

# ***The Efficacy of the Zoo-phonics® Multisensory Language Arts Program for Toddler, Preschool, Transitional Kindergarten and Kindergarten Children in California and Michigan Schools***

***2013 - 2014***

*Study One: Toddler Alphabetic Knowledge*

*Study Two: Preschooler Alphabetic Knowledge*

*Study Three: Comparison of Year-End Literacy Scores for Preschool, Transitional Kindergarten and Kindergarten Students*

*Study Four: Comparison of Year-End Literacy Scores for Transitional Kindergarten and Kindergarten Students*



**An Independent Study Conducted by E3 Research**



# ***The Efficacy of the Zoo-phonics Multisensory Language Arts Program for Toddler, Preschool, Transitional Kindergarten and Kindergarten Children California and Michigan Schools***

## **4 Studies**

### ***Introduction:***

A study of the efficacy of the *Zoo-phonics Multisensory Language Arts Program* was conducted during the 2014-2015 school year by E3 Research, LLC. It was selected because it has demonstrated high potential as an integrated, active, multisensory curriculum. *Zoo-phonics* rapidly anchors the letter shapes and sounds in memory, preparing children for early reading, spelling and writing. Instruction aligns to the Head Start Guidelines, California Foundations, and Common Core Standards.

The *Zoo-phonics* methodology was determined to be efficacious (Griffith, 2014) and is 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, moving newly taught information into long-term memory (Jensen, 2000; Medina, 2008; Ratey, 2009). Children learn more effectively when they move with purpose. 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 learn 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. (Liu, 2014).

### ***Participants in Study 1:***

Twenty toddlers attending the *Safari Learning Academy* in Sonoma, California, were assessed prior to moving into the Preschool Program at age 3. The demographic mix included a majority of students of Caucasian descent, in the mid-socio-economic range. The mean age of these toddler students was 2 years and 11 months. Some toddlers did not have strong expressive language at the time of the assessment.

### ***Participants in Study 2:***

Ninety-nine preschoolers, ages three and four years old, located in Michigan, New York, Washington D.C., and Georgia, participated in this study. The demographic mix included a majority of students of Caucasian descent and

in the mid-socio-economic range. The study also included a number of children from Latino and African American ethnic groups in low-income families. Students attended half-day classes, between two and five days a week. Some students did not attend with consistency.

### ***Participants in Study 3:***

The group was comprised of 99 preschool students, 31 transitional kindergarten students (TK's) and 240 kindergartners. The socio-economic and ethnic demographics were mixed. The preschool participants were described in Study 2. The transitional kindergarten students in this study came from one kindergarten class in an elementary school in Central California. The ages of these TK's ranged from 4.10 to 5.0 years. Because of their birthdays, they had missed the California age requirement for entrance to kindergarten. Also participating in this study were 240 kindergarten students enrolled in ten kindergarten classes in four public schools located in Southern, Central, and Northern California and in Michigan.

### ***Participants in Study 4:***

This group was comprised of 31 transitional kindergarten students and 240 kindergartners. The students in Study 4 were same TK and K students in Study 3.

### ***Assessment Instrument:***

The assessment instrument used in these studies was the *Zoo-phonics Beginning Reading Assessment, Version 2 (Z-BRA2)*. This instrument was developed as a part of the *Zoo-phonics Multisensory Language Arts Program* and measures many indicators of early literacy. For Study 1, children were assessed prior to turning three. Data were collected throughout the year. For Studies 2 – 4, data were collected during the first two weeks of school (Pre-Test), at Mid-Term in January, and at the end of the school year in late May.

For each of the tests, significant gains were reported using 2-tailed T-Tests. The significance for nearly all tests was set at .000, meaning that the results did not happen by chance. Large effect sizes of 0.8 or greater were indicated, using Cohen's d.

Demographic information was collected that included age, gender, ethnicity, socio-economic status, and those learning a second language. It also denoted any students with developmental delays and students needing speech therapy.

All teachers held certificates for Early Childhood or teaching credentials sanctioned in their own states. Instructional aides were district certified. Teachers, aides, and school administrators agreed to use the *Zoo-phonics Program* with full fidelity.

#### **Procedures:**

Prior to the beginning of the school year, all teachers and instructional assistants received intensive training in the use of *Zoo-phonics* instructional techniques and materials. Each classroom was supplied with a complete set of age-appropriate *Zoo-phonics* instructional materials, including digital curriculum.

During the first two weeks of class, all students were assessed using the *Z-BRA2*. Data were collected on lower- and uppercase letter names and sounds, Alliterative Animal Names, and the Body Signals associated with each Animal Letter. The second assessment was conducted at Mid-Term, again testing for upper- and lowercase letter names, sounds, Alliterative Animal Names and Signals. The Mid-Term assessment was used to measure growth in alphabetic principles since the Pre-Test as well as to identify any students who may have needed support or early interventions. At the end of the school year, the *Z-BRA2* was again administered including all four elements of lower- and uppercase letters.

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## **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 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 (Ehri, et al, 1984). Each Animal Letter has a related Body Movement, called a Signal, acting 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 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 *Uppercase 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 letters and their sounds first; before teaching letter names and capital letters (95% of text is written with lowercase letters, see *Zoo-phonics* "Essences" below). Children learn the letter shapes and sounds of the letters so quickly for long-term memory that there is no need to teach the most frequently used letters first. Within two to four months, most children have the entire alphabet to utilize.

A variety of instructional curricula and materials support 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 helps 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 SmartBoards. *Zoo-phonics* also has a Spanish Multisensory Language Arts Program. Arabic and Danish versions are being developed.

As children learn the alphabet, fun and interesting information 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 Adventure-some 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. Children continue to use their bodies to Signal out the sounds of 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 Body Signals, until mastery and independence is achieved. Children will now have strategies to decode large, unfamiliar words. Children 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.

## Definitions

1. *Alphabetic 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. *Toddler:* Toddler is defined as a child 18 months to 3 years of age.
  6. *Preschool:* Preschool is defined as children ages 3 to 4 years 11 months of age.
  7. *Transitional Kindergarten:* Transitional Kindergarten (or TK) is defined as children from approximately 4 years 11 months – 5 years 11 months of age. The TK Program was implemented to take those young kindergartners who are not ready for kindergarten academically or socially, giving them more time to mature and gain skills. Rules vary by state. Some states do not provide transitional kindergarten programs.
  8. *Kindergarten:* Children normally begin kindergarten (or K) at 5 years of age. Rules vary by state.
  9. *Zoo-phonics Basic Reading Assessment 2 (Z-BRA 2):* This assessment covers all aspects of phonemic awareness, alphabetics, the 4 reading domains, and written language.
  10. *Baseline:* Also called Pre-Test. This is the test given at the beginning of the year to determine student alphabet, phonics, and word knowledge.
  11. *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).
  12. *“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.
  13. *Social-Economic Status (SES):* This is the economic and ethnic make-up of participants in the study group.
  14. *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 impact. They provide a mnemonic affect. The capital letters contain the same animals for an associative affect.
  15. *Alliterative Animal Names:* Zoo-phonics uses alliterative animal names (Bubba Bear) to teach the sounds of the letters. This has a strong effect on memory when connected with the Animal Alphabets and the Body Movements (Signals).
  16. *Signals:* The animal-related body movement that connects the sounds and shapes of the *Zoo-phonics Animal Alphabets*.
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## The Essences of Zoo-phonics

1. The Animal Alphabets (lower- and uppercase) help 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. (Lowercase letters are used 95% of the time in text.)
4. An animal-related body movement (called a Signal) for each Animal Letter helps “cement” the 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 phonemic word families later. Children’s brains need patterns.
8. The Zoo-phonics curricula (toddlers/preschool, kindergarten, 1<sup>st</sup> grade) is fully integrated with other academic subjects daily.

# Study One: A Toddler Study

## Safari Learning Academy, Sonora, California

### Toddlers' Alphabetic Knowledge

It is generally not expected that toddlers learn the alphabet at such a young age. However, this study demonstrates that toddlers can learn the shapes, sounds, Signals and Alliterative Animal Names of the lowercase alphabet when presented in a concrete, mnemonic, playful, and physical manner.

#### Participants:

Twenty toddlers attending the *Safari Learning Academy* in Sonora, California, were assessed prior to moving into the Preschool Program at age 3. The mean age of these toddler students was 2 years and 11 months. Some still did not have strong expressive language at the time of this assessment. Most children enter the Toddler Program with limited expressive language, making a baseline assessment difficult.

#### Methodology:

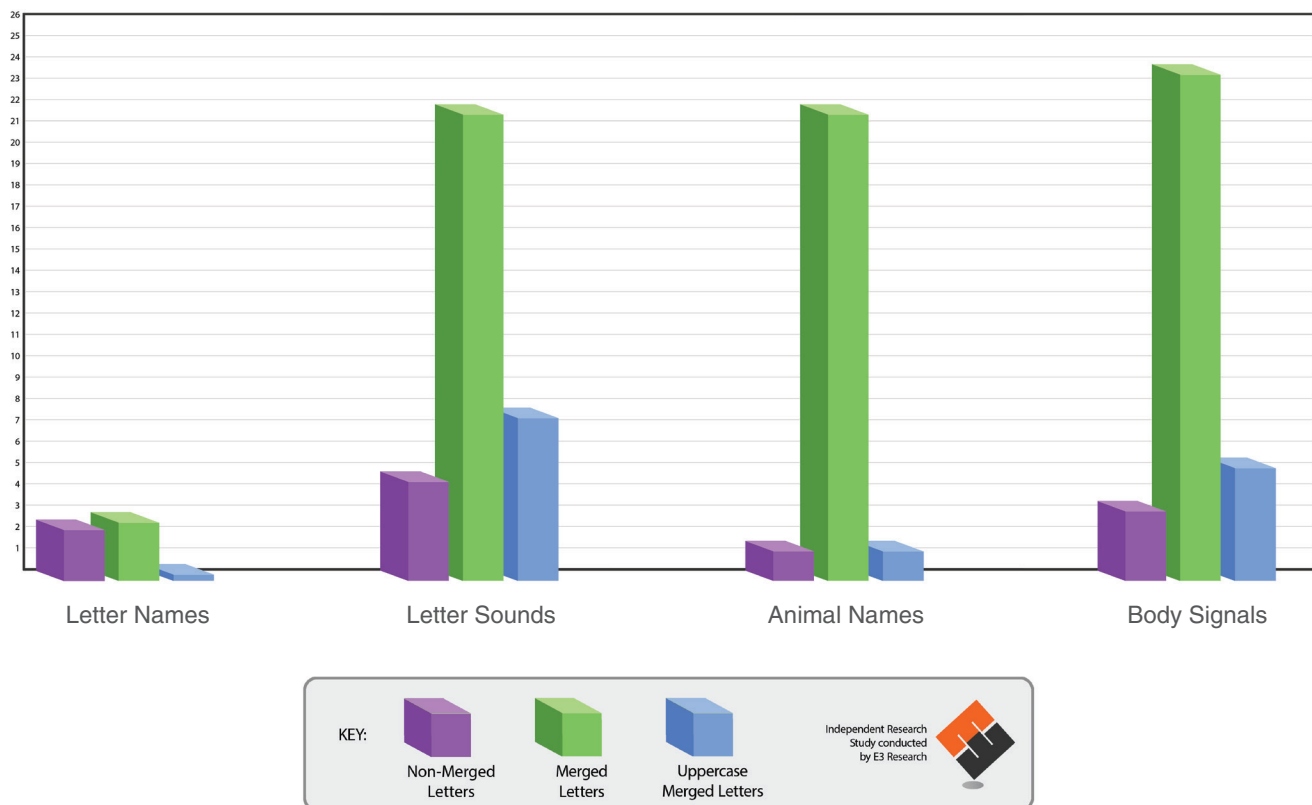
A single case study was used to determine the alphabetic knowledge of 20 toddlers prior to going into *Safari Learning Academy's Preschool Program*. Toddlers between 18 months and 3 years of age were taught the *Zoo-phonics Lowercase Animal Alphabet* (lowercase animal letters,

sounds, Alliterative Animal Names and animal-related body movements called Signals) with full fidelity to the program. The *Zoo-phonics Basic Reading Assessment 2 (Z-BRA 2)* was used to assess toddler knowledge of the alphabet. During the assessment, children were shown plain lowercase and uppercase letters and the *Merged Animal Lowercase* and *Merged Animal Uppercase Letters*, "a – z." Children were asked to identify the letters by letter name, letter sound, the Animal Alliterative Name, and the Body Signal.

#### Findings:

**Explanation:** For the test, the teacher showed children the plain letters (dark blue bar), the *Zoo-phonics Merged Animal Lowercase Letters* (green bar), and the *Zoo-phonics Merged Animal Uppercase Letters* (light blue bar). The children looked at each and identified it by letter name, letter sound, Alliterative Animal Name, and Signal (bar sets). Mean scores show steady growth throughout the year, with the strongest growth seen between the Pre-Test and the 1<sup>st</sup> Trimester (November). Through *Zoo-phonics*, the lowercase alphabet, "a – z," is learned in the first 2 months of school.

Graph 1 – Toddler's Alphabetic Knowledge



The data demonstrates that whenever the toddlers saw the *Zoo-phonics Merged Animal Letter Cards*, they had strong recall of the shapes and sounds of the letters, could recall the Alliterative Animal Names that teach the sounds, and could recall the animal-related Body Movements (Signals) for each letter with proficiency. It also showed that usage of the Animal Letters and Body Signals helped them to remember less emphasized alphabet information, such as letter names and capital letters, because the children made associations with the animals. Although not assessed at this time, toddlers also were able to identify the initial letter sounds in names and object words (*Michelle*, *milk*, *crackers*, *juice*, etc.) and can transfer this skill to their environment.



# Study Two: The Preschool Study

## A Four School Study Preschooler Alphabetic Knowledge

### Participants:

Ninety-nine preschoolers, ages three and four years, located in Michigan, New York, Washington D.C., and Georgia participated in this study. The demographic mix included a majority of students of Caucasian descent, in the mid-socio-economic range. The study also included a number of children from various ethnic groups and low-income families, including African American and Latino students. Students attended half-day classes between two and five days a week. Additionally, many children in preschool did not attend their schools with the regularity of public schools, and the preparation of teachers is not as extensive as their credentialed counterparts.

Directly connected to the *Zoo-phonics* alphabet instruction, students participated in a variety of educational activities in math, science, art, music, social studies, physical education, sensory-drama, and cooking, all as a part of the daily *Zoo-phonics* curriculum.

### Methodology:

The study was conducted over the course of the 2013-2014 school year. Prior to introducing the *Zoo-phonics* curriculum to the students, teachers conducted the Pre-Test during the first two weeks of school (September). Additional assessments were conducted at the end of the 1st Trimester (November), and at the end of the 3rd Trimester in late May. The *Z-BRA 2* tests were used to assess alphabetic knowledge of lower- and uppercase letters (letter shapes, names, and sounds; Alliterative Animal Names and Signals). The tests included the information designed to identify any students who may have been taught *Zoo-phonics* in a prior preschool or in the home, as this would alter baseline scores for students with prior alphabetic knowledge.

Teachers in the study were certified to teach preschool in their states and were trained in the methodology and curriculum used in the

*Zoo-phonics Program*. At the outset of this study, teachers, aides, and principals agreed to use the *Zoo-phonics Multisensory Language Arts Program* with fidelity.

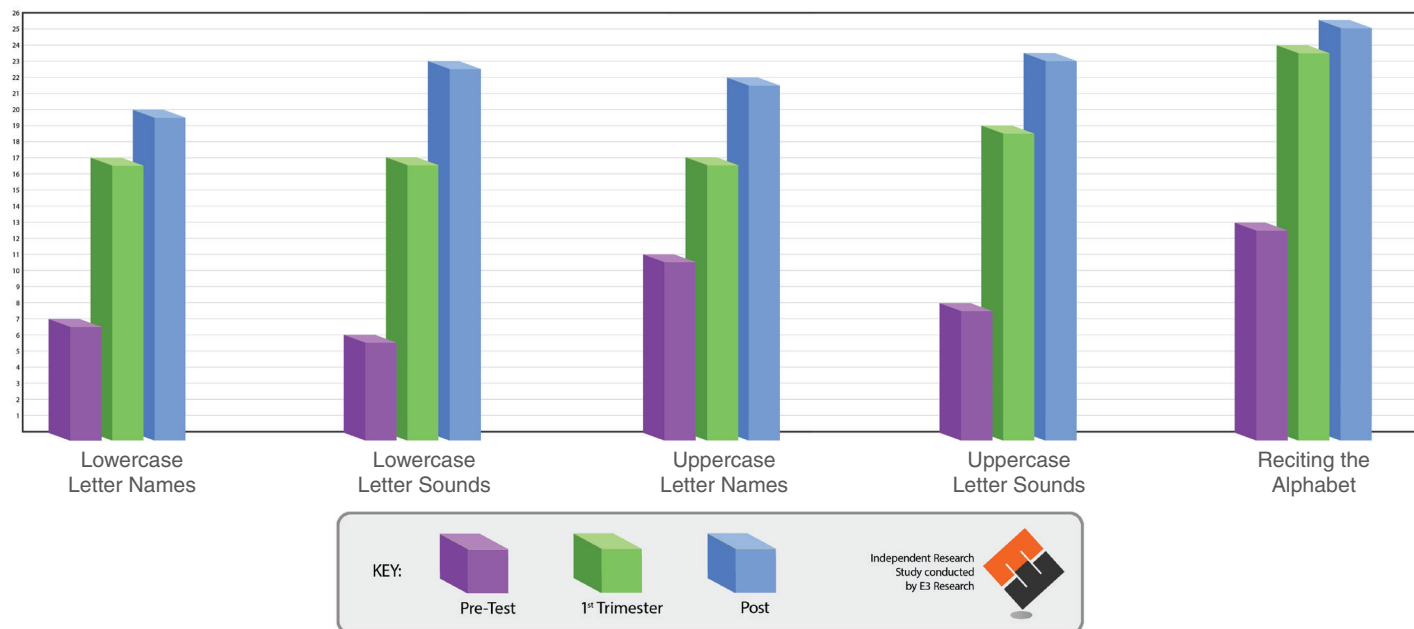
### Findings:

For each of the tests, significant gains were reported using 2-tailed T-Tests. The significance for nearly all tests was set at .000, meaning that the results did not happen by chance. Large effect sizes of 0.8 or greater were indicated, using Cohen's d. A general pattern emerged showing consistent growth in both upper- and lowercase letter names, sounds, Alliterative Animal Names and Body Signals. The mean scores for upper- and lowercase letter names was nearly 22 letters in each category, while both upper- and lowercase letter sounds averaged above 23 in each category.

At the end of the year, for lowercase letter names, preschool students made an overall growth of 51%. In lowercase letter sounds, preschoolers made an overall growth of 66%. For uppercase letter names, preschoolers made an overall growth of 43%. In uppercase letter sounds, preschoolers made an overall growth of 59%. When reciting the alphabet, preschoolers made an overall growth of 48%. At the end of the year, mean scores showed that preschool students were proficient in 88% of all alphabetic information, making a 53% increase overall from the beginning of the year. It should be noted that this study was comprised of a combination of three- and four-year-old children. In this study, student test results were not separated by age.

**NOTE:** Each graph contains three bars. The first bar in each set is the Pre-Test (September), the 2nd bar in each set is the 1st Trimester Test (November), and the 3rd bar in each set is the Post-Test (June). In each bar, student knowledge of lowercase letter names, letter sounds, uppercase names, uppercase sounds, and recitation of the alphabet was assessed.

**Graph 2 – Lowercase Names, Lowercase Sounds, Uppercase Names, Uppercase Sounds, Reciting the Alphabet**



The preschool students in this study showed strong growth in the alphabetic domain, demonstrating that the letter shapes and sounds of the lowercase alphabet can be learned in two months. Mean scores showed that most children were close to proficiency by November. Any children who did not have full proficiency by the end of the 1st Trimester gained the rest of the letter information over the course of the year. This enabled preschool students to use their alphabet skills much earlier than is normally expected for this age group. Having alphabetic knowledge prepares preschool children for more advance academic concepts earlier, including initial, ending and medial sounds, sound segmenting, blending, and rhyming. Significant to this study is that these gains were accomplished because of the mnemonic, playful and physical *Zoo-phonics* curriculum.

The study results also indicate that 3-year-olds learn the alphabet as quickly as 4-year-olds, and males learned as quickly as females. It was observed that by teaching the *Lowercase Animal Alphabet* with the body movements (Signals), it actually helped students learn the capital letters, even when they were not the focus of the instruction, because of the association with the animals in both *Animal Alphabets*.

# Study Three: A Comparison of Year-End Mean Scores of Preschool, Transitional Kindergarten and Kindergarten Students

## Participants:

This study was comprised of 99 preschool students, 31 transitional kindergarten students and 240 kindergartners. The socio-economic and ethnic demographics were mixed. The preschool participants were described in Study 2. The transitional kindergarten students in this study came from one kindergarten class in an elementary school in Kerman, California. The ages of the TK's ranged from 4 years 10 months to 5 years old. Because of their birthdays, they had missed the California age requirement for entrance to kindergarten. Also participating in this study were 240 kindergarten students enrolled in ten kindergarten classes, in four public schools, located in Southern, Central, and Northern California, and in Michigan. All students in the participating schools received reading instruction using the *Zoo-phonics Multisensory Language Arts Program*, implemented with full fidelity by teachers, aides and administration.

## Methodology:

A cross-sectional, multi-case method was used to determine the efficacy of the *Zoo-phonics Multisensory Language Arts Program* for transitional kindergartners and kindergartners in various demographics. Preschool scores from Study 2 were used as a comparison in this study. The study was conducted over the course of the 2013-2014 school year. Prior to introducing the *Zoo-phonics Program* to the students, a baseline assessment was conducted during the first two weeks of school (September). Additional assessments were conducted at the end of the 1st Trimester (November) and at the end of the 3rd Trimester (June). The *Z-BRA2* was used to assess alphabetic knowledge of lower- and uppercase letters (letter shapes, names, Alliterative Animal Names, and letter sounds). The tests included information designed to identify any students who may have been taught the alphabet with *Zoo-phonics* in a preschool or in the home as it would affect the study.

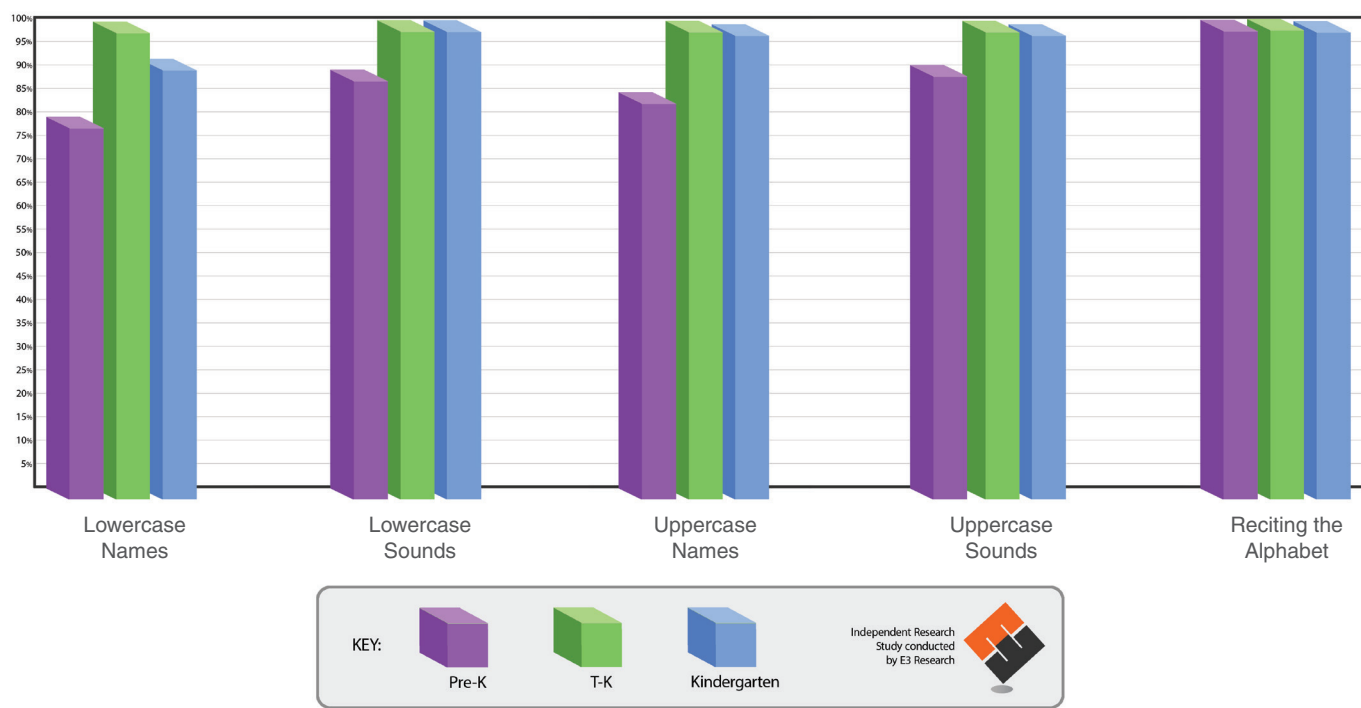
## Findings:

For each of the tests, significant gains were reported using 2-tailed T-Tests. Large effect sizes of 0.8 or greater were indicated, using Cohen's d. The significance for nearly all tests was set at .000, meaning that the results did not happen by chance.

While both the transitional and kindergarten groups included some 4-year-olds, the preschools also contain an equal number of 3- and 4-year-olds children. Considering the span of ages, it was found that *Zoo-phonics* is highly efficacious for all age groups. This age difference may explain why the scores of these preschool students were high in alphabetics but not as high in the fluency domains. Mean scores showed that most of the 3-year-olds were not developmentally ready for some of the higher literacy skills as that of the older students in the study, as would be expected. Mean scores showed that although the TK's had not as yet attended kindergarten, they were able to quickly learn the alphabet and more advanced literacy concepts through *Zoo-phonics* commensurate with their kindergarten counterparts.

Transitional kindergarten and kindergarten students slightly outperformed preschool students (88% vs. 99%) across all administered tests as would be expected. However, preschoolers learned the "a-z's" quickly, September to November. Both groups were tested for proficiency in the upper- and lowercase alphabet letters, shapes, and sounds, but the transitional kindergarten students were also tested on several language arts sub-domains that enter the fluency domain. All groups experienced the greatest alphabetic gains during the 1st Trimester because of the ease of *Zoo-phonics*, gaining additional literacy information throughout the rest of the year.

Graph 3 – Comparison of End-of-the-Year Mean Scores for Preschool vs. Transitional Kindergarten vs. Kindergarten



Mean scores demonstrate that preschool students grew almost as rapidly as the transitional kindergarten and kindergarten students in alphabetic knowledge. These alphabetic skills enabled preschool students to effectively use their alphabet knowledge for letter and word play, leading to sound segmenting, blending, and rhyming, which is foundational to reading, spelling, and writing. Transitional kindergarten and kindergarten students were able to enter these areas of fluency with strong skill development. Because of this preparation, all groups were able to enter the next grade level above the recorded baseline scores of the study class ahead of them.



# Study Four: Comparison of Year-End Mean Scores for Transitional Kindergarten and Kindergarten Students

## Participants:

The group was comprised of 31 transitional kindergarten students and 240 kindergarten students presented in Study 3. Participant information was explained in the prior study above.

## Methodology:

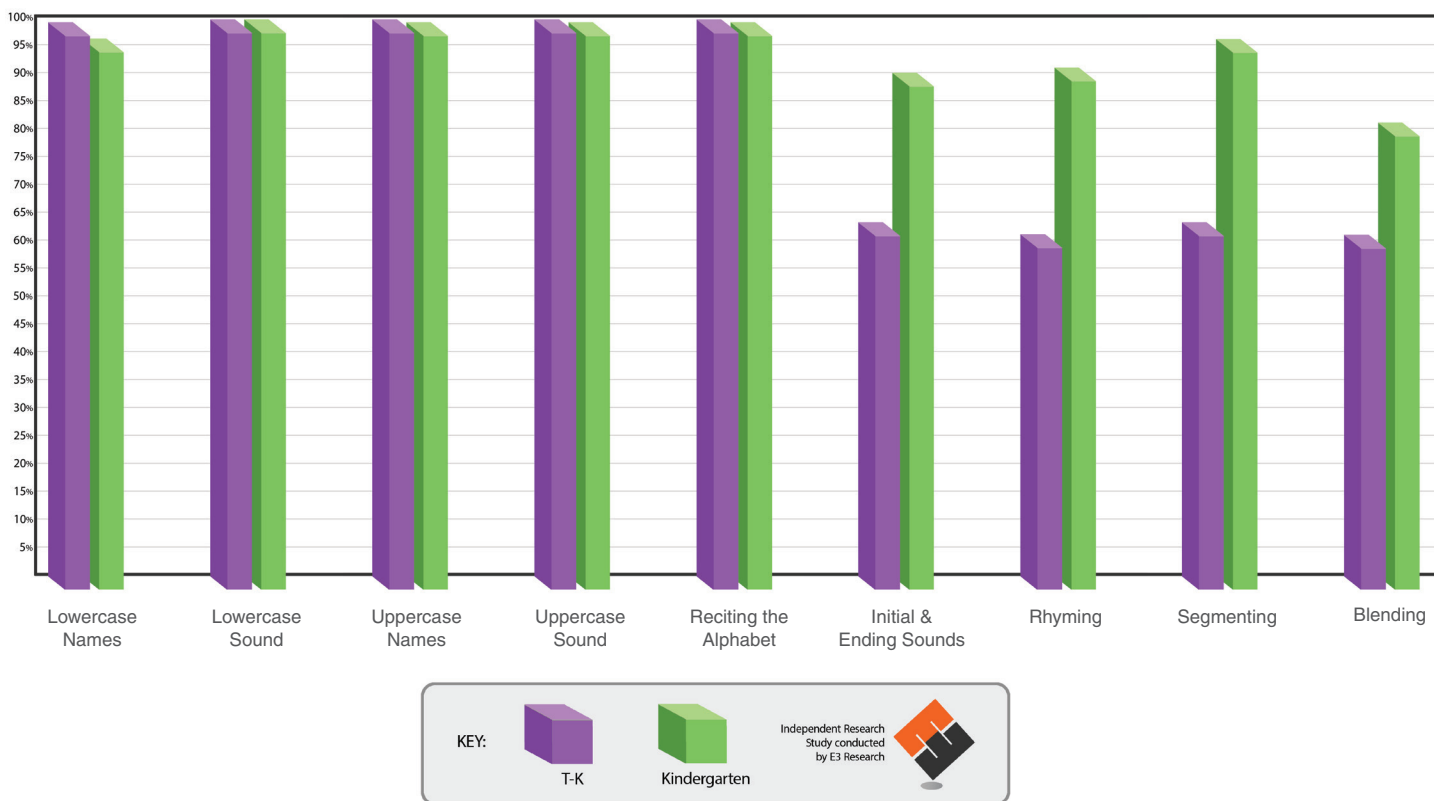
Although Pre-Tests, 1st Trimester Tests, and Post-Tests were conducted, for this comparison only the year-end results were compared between the two groups. Additional literacy tests were given to both groups because Mid-Term assessments showed that they were developmentally ready for more complex language arts concepts.

## Findings:

For each of the tests, significant gains were reported using 2-tailed T-Tests. The significance for nearly all tests was set at .000, meaning that the results did not happen by chance. Large effect sizes of 0.8 or greater were indicated, using Cohen's d.

The findings of the two age and grade levels, when compared in the Alphabetic Domain, yield strong evidence for growth across all students and in all settings. It would be anticipated that kindergarten students would perform at high levels of proficiency across all tests and would out-perform the transitional kindergarten students. Year-end data does not support this. This class of transitional kindergarten students performed slightly better in both upper- and lowercase letter naming, but the difference is not statistically significant. This might be explained by the difference in teaching style, experience, or demographics. Kindergarten children made slightly greater growth in more advanced literacy domains because of their age and additional school experience. It should be noted that the transitional kindergarten children in these studies had not been to kindergarten yet.

Graph 4 – Comparison of End-of-the-Year Mean Scores for Transitional Kindergarten vs. Kindergarten Students



The evidence clearly demonstrates that both transitional kindergarten and kindergarten students, regardless of age and school experience, all learn the alphabet at a rapid pace, especially during the 1st Trimester of the school year. Alphabetic knowledge gains are continued over the course of the entire year with high proficiency achieved in shapes and sounds of the lower- and uppercase letters, initial, medial, and ending sounds. This foundation allowed these children to gain reading, spelling and writing skills earlier than normally expected, including with English Language Learners and special needs students. Transitional kindergarten students made rapid growth in the alphabetic domain and also gained proficiency into other advanced literacy concepts such as segmenting and blending words. As would be expected, mean scores showed that kindergarten students outperformed the TK's in more advanced literacy skills. TK's still showed strong growth in all literacy domains in these studies.

# A Summary of Four Studies: Toddlers, Preschool, Transitional Kindergarten and Kindergarten Students

A general view of the results of the four studies involving toddlers, preschoolers, transitional kindergarten and kindergarten students shows that the *Zoo-phonics Multisensory Language Arts Program's* methodology and instructional practices are appropriate and effective for all ages of students to learn alphabetic principles and more advanced literacy skills. Developmental levels, prior learning, teacher proficiency, and other factors may play some role in how far a class progresses over the course of a school year.

Alphabetics and phonemic awareness are the dominant focus of *Zoo-phonics* for toddlers and preschoolers. For older preschoolers, their alphabetic knowledge enabled them to explore more advanced literacy skills such as word building (spelling), sound blending and segmenting, and reading simple vowel-consonant (VC) and consonant-vowel-consonant (CVC) words. Many four-year-olds progressed to blends, digraphs, and schwa sounds, although they were not assessed in that area. Transitional kindergarten students were able to develop additional written and fluency skills earlier than expected. Kindergarten students achieved proficiency in alphabetics, fluency and comprehension skills, as well as written language skills.

## **Overall Conclusions:**

Mean scores from the toddlers, preschoolers, transitional kindergarteners, and kindergarteners demonstrated that, regardless of gender, limited English language ability, students with special needs, ethnic groups, or SES factors, *all* students benefitted from the *Zoo-phonics Multisensory Language Arts* curriculum, methodology, and instruction. All students in these studies will enter the next year with greater alphabet knowledge and fluency skills than the peers and predecessors who did not have the *Zoo-phonics Program*.

“Research demonstrates that if toddlers and preschoolers have a solid foundation of alphabetic skills and rich vocabulary development, they will begin the language arts process earlier and have more academic success and confidence in school.”

- *National Institute for Early Education Research (NIEER) Rutgers University, 2006*

“...it appears now that this motor center also coordinates thoughts, attention, emotions, and even social skills. When we exercise, particularly if the exercise requires complex motor movement, we're also exercising the areas of the brain involved in the full suite of cognitive functions.”

- *Spark, (Ratey, 2008, p. 41).*





**An Independent Study Conducted by E3 Research**

[www.e3research.com](http://www.e3research.com)

Tel: 916.956.8556

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Zoo-phonics, Inc. - 995 Morning Star Dr, Ste B, Sonoma, CA 95370 - Tel: 1.800.622.8104  
02-121415