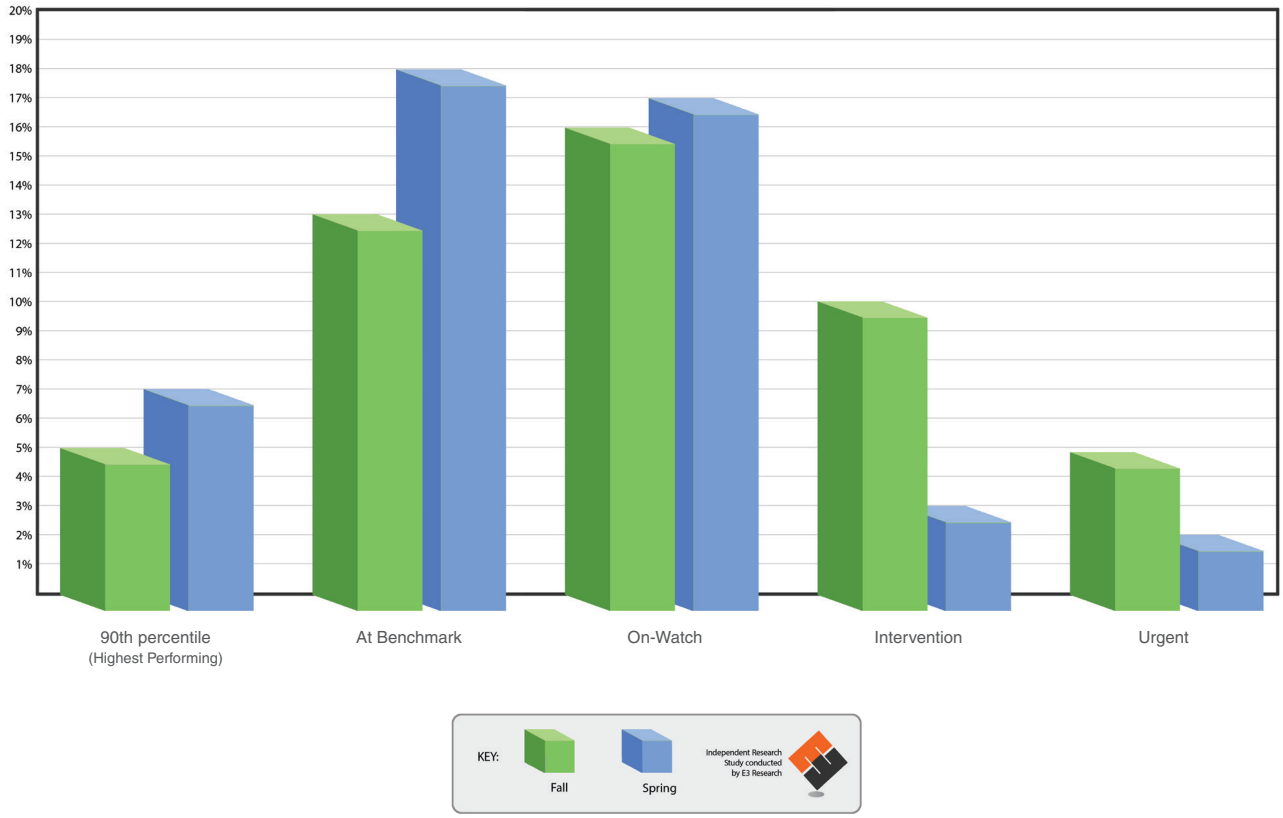


As indicated in Graph 5, the vast majority of first grade students were below grade level in the fall, with the majority of students at the Readiness level or between the Pre-Primer and Primer levels. Only a small number of students were at grade level or above at this time. By the end of the school year, significant changes occurred with the majority of students advancing to grade level or above, with nearly half of the students reading at the second through sixth grade levels, with the largest single group reading at the third grade level. Of the few students still performing below grade-level, the largest group of students had advanced from Readiness to the Pre-Primer level.

STAR Screening

STAR was administered at the beginning of the school year and again at the end. At the beginning of the year, 38% of the first grade students were at-or-above the fall benchmark, while 62% were below the benchmark. At the end-of-the-school year, 53% of the students had risen to the spring benchmark or above, with 47% remaining below. The largest number of students below the benchmark was in the On-Watch category while a large number of students in the Intervention and Urgent categories dropped dramatically.

Graph 6 – *STARS* Benchmark Scores, Fall and Spring



STAR scores mirror the *PALS 1-3* reading scores in terms of demonstrating a significant shift from the number of students below the benchmark in the fall to above the benchmark in the spring. *STAR* benchmarks are intended to identify students who are at-risk rather than to identify grade-level equivalency in reading. Graph 6 indicates that most students in the below-benchmark categories advanced to a higher level, with a marked shift of those students in the Intervention and On-Watch categories. The number of students in the Intervention and Urgent categories fell markedly over the school-year resulting in the identification of only a small number of students needing interventions.

"Traditional seatwork engages less of the brain. If you want your learners to remember what they are learning, get them involved: Get them moving. Start 'playing' more and 'working' less" (2000, Jensen). The President's Council on Fitness and Sports recommends that all school age children need a minimum of 30 minutes a day of physical movement to stimulate the brain" (2000, Jensen). This research has been obviously ignored. Simply view the teaching practices of the last decade where recess and physical education classes have been dropped providing more time for reading lessons due to slumping reading scores of America's youth. Instead of changing the manner in which the alphabet, reading, spelling and writing are taught, the hour has been extended, killing the joy of learning for children. Jensen adds, "… some educators will still ignore the findings."

Conclusions

Research Questions:
RQ1: Do first grade students receiving the *Zoo-phonics Multisensory Language Arts Program* demonstrate greater growth in reading skills outcomes (alphabetics, phonics, reading fluency, comprehension)?

RQ2: Are there differences in literacy skill levels between sub-groups (ethnic groups, low SES, gender) after receiving *Zoo-phonics Multisensory Language Arts Instruction* treatment as measured by the *PALS 1-3* and *STAR* assessment tests?

RQ3: Do students who have received the *Zoo-phonics Multisensory Language Arts* instruction reach benchmarks established by *PALS 1-3* and *STAR* assessment tests?

Conclusion 1:
Students showed significant growth in Instructional Reading levels between the beginning and the end of the school year. At the beginning of the year only 38% of students were at or above the *STAR* benchmark, while 62% were above grade level by the end-of-the-year. Importantly, the number of students in the Intervention and Urgent categories showed a marked decrease by the end-of-the-year.

Conclusion 2:
Students made significant advancement in reading levels. At the beginning of the year, most students were at the *PALS 1-3* Readiness and Pre-Primer levels, both performing below the first grade level. By the end-of-the-year, most students were at the first grade reading level and many were reading at fourth and fifth grade levels.

Conclusion 3:
***PALS 1-3* Year-End benchmarks were achieved by most students.** With a mean score of 23, nearly all students met the COW benchmark of 25 by the end of the school year. The spring benchmark for Entry Level Summed Score was met by most students, while the spring mean score of 57 compares favorably with the *PALS 1-3* spring maximum score of 60 for Level C Summed Scores.

Conclusion 4:
***STAR* benchmark achievement increased significantly throughout the year.** An increase from 38% to 53% in students meeting or exceeding the benchmark was experienced. While the number of students in the Intervention and Urgent categories decreased, 47% of these students remained slightly below the benchmark, mostly in the On-Watch category. Even though the number of students remaining below the benchmark is high, there was still marked improvement as evidenced by the number of students advancing into this category from lower levels.

Conclusion 5:
Boys and girls performed equally on all tests. There is no significant difference in performance among boys and girls in literacy as measured by each of the *PALS 1-3* composite scores.

Conclusion 6:
General reading achievement improved significantly. The *PALS 1-3* composite scores (COW, Summed Scores and Reading Level) indicate that students made strong progress in reading skills development and generally met the benchmarks. *STAR* benchmark scores indicate that a significant number of students made notable gains in literacy skills, but there were a few that still need support to reach the benchmarks and advance to grade-level reading.

An Independent Study Conducted by E3 Research

www.e3research.com
Tel: 916.956.8556

www.zoo-phonics.com
Zoo-phonics, Inc. - 995 Morning Star Dr, Ste B, Sonora, CA 95370 - Tel: 1.800.622.8104
05-121515