

***The Effectiveness of the Zoo-phonics® Multisensory
Language Arts Program With Three- and Four-Year-Old
Head Start and Preschool Students in Rural Kentucky
5 Studies***

2014 - 2015

Study One: Alphabet Knowledge of Three-Year-Old Head Start and Preschool Students

Study Two: A Comparison Study of the Alphabetic Knowledge of Three-Year-Old Girls vs. Boys

Study Three: Alphabetic Knowledge of Four-Year-Old Head Start and Preschool Students

Study Four: A Comparison of Alphabet Knowledge of Four-Year-Old Girls vs. Boys Attending Head Start and Preschool

Study Five: A Comparison of Alphabet Knowledge of Three- and Four-Year-Old Head Start Students



An Independent Study Conducted by E3 Research

The Effectiveness of the Zoo-phonics Multisensory Language Arts Program With Three- and Four-Year-Old Head Start and Preschool Students in Ohio County School District, in Rural Kentucky

5 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:

A one year study of 192 Preschool and Head Start students enrolled in six Head Start Programs was conducted during the 2014-2015 school year. The schools were located in rural Ohio County, Kentucky. Children attended half-day sessions. Head Start and preschool students participated in this study. Both programs are integrated and overlap. Children move in and out of the Head Start Program because of the needs for enrichment or special needs support.

A total of 3,997 students are enrolled, preschool through 12th grade. There are six elementary schools, one middle

school, one high school, and one alternative school. Free and reduced lunches are received by 67% of the students. The vast majority of students are Caucasian. In the Pre-school and Head Start Programs, 2% of the children are English Language Learners, and 5% of English Language Learners are distributed district-wide, with Beaver Dam Elementary having the greatest percentage.

Ohio County School District is currently rated a "proficient school district." This district is currently ranked 82nd out of 159 districts in Kentucky. 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 those needing speech therapy.

Procedures:

Principals, teachers and instructional aides received intensive *Zoo-phonics* training and ongoing support in the methodology, techniques and curriculum. Teachers, aides, and school administrators agreed to use the *Zoo-phonics Program* with full fidelity. All teachers held Kentucky teaching credentials. Instructional aides were district certified.

Each classroom was supplied with a complete set of age-appropriate *Zoo-phonics* instructional materials and teaching aids. Mentoring through *Zoo-phonics* was available throughout the year.

Data were collected using alphabet tests from the *Zoo-phonics Basic Reading Assessment, 3rd Version (Z-BRA3)*. Prior to beginning the *Zoo-phonics Curriculum*, all Head Start and Preschool students were assessed. Students were then assessed in January as a Mid-Term assessment and then again at the end of the school year (late May). Tests included upper- and lowercase letter names, lowercase letter sounds, Alliterative Animal Names and Body Signals. The Mid-Term assessment was used to measure growth in alphabetic principles and to identify students who may have needed support and early intervention. At the end of the school year, the *Z-BRA3* was again administered including all four elements of lower- and uppercase letter information.

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 1st 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 Signals, 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 name that helps children master the sounds of the letters quickly: **a**llie alligator, **b**ubba bear, **c**atina 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 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 provides 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 SmartBoards. *The Zoo-phonics en español*, a Spanish sister program, is also available. 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, physical education, sensory-drama, science, social studies, cooking/nutrition. 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. 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.

"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).

"Zoo-phonics® is an amazing program which accelerates all students' learning. Most importantly, it helps our special needs and ELL students' progress at an amazing rate."
- Pam Evenson, Kindergarten Teacher, Study Participant - Quail Valley Elementary, CA

The Essences of Zoo-phonics

1. The pictorial *Animal Alphabets* (upper and lower-case) 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 graphemes and phonemes 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) daily.

Definitions

1. *The Head Start Program:* Head Start promotes the school readiness of young children from low-income families through agencies in their local community. Early Start and Head Start programs support the mental, social, and emotional development of children from birth to age 5. In addition to education services, programs provide children and their families with health, nutrition, social, and other services. Head Start is aware of the child’s need for social, emotional, physical and academic well-being and respects each child’s ethnic background and language (2015, <http://www.acf.hhs.gov/programs/ohs>).
2. *Preschool-Age Children:* In this study, children are ages 3 and 4 years of age.
3. *Alphabetic Knowledge:* Recognizing the lowercase and uppercase letters by shape, sound and name.
4. *Alphabetic Domain:* The Alphabetic Domain is defined as a combination of alphabet knowledge: lower- and uppercase letter shapes, sounds, letter names (in *Zoo-phonics*, Signals and Alliterative Animal Names are included) and beginning, medial, and ending sounds in words.
5. *Zoo-phonics Basic Reading Assessment, Version 3 (Z-BRA 3):* This assessment was created for *Zoo-phonics* research studies. It covers all aspects of phonemic awareness, alphabets, phonics, literacy (accuracy, efficiency and comprehension), etc.
6. *Baseline:* Also called Pre-Test. The *Z-BRA 3* is given at the beginning of the year to determine student alphabet, phonics, and word knowledge.
7. *Mid-Term Test:* The *Z-BRA3* was given mid-year during the month of January. It determines whether children have developed proficiency in alphabetic knowledge. It has helped determine whether children need academic intervention.
8. *Post-Test:* The *Z-BRA3* was given at the end of the year to determine growth in alphabetic knowledge.
8. *Social-Economic Status (SES):* This is the economic and ethnic make-up of participants in the study group.
9. *Merged Animal Alphabet:* *Zoo-phonics* has drawn the animal in the exact shape of the lowercase letters for a mnemonic affect (Ehri, et al, 1984). The capital letters contain the same animals for an associative affect between lower- and uppercase letters.
10. *Signals:* The animal-related body movements that connect the sounds and shapes of the *Zoo-phonics Animal Alphabets*.

Study One: Alphabet Knowledge of Three-Year-Old Head Start and Preschool Students

Participants:

In this study, 67 three-year-old children participated. There were 41 boys (62%) and 26 girls (38%). Ethnicity indicated that 93% were white, 7% were Latino, 0% were black. All children participated in the “free and reduced lunch” program, as most are considered low SES. A few students had special academic needs.

Methodology:

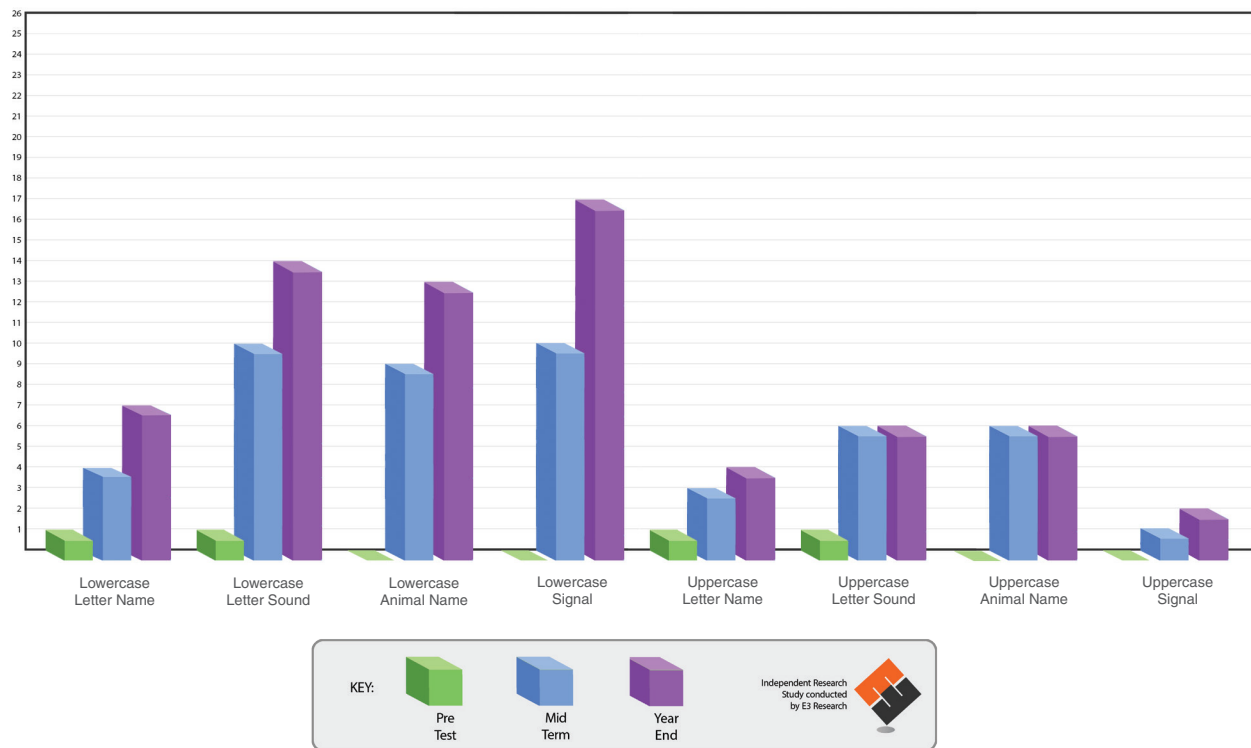
A cross-sectional, multi-case method was used to determine the efficacy of the *Zoo-phonics-Multisensory Language Arts Program* for Head Start/Preschool students in a specific demographic. The *Z-BRA-3* was used to assess alphabetic information (letter names, lower- and uppercase letter shapes, and sounds, Zoo-phonics Alliterative Animal Names and Signals) through three assessment periods, the Pre-Test, the Mid-Term Test (January) and the Year-End assessment. Students were shown plain lower- and uppercase letters as well as the *Zoo-phonics Merged Animal Lowercase and Merged Uppercase Letters* for each test session.

Findings:

Pre-Test mean scores demonstrated that three-year-olds knew one lowercase letter name and one uppercase letter name, but knew no other alphabetic information. By Mid-Term testing, mean scores showed that that three-year-old students had 49 points of letter information with an overall gain of 47 points primarily in lowercase letter information. By the end of the year, mean scores show that children gained 69 total points, with a gain of 20 points since the Mid-Term. The significance level for every category was reported at .000. This indicates that the scores in every category were not arrived at by chance.

Overall growth continued in the second half of the year. The use of Animal Letters and Body Movements (Signals) demonstrated its effectiveness by high scores in the Mid- and Post-Test sessions. Full mastery of lowercase letter shapes and letter sounds was not reached as expected. By looking at capital letters and letter names scores throughout the year, it is evident that capital letter and letter name information was taught during the year. It is possible that when capital letter and letter name instruction was included in the daily lessons (not included in the first half of the *Zoo-phonics* curriculum for preschoolers), the additional information may have interfered for the three-year-olds in this study.

Graph 1 – Alphabetic Knowledge of Three-Year-Old Head Start and Preschool Students



The Pre-Test demonstrated that three-year-old students had little alphabet knowledge. By January, three-year-old Head Start and Preschool students made strong gains, primarily in lowercase letter information because of the focus of the *Zoo-phonics Multisensory Language Arts Program*. By the end of the year, three-year-olds gained additional alphabetic information in all categories, but primarily in the area of lowercase letters.

Graph One illustrates that children also gained some letter name and capital letter information by Mid-Term Test and Post-Testing, suggesting that parents and/or teachers had included some capital letter and letter name instruction with the *Zoo-phonics* instruction. Children may also have gained this information inferentially because they see and hear it the environment. This unintended instruction may have interfered with full mastery of the lowercase letter shapes, sounds and Signals.

Study Two: A Comparison Study of the Alphabetic Knowledge of Three-Year-Old Girls vs. Boys

Participants and Methodology:

The participants and methodology in this Study is the same as found in Study One. This study analyzes the efficiency by which girls and boys, in comparison, learned alphabet information. Graph 2 demonstrates the comparative growth (Pre-Test to Post-Test) of three-year-old Head Star and Preschool students in the areas of lower- and uppercase letter names, sounds, the *Zoo-phonics* Alliterative Animal Names and Body Signals. Children were shown the *Zoo-phonics Merged Lowercase Letters* and *Merged Uppercase Letters* in all three test sessions.

Findings:

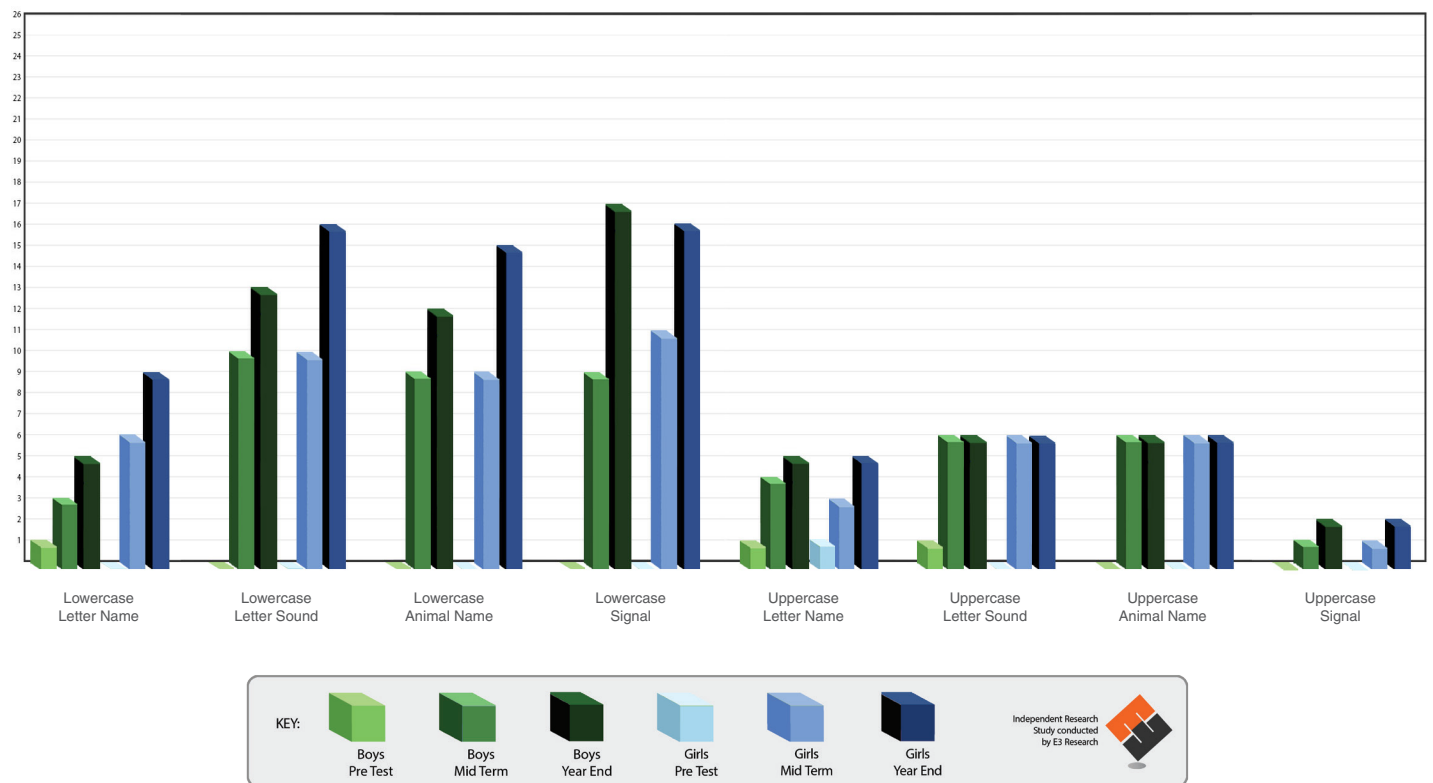
Pre-Test mean scores demonstrated that both boys and girls had little alphabetic knowledge. In the Pre-Test, boys only knew three letters from lower- and uppercase alphabets. By the Mid-Term test, boys had a total of 49 points, with a gain of 46 points. By the Post-Test, boys had a total of 66 points, gaining 20 points of letter

information, January to May. The significance level for every category was reported at .000. This indicates that the scores in every category were not arrived at by chance.

In the Pre-Test, mean scores indicate that girls knew no lower- and uppercase letter information. By the Mid-Term Test, girls had a gain of 55 points, primarily in lowercase letter information. By the Post-Test, girls had a total of 88 points, gaining 29 points of letter information, January to May, slightly out-performing boys. However, there is no statistical difference between the genders.

Mean scores of both girls and boys demonstrated the effectiveness of the *Zoo-phonics Animal Letter Alphabets*, the connectivity and physicality of the Alliterative Animal Names and Body Signals, as well as the playful and physical activities throughout the curriculum.

Graph 2 - A Comparison Study of 3 Year Old Boys and Girls



Pre-Test mean scores demonstrate that students had little alphabetic knowledge. In the Mid-Term Test, both genders made significant gains, with girls and boys scoring comparably except in the area of lower- and uppercase letter names where girls had a slight edge. By the end of the year, three-year-old girls knew on average +16/26 of the lowercase letter shapes, sounds and Signals, followed closely by boys. The findings for each alphabetic skill showed significant growth throughout the year. With a p value set at .000 for each statistic, it is clear that these students gained alphabetic knowledge through this multisensory approach.

Study Three: Alphabetic Knowledge of Four-Year-Old Head Start and Preschool Students

Participants:

In this study, 114 four-year-old students participated, with 70 (61%) boys, and 44 (39%) girls, 102 (90%) were white, 12 (10%) were Latino, and 0 (0%) were black. All children participated in the “free and reduced lunch” program because most were considered low SES. Some non-SES preschool students participated in this Program because they had special academic needs.

Methodology:

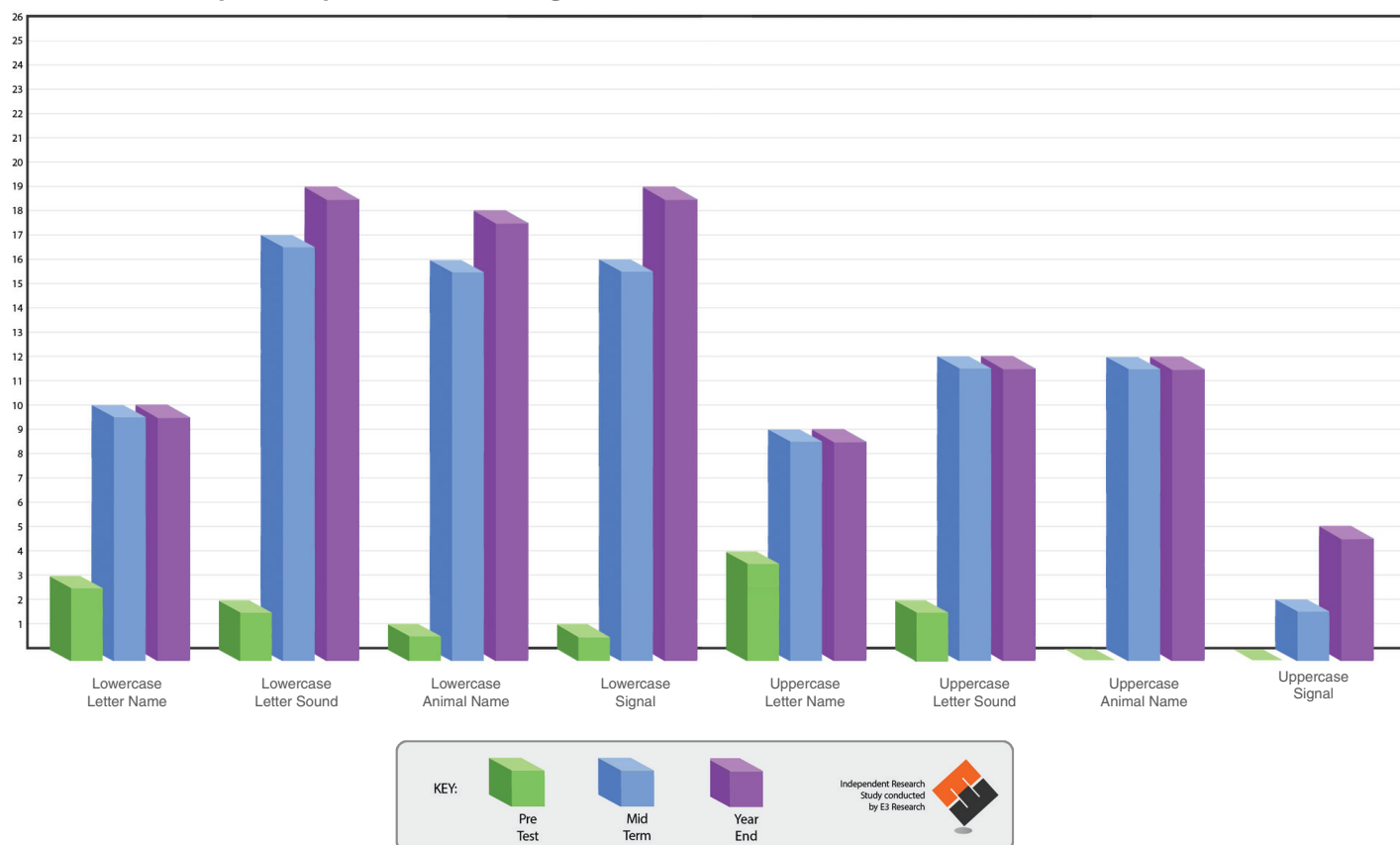
A cross-sectional, multi-case method was used to determine the efficacy of the *Zoo-phonics Multisensory Language Arts Program* for Head Start and Preschool students in a specific demographic. *The Z-BRA3* was used to assess alphabetic information through three assessment periods, the Pre-Test, Mid-Term Test (January) and Year-End (May) assessments. Students were shown the *Zoo-phonics Merged Animal Lowercase and Uppercase Letters* for all test sessions.

Findings:

Pre-Test mean scores show that the four-year-olds in this study had an overall alphabetic knowledge of thirteen points in all skill categories. Mid-Term mean scores showed that these students had gained an overall alphabetic knowledge of 94 points, confirming an alphabetic gain of 81 points. Year-End mean scores show four-year-olds had 104 points, indicating only a 10 point gain from January to May. Most alphabetic gains were made from the Pre-Test to the Mid-Term Test because of the methodology of the *Zoo-phonics Program*. The significance level for every category was reported at .000. This indicates that the scores in every category were not arrived at by chance.

Although gains were strong, the four-year-old students in this study did not have full mastery of lowercase letter information, as was expected. It is possible that mastery of alphabetic information may have been affected by the inclusion of capital letter and letter name instruction, which may have interfered with full proficiency.

Graph 3 - Alphabetic Knowledge of Four-Year-Old Head Start and Preschool Students



Mean scores indicate that four-year-old students had limited alphabetic knowledge in the Pre-Test. Significant gains were made by all students by January, primarily in lowercase letter information. By the end of the year, four-year-old students demonstrated significant growth in all alphabet skills, especially lowercase shapes and letter sounds. Students also showed gains in both capital letters and letter names by the end of the year, suggesting that parents or teachers may have included this teaching in addition to the *Zoo-phonics* lowercase instruction. Children may also have learned it inferentially through environmental print. This non-intended instruction may have slightly interfered with lowercase mastery, although for four-year-olds, the visual impact and physicality of the *Zoo-phonics Lowercase Animal Alphabet* and curriculum may have offset most interference, as scores were still significantly high.

Study Four: A Comparison of Alphabet Knowledge of Four-Year-Old Girls vs. Boys Attending Head Start and Preschool

Participants and Methodology:

The participants and methodology are the same as is found in Study Three.

Findings:

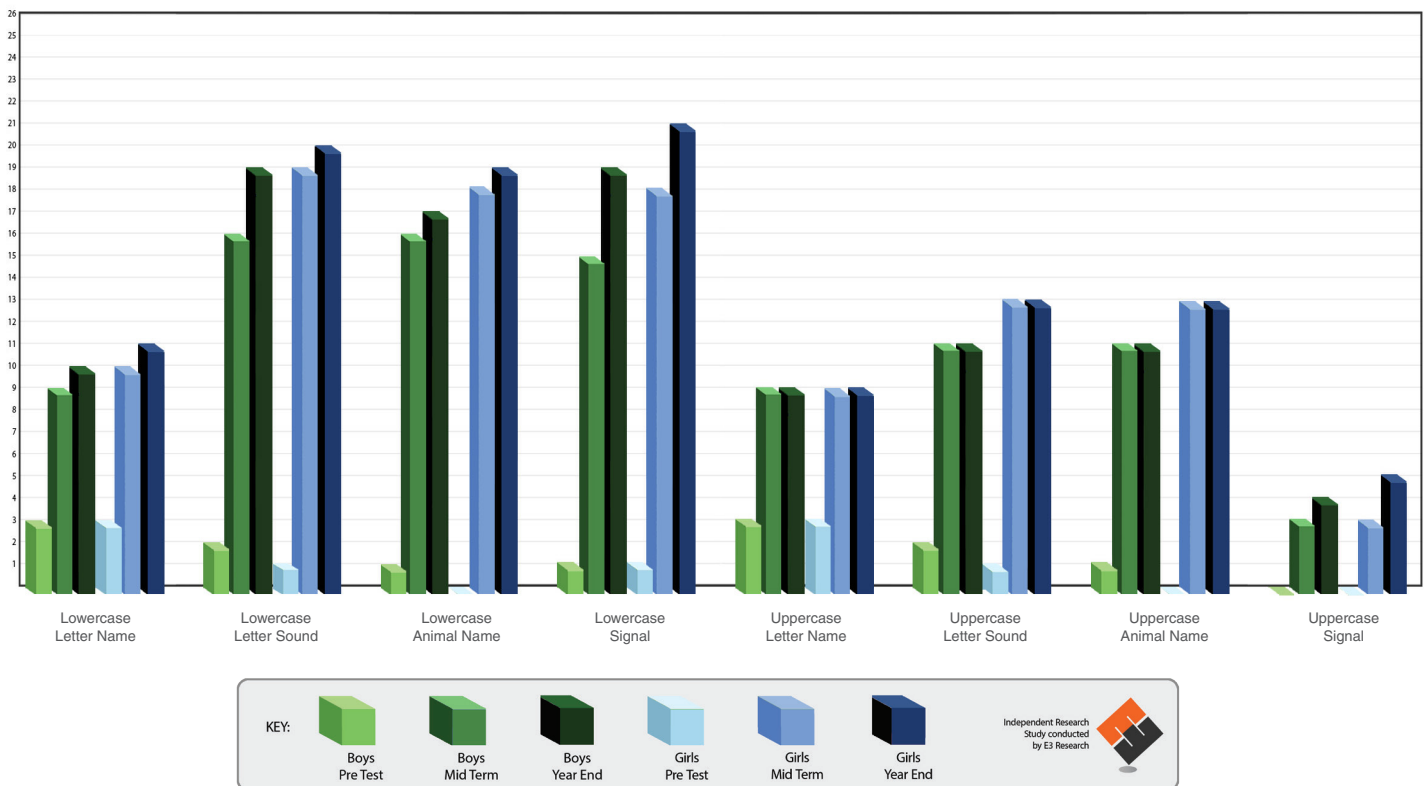
Pre-Test mean scores showed that boys had an overall alphabetic knowledge of 13 points in eight skill categories. Mid-Term mean scores show that boys had 90 points of alphabetic information, indicating a 77-point gain from the beginning of the year. Year-End mean scores showed that boys had 100 points of alphabetic information, gaining 10 points from January to May and 87 points from the beginning of the year. The significance level for every category was reported at .000. This indicates that the scores in every category were not arrived at by chance.

Pre-Test mean scores demonstrated that girls had overall alphabetic knowledge of 9 points. By the Mid-Term test, girls had an overall alphabetic knowledge of 103 points,

confirming an alphabetic gain of 94 points. Year-End mean scores showed that girls had 111 points of alphabetic information for a 17-point gain from January to May and an overall gain of 102 points from the Pre-Test to Year-End. Girls outscored boys by 11 points spread over 8 categories (an average of 1.4 letter information per category).

By the end of the school year, there was no significant difference in the performance levels of four-year-old boys and girls in the 8 alphabetic categories. It is evident in the data that the strongest growth occurred in lowercase letter shapes, sounds, Alliterative Animal Names and Body Signals. Students also grew in the area of capital letters and letter names, although not at the same pace as lowercase alphabet information. Consistent with the *Zoo-phonics Program's* design, uppercase letters and letter names are introduced only after lowercase letter shapes and sounds are mastered.

Graph 4 - A Comparison of Alphabetic Knowledge of Four-Year-Old Girls vs. Boys



Pre-Test, Mid-Term Test and Post-Test mean scores show no statistical difference in alphabetic knowledge of four-year-old boys in comparison to four-year-old girls in the area of lower- and uppercase letter names, sounds, Alliterative Animal Names and Body Signals, although girls showed a slight advantage.

High scores in the four central components of the *Zoo-phonics Animal Alphabet* (pictorial mnemonic lowercase letter shapes and letter sounds, alliterative animal names, and the Signals) were seen consistently for both girls and boys. These key components transform abstract letter information into concrete, accessible information for emergent learners.

Study Five: A Comparison of Alphabet Knowledge of Three- and Four-Year-Old Head Start Students

Participants and Methodology:

See participant information in Studies 1 and 4. The purpose of this study is to compare alphabetic knowledge of three-year-old and four-year-old Head Start and Preschool children, as well as to determine the efficacy of teaching the lowercase alphabet to very young children through a multisensory approach.

Findings:

Pre-Test mean scores demonstrated that three-year-old children knew one lowercase letter name and one uppercase letter name but knew no other alphabetic information. By the Mid-Term, mean scores showed that three-year-old students had gained 47 points of letter information with an overall score of 49 points in eight categories. The significance level for every category was reported at .000. This indicates that the scores in every category were not arrived at by chance.

Pre-Test mean scores show that four-year-old children had an overall alphabetic knowledge of thirteen points in all skill categories. Mid-Term Test mean scores showed that students had an overall alphabetic knowledge of 94 points, confirming an alphabetic gain of 81 points between the two testing periods. End-of-the-year mean scores show that four-year-olds had 104 points, showing a 10-point gain from January to May. Most alphabetic gains were made from the Pre-Test to the Mid-Term Test, demonstrating how efficiently children learn alphabetic knowledge through a multisensory language arts program.

Although both groups grew significantly, the additional year of developmental maturation and experience for four-year-olds had a strong influence on learning. By the end of the school year, both three- and four-year-olds showed significant growth in all areas of alphabetic principles taught by the *Zoo-phonics Multisensory Language Arts Program*. Predictably, four-year-olds out-performed three-year-olds in all categories with a 45 point difference. This is true of both boys and girls in the study.

It is important to note that mean scores showed that the Head Start and Preschool children in this study did not have full mastery of lowercase letter information as was expected, even for the four-year-olds. It is possible that mastery of lowercase information may have been affected by the inclusion of some capital letter and letter name instruction, which is not the focus of the *Zoo-phonics Preschool Curriculum*. Capital letters and letter names are included at the end of the *Zoo-phonics Preschool Curriculum* as children are getting ready for kindergarten. Uppercase letter shapes, sounds and names are taught, but only when children have proficiency in lowercase shapes and sounds. Zoo-phonics states that lowercase shapes and sounds are used 95% of the time in text, so should be taught first. Teachers were instructed not to include these skills for their three-year-olds. This appears to have affected three-year-olds more than it did four-year-olds, although there was also a possible slight affect with four-year-olds. Notably, both three- and four-year-old students still showed significant gains in lowercase alphabetic knowledge.

“We have seen our students learn the alphabet and be able to use it so all kids can be part of the literacy club (able to read!). How quickly they are learning! It is phenomenal.”

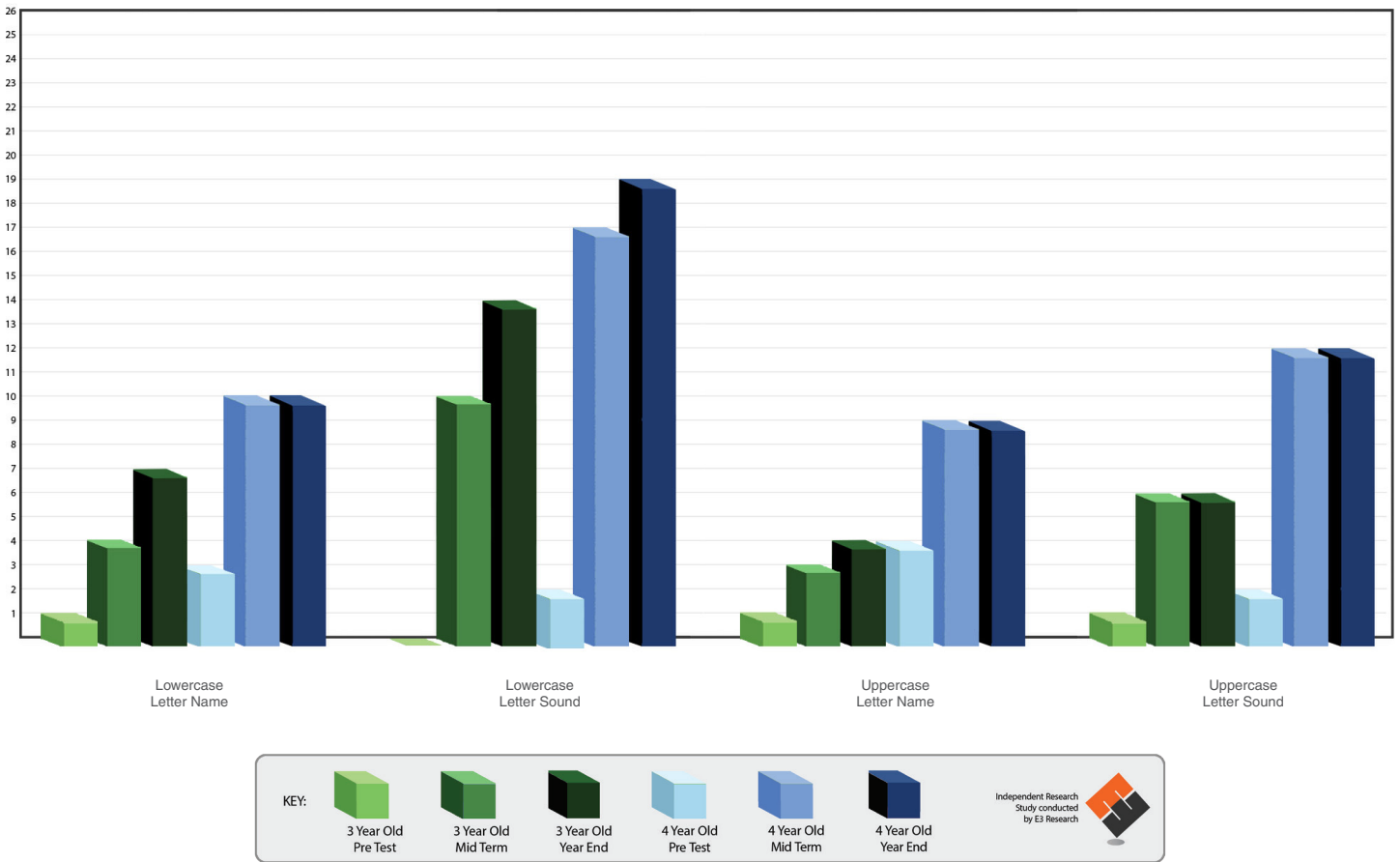
- Quail Valley Elementary Kindergarten Teaching Team, Study Participants - Quail Valley Elementary, CA

“The increase in phonologic knowledge has been amazing since the implementation of Zoo-phonics® in our Preschool/Head Start classrooms. Even our youngest students are able to Signal and sound the entire alphabet after a few weeks in the classroom.”

- Jana Allen, Director, Head Start, Ohio School District, Kentucky

“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.”

Graph 5 – A Comparison of Alphabetic Knowledge of Three- vs. Four-Year-Old Head Start and Preschool Students



Conclusions:

Data shown in Graph Five demonstrate the academic growth of three- and four-year-old Head Start and Preschool students in the areas of lower- and uppercase letter shapes, letter names, sounds, Alliterative Animal Names and Body Signals. Both ages grew significantly, although, as to be expected, four-year-olds outperformed three-year-olds due to developmental maturation and experience. This study shows that all children, regardless of gender, ability, economics, or ethnic groups, gained significant alphabet knowledge through the *Zoo-phonics Multisensory Language Arts Program* that prepared them for the next year.

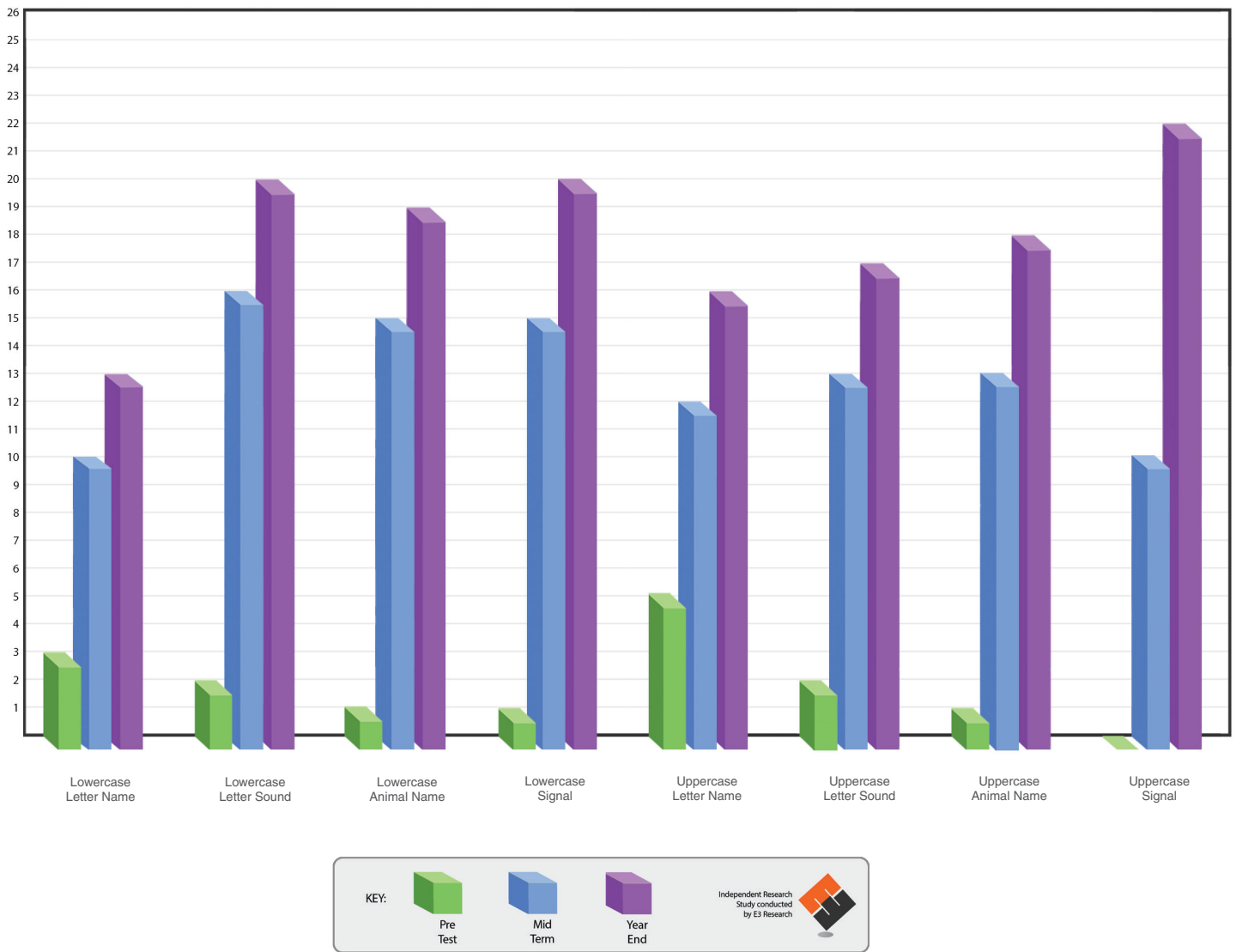
“Research demonstrates that if toddlers and preschoolers have a solid foundation of alphabetic skills and rich vocabulary development, they will begin the language arts process earlier and have more academic success and confidence in school.”

- 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).

Graph 6 – Proficiency in Each Alphabetic Category During the School Year



The graphs show the level of proficiency in each alphabetic category during the school year. Significant growth occurred in both lower- and uppercase categories with strong early literacy learning for both three- and four-year-olds. A comparison of four-year-old boys and girls show that they learn alphabetic principles at essentially the same rate through *Zoo-phonics*, if uppercase and letter name information is not included in the instruction.

Conclusions:

The *Zoo-phonics Multisensory Language Arts Program* has been shown to be effective in teaching alphabetic principles to three- and four-year-old students. Both ages benefitted from learning through the pictorial mnemonics, the Alliterative Animal Names (that teach the sounds) and the body movements (through the Signals and curriculum activities) and can gain significant alphabet knowledge prior to entering kindergarten, fully preparing them for the academic expectations of kindergarten.

“Boys are not...sensitive to touch or pain, which is why their play may be a bit rough, but touch is a major source of information. The teacher who utilizes this information will offer a learning environment that provides...visual stimulation, prompts, cues, manipulative learning opportunities... into hands-on experiences.”

- *Teaching the Male Brain, How Boys Think, Feel, and Learn in School* (James, 2007, p. 59).

Year-End Summary:

This study was conducted in the Ohio County School District in rural Kentucky during the 2014 - 2015 school year. The data for these studies were gathered from 226 children enrolled in Head Start and Preschool Programs located in six centers. Three- and four-year-old boys and girls were taught early literacy skills using the *Zoo-phonics Multisensory Language Arts Program* during its introductory year. Student assessments were conducted in a Pre-Test, Mid-Term Test, Post-Test model in order to assess student growth throughout the school year. Data in the study were analyzed using *Z-BRA3* in order to determine the efficacy of the *Zoo-phonics Program* in a low economic Head Start and Preschool setting.

Gains in Alphabetic Principles - Lowercase:

	Name	Sound	Animal	Signal
Pre-Test to Mid-Term:	7	14	14	14
Mid-Term to Year-End:	3	4	5	5
Pre-Test to Year-End:	10	18	19	19

For each category and between each testing term, Head Start and Preschool students showed significant gains in all alphabetic principles, with the focus only on lowercase letter shapes, sounds, Alliterative Animal Names, and Signals taught with the *Zoo-phonics Animal Alphabet*. The scores for both three-year-old and four-year-old students are included in the analysis. As predicted, four-year-old students showed stronger growth than three-

year-olds in all categories. The strongest gains were made during the first half of the year because mastery of most of the letter information (lowercase letter shapes, sounds, alliterative animal names and Signals) occurred at this time.

Growth continued at a significant rate through the end of the school year. The Pre-Test to Year-End mean gains indicated that students, overall, learned 10 lowercase letter names (not encouraged in the *Zoo-phonics Preschool Curriculum*) and an average of 19 letter shapes and sounds (the emphasis of the *Zoo-phonics Preschool Curriculum*). Learning was supported by the *Lowercase Animal Alphabet*, the Alliterative Animal Names, and the Body Signals, as is evidence by the data. This strongly indicates that the *Zoo-phonics Multisensory Language Arts Program* approach is effective in teaching Head Start and Preschool children alphabetic principles.

Gains in Alphabetic Principles - Uppercase:

	Name	Sound	Animal	Signal
Pre-Test to Mid-Term:	7	11	12	10
Mid-Term to Year-End:	4	4	4	12
Pre-Test to Year-End:	11	15	16	22

It is important to note that each category of the study showed statistically significant gains between testing sessions and over the course of the school year. The significance level for every category was reported at .000. This indicates that the scores in every category were not arrived at by chance.

From the Preschool Director: "I have many certifications, taught for 17 years, and was a principal at a small rural pre-k-6th grade school for 13 years. The last two years I have been an Ohio School District employee over multiple programs including preschool. However, this isn't the way I began my school career. When I was a young boy there was no preschool or kindergarten where I lived. The year before I began first grade, I passed a sixth grade math test, but years later as I was exiting seventh grade I scored at second grade reading level in my remedial reading class.

Numbers always made sense to me but from the time I was little, I couldn't hear the endings of words. They simply drifted off. This made reading, spelling, and communicating very difficult. With strong family and teacher support, I was able to overcome, adapt and succeed in my education.

Every day I get to observe children in our Head Start and preschool classrooms. I love watching them get up and move, making the sounds and Signals of the Zoo-phonics Program.

It is exciting to watch our Head Start and preschool students make such great gains with Zoo-phonics. It is also a little painful for me in that I wonder what it would have been like if I could have had Zoo-phonics as a child?

I am thankful that I am allowed to go to work every morning to help children. I would not change one single thing about my career, but it does give me a passion to help students to make letter connections that I never made. When I can say, "I wish I had this Program when I was little," I know I have been successful as an educator."

- Jeff Martin, Director, Preschool, & Gifted Program, Ohio School District, Kentucky



An Independent Study Conducted by E3 Research

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