Comparing a Teacher-Led Program to an Independent Technology Based Program in

Improving Early Literacy Skills

Angeline E. Peck

Eastern Illinois University

Abstract

This action research study was conducted to discover what the effects are on kindergarteners in the area of early literacy development when using a research based, teacher-led program called Leading to Reading (LTR) in comparison to technology based programs as intervention activities. This study aimed to compare teacher-led instruction with computer assisted instruction and its effect on early literacy skills in the elementary classroom. Participants for this study included eight female and two male students. Ethnicity of the group include four Caucasian, three Multiracial, two African American and one Hispanic student (n=10). Students participated in activities appropriate for the subgroup placement; activities include computer programs with a focus on early literacy skills, small group activities and projects focused on short vowel word work to support early literacy growth. Results indicate each method of teaching was significantly successful on its own, however combining the two may lead to optimal student achievement.

Comparing a Teacher-Led Program to an Independent Technology Based Program in

Improving Early Literacy Skills

Currently teaching in central Illinois, I am working on a Master's in Elementary

Education from Eastern Illinois University. I have taught Kindergarten, Third grade and

First grade in my six years of educating; a majority of these years I have been teaching

Kindergarten. Teaching to meet each student's needs is essential to prepare them with

important skills. Finding programs and resources to achieve this is a priority.

The students I work with come from low socioeconomic backgrounds, and many

struggle upon entering school with readiness skills and foundational skills. The current class

I teach consists of 23 kindergarten students, ages five to six years old. Ten Caucasian

students, seven African American students, one Hispanic student and five Multiracial

children make up 23 total students; of these, nine are male and 14 are female students.

Several have little to no preschool experience. Early literacy skills or pre-literacy

skills are developed in preschools or with parent-child interactions. Many may not have

opportunities or resources at home to work with and have difficulty with letter naming or

sound activities when school age. This creates strain when attempting to put together sounds

and read words or create words. Literacy skills or skills such as decoding, oral reading

fluency, reading comprehension, writing, and spelling are essential. These skills are

necessary and apparent within all literacy practices, and they are readily distinguished as

being necessary elements of literacy (NELP, 2000).

The purpose of this research is to discover what the effects are on kindergarteners in the area of early literacy development when using a research based, teacher-led program called Leading to Reading (LTR) in comparison to technology based programs as intervention activities. This study aimed to compare teacher-led instruction with computer assisted instruction and its effect on early literacy skills in the elementary classroom. The teacher-led approach (*Leading to Reading*) to teach phonics is compared with the use of computer based programs to teach early phonics skills. The approach that led to better student outcomes was identified. Studies on early phonemic awareness show how important these skills are for early reading skill development. If an area of early skill development is underdeveloped, a child may struggle as they grow as a learner.

This study aims to discover: What approach led to better early literacy development in Kindergarteners: a research based, teacher led program (LTR) or technology based programs where students work independently? Which method of teaching shows greater student growth in the area of phonics and early literacy development?

Literature Review

Establishing emergent literacy skills is essential for later development in reading and comprehension. Early literacy abilities learned by children ages 0-5 are a "precursor" for later abilities in reading (NELP, 2000). Such skills as alphabet knowledge, phonemic awareness, sequencing of letters, words or objects and some writing skills are readiness skills needed to be a successful reader (NELP, 2002). The National Reading Panel (2000) also acknowledges the importance of teaching phonemic awareness, phonics, fluency and comprehension skills to young learners. The NRP has devoted itself to finding the best

instructional practices to share with teachers and parents. Teaching a specific skill may not have a precise method that is considered "best", especially when children learn at different rates and may need to be taught differently than other students (IRA, 2000). The International Reading Panel (2000) encourages a "balanced approach" to teach reading skills so that other important skills are not ignored. This same report notes a strong correlation between phonemic awareness and learning to read; this area of early literacy should not be ignored.

Early Literacy Importance

There are many ways to teach children literacy skills. Parents and teachers are effective in teaching primary literacy skills (IRA, 2000). Early introductions to foundational skills happen at home between children and parents with story time, word or letter games and early writing exposure (IRA, 2000). Unfortunately, many low income families do not have resources or the experiences themselves to provide opportunities of early literacy exposure to their children. Numerous children enter school with no prior readiness skills (Wright, Diener & Kay, 2000). Finding ways to teach to all students, regardless of prior knowledge, can be a challenge in kindergarten and preschools. Kindergarten students need to be exposed to a variety of literacy activities and given opportunity for early literacy growth.

Copious studies describe the importance of early reading skills or readiness skills for young learners. Attainment of these skills in primary stages of learning can positively affect reading and comprehension later in a child's education (Segers & Verhoeven, 2005). Eleven indicators identified as important skills to learn are: alphabet knowledge, phonological

awareness, rapid automatic naming (RAN), RAN with colors or words, writing, phonological memory, concepts of print, print knowledge, reading readiness, oral language and visual processing (NELP, 2002). Six of these skills, if taught to young learners, are noted as predicative to later literacy ability; these are alphabet knowledge, phonological awareness, rapid automatic naming (RAN), RAN with colors or words, writing and phonological memory (NELP, 2002). Teaching these skills to preschooler and kindergarten students will help make young learners more successful.

Phonological Awareness and Reading

A repeated skill linked to becoming successful through stages of literacy is phonological awareness. Phonological awareness includes larger units of sound such as syllables, onsets, and rimes; to comprehend spoken language (IRA, 2000). Phonological awareness is the ability to detect, manipulate, or analyze aspects of spoken language independent of meaning (NELP, 2002). An understanding of this skill at an early age has been linked to reading achievement in young learners. Early reading acquisition leads to more grade or age appropriate readers as they progress (IRA, 2000).

Many studies compare methods of teaching phonological awareness to preschool and kindergarten students. In most studies, control groups are engaged in a teacher-led, daily routine with a balanced approach to teaching literacy skills. With a stern significance placed on the development of early literacy skills, approaches are examined to find a best fit. There is no "right" answer to the facilitation of early reading achievement, though instructional strategies linked with increases in early literacy growth include: a literacy-rich classroom containing high-quality literacy centers, clear instruction shadowed by practice in areas of

phonics, phonemic awareness, fluency, vocabulary and comprehension and use of authentic

children's texts for literacy instruction. (Tracey and Young, 2007)

Computer Assisted Instruction (CAI) and Integrated Learning Systems (ILS)

Technology use is a high priority in today's world. Utilizing this as a tool to assist in

the learning process may make major differences in the learning process for our young

learners. Computer Assisted Instruction (CAI) should not replace books or teacher

instruction, but add to the learning process. Children have more access to computers, they

learn better with sounds and pictures and the appropriate use of suitable programs could

make a significant difference. Using computer programs to extend or add to the teaching

and learning process would be beneficial to students. (Vernadakis, Avgerinos, Tsitskari &

Zachopoulou, 2005)

Many studies conducted sought to conclude if the use of programs helped the early

literacy development of young learners. Cassady and Smith (2003) stated that using an

Integrated Learning System (ILS) with a focus on reading had "measurable and meaningful

effects on student growth", particularly in the area of phonological awareness. Use of

technology resources can give teachers a variety of resources to use with each learner and

support the teacher-led materials.

Specific programs such as *Waterford Early Reading Program (*WERP*)* target and

promote early literacy growth. Positive effects and statistically substantial results were

linked with the use of the WERP (Tracey and Young, 2007). Another look at WERP in

regard to early literacy skills found that students thrived from the program with concepts of

print, rhyming, blending and segmenting words (Macaruso & Walker 2008). Waterford is

noted as teacher friendly and easy to integrate into the classroom; modules could be easily matched up with classroom goals (Cassaday & Smith, 2003). Programs similar to this are appropriate supplemental aid to reading instruction. Computers are capable of presenting feedback, use colorful images and allow a child to work at their own pace with the materials while maintaining interest and motivation (Segers & Verhoeven, 2005).

Technology and the Classroom

With a shift to higher standards for our youngest learners, teachers need assistance to build a strong foundation for each learner. Low-performing kindergarteners have shown to benefit from CAI and ILS when practice was meaningful and intensive (Macaruso & Rodman, 2011). Wild (2009) encourages CAI as an effective strategy to practice skills that are delivered to students in a systematic approach in the classroom. CAI has shown useful for support in early literacy skills such as phonological awareness, phonics skills, word-attack strategies and comprehension (Macaruso, Hook & McCabe, 2006). Interventions can be effective in preventing reading difficulties for at-risk kindergarteners or low SES. Each should include elements of phonemic awareness, appropriate group size and intensity of time on task. Evidence supports implementing reading interventions for low SES (Cavabaugh, Kim, Wanxek & Vaughn, 2004).

The National Reading Panel (2000) acknowledges the teacher as a dynamic role in conveying reading readiness skills and research needs to be done to understand the prospective of computers to assist in reading instruction. Integrating technology into the classroom to aid instruction or enhance skills could prove to positively affect reading readiness in early learners. The computer piece of an intervention for early literacy skills

would support students' needs and offer information in multiple ways through text, sound, rich images and animation. Motivational needs are also met with features such as immediate feedback, sense of control, various modalities of work offered and interactivity. Incorporating technology into early literacy education is promising, though it should be paired with teacher - led activities and used as a response to student needs. (Mioduser, Tur-Kaspa & Leitner, 2000).

Methods

Participants

The subject population targeted was from a group of 23 kindergarten students, ages five to six years old. Due to students moving in and out of our school and district, the above demographics have changed from that noted in the initial proposal. The intended number of students included in the study will be 10 of the 23 students. Participants in this study were selected from a kindergarten class roster. At the beginning of the academic year, as part of the regular school practice, all students in the class were pretested using the LTR pretest criteria (appendix A). From the results of this pre-test, there were ten students who knew all alphabet letter sounds. These ten students are the participants for this study. Of these ten, eight were female and two were male; four Caucasian, three Multiracial, two African American and one Hispanic. The "Fall" results are displayed in an Excel chart (Appendix B).

Parents of the students were notified of the research process, what the program provided and support offered for their children via a letter (appendix C). Parents are ensured that results are private; no names or any other means of identification of their child were

used. The research conducted used pseudonyms to identify students to refrain from

identifying any child.

Materials and Procedures

The study was conducted in an elementary school setting, using a significantly

effective research based program called Leading to Reading (LTR). As mentioned before,

the participants for this study were identified based on a pre-test that is administered as part

of the regular school practice. The results of this pre-test also identify the specific skills that

these students need more help with. Based on the specific skill identified, intervention

strategies will be planned and implemented for each of these ten participants. Students are

expected to show mastery in each skill before progressing to the next skill group. Weekly

progress monitoring assessments were conducted to ensure individual understanding and

progress. The assessment scores were recorded on the LTR data sheet (appendix D).

Technology assisted programs were utilized for a subgroup to compare growth of the skill/s

in focus. A daily 30 minute block was devoted to this during the regular school day. Weekly

homework was sent home as this is an essential part of the LTR program. The study was

conducted for a length of six weeks.

The study group was divided into two subgroups: teacher led instruction and

technology assisted instruction. For the duration of this study, one group practiced the target

skill in a classroom setting with a teacher delivering instruction (T group in data forms).

Uses of paper/pencil materials were utilized; activities, games, projects and students

interacting with one another was the source of practice. Each time the group met the target

words were read from "flash cards" and identified the vowel for the week (example: "cat";

/a/ is short a, in the middle of the word). The duration of the time was spent on an activity, game or project. For weeks one through five, one vowel (short sound) was the focus of our practice, reading and writing. The sixth week of the study utilized all vowels as a review.

The other group will practice the target skill in a classroom setting with access to computers to deliver instruction (C group in data forms). An online public site (no membership or purchase necessary) called "Literactive" was retrieved for students to practice and interact with a focus on the same skill as the first subgroup. This group also opened each meeting with a "flash card read" of the same target words. They too identified the vowel and isolated the sound. These students were then given opportunity to use the Literactive program to practice creating CVC words, initial sound identification, vowel pairs (same short vowel sound), and medial and final sound identification. All of the skills utilized their ability to decode words, use knowledge about vowels in words and be successful with reading words in isolation.

Both subgroups received the same weekly homework, weekly progress monitoring and pre/posttest design. Each subject involved in the study was pre tested to ensure their fit to the skill group. Each subject received weekly homework with an expectation that an adult at home works at least three nights a week with them. Subjects participating had a weekly assessment to gather data on individual progress. To collect this individual data, students were to read 10 preselected words from the list of words that week. The data collected shows the correct number of words read. Each participant also had five, 30 minute sessions at school with practice on the specified skill; the only difference was the mode of delivery of that practice.

LTR is a program all students are being placed in at our school. The technology piece is being added for purposes of this research study. Once the six week study was complete, the non-technology subgroup had an equal opportunity to access the computer assisted programs as well.

Results

The outcomes of this study were identified and considered for the evaluation of comparing two types of teaching approaches; computer-based and teacher-based. At the end of each week, all ten students were progress monitored.
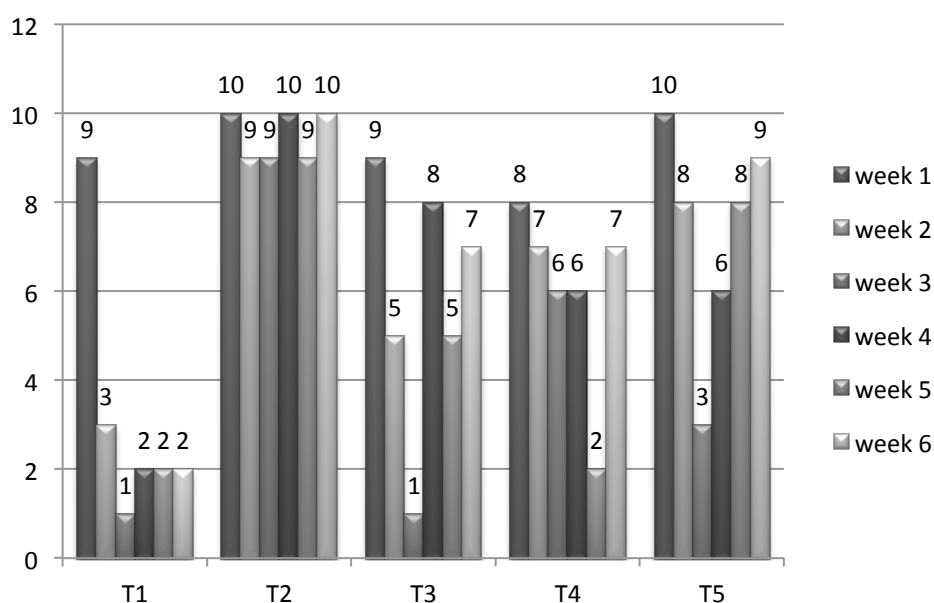
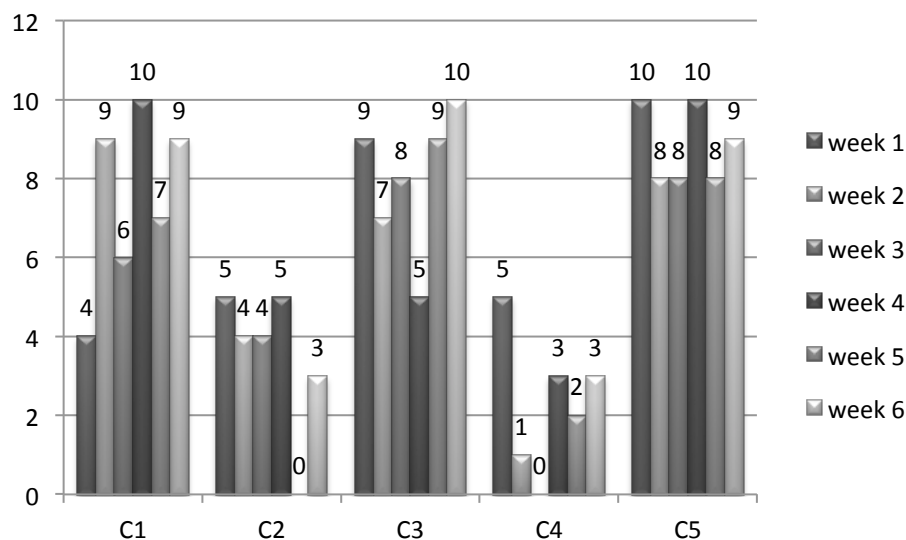*Figure 1.* Teacher-led group progress monitored data

In Figure 1, the students were taught in a classroom setting with opportunity to work in a small group, with partners, independently and as a whole group. The focus for week one through five was on a different short vowel; week six was a review of all vowels. The data points noted are the total of correctly read words out of 10. Each student is identified with a

"T" for Teacher-led; T1 scored continuously low after the first week in the program. T2

maintained 90-100% scores each week, T3 and T5 performed similarly and T4 stayed

between 60-80% each week with one exception.

Teacher-led Average %
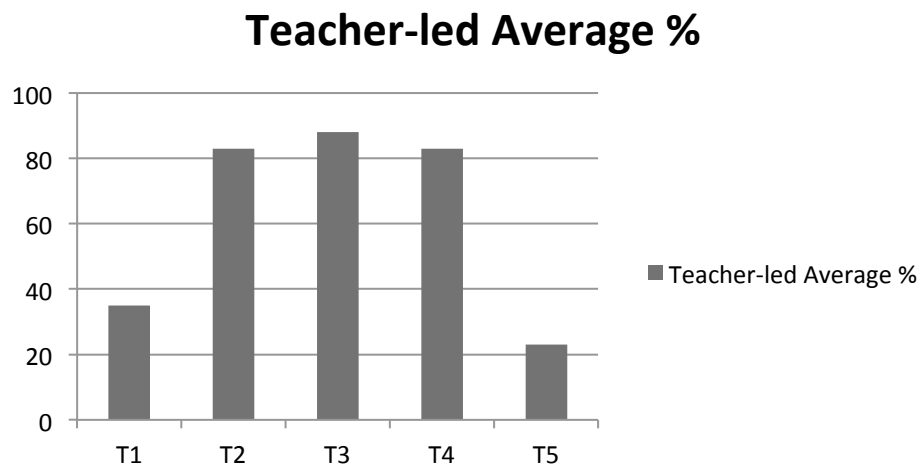
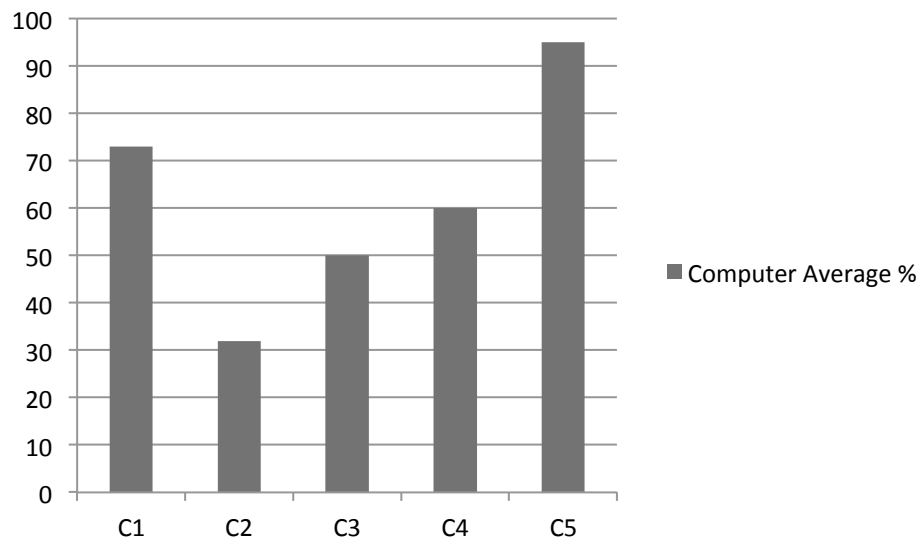*Figure 2*. Teacher-led student averages of data

Each student involved in the teacher-led subgroup assessed weekly. A total of 60

possible points was considered and the averages displayed in Figure 4 demonstrate the

participants overall performance with short vowel word identification. Participants T2, T3,

and T4 achieved over 80% efficiency with the skill, while T1 and T5 remain below 40%.

Figure 3. Computer-led group progress monitored data

Figure 3 students were working with word concepts on the computer. Aside from a daily review of the target word list, each student worked on their own computer with no collaboration. The data points noted are the total of correctly read words out of 10. Participants in this group are represented with "C" for Computer assisted group; C1 and C3 display similar achievement, maintaining most scores above 70%; C2 and C4 perform below 50% each week. C5 demonstrated an understanding of the skill work assessing at or above 80% each week.

Figure 4. Computer-assisted student averages of data

All members of the computer assisted subgroup scores were averaged, too. Figure 4 reveals the participants inclusive performance with short vowel word identification. C2 averaged at 32%, C3 at 50%, C4 at 60%, C1 at 73% and C5 at 95%; these participants seem to stair step each other in average scores.
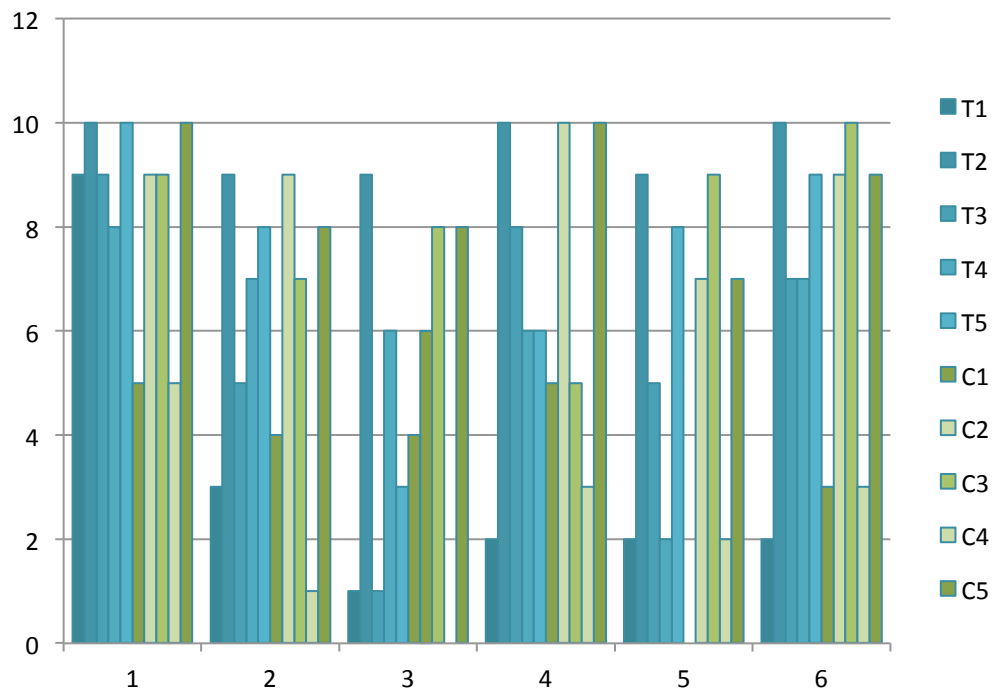
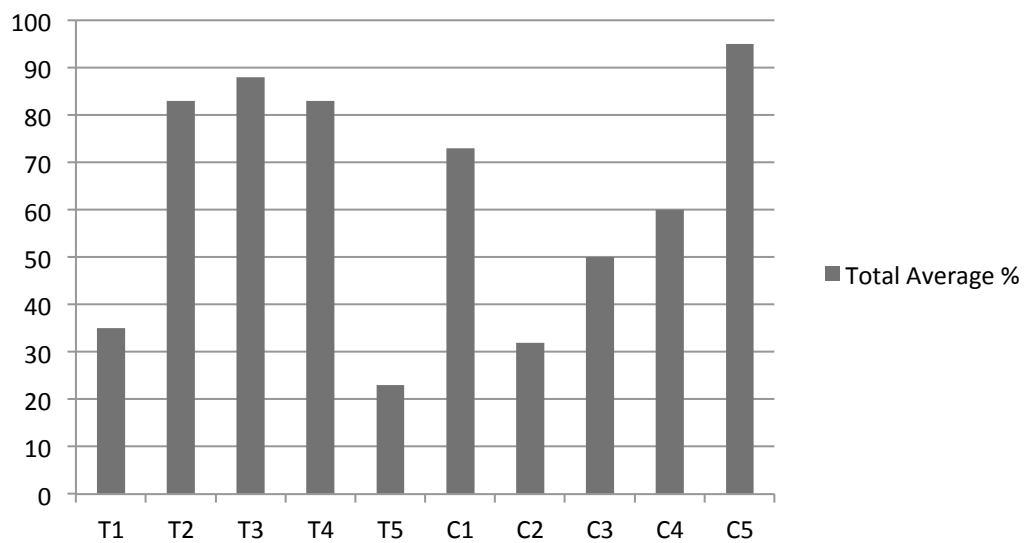*Figure 5.* Teacher-led and Computer-led progress monitor data

Figure 6. Teacher-led and Computer-assisted average performance data

Figure 5 and Figure 6 are comparisons of the two groups each of the six weeks and their averages. The blue data bars identify the teacher-led group. The green data bars indicate the computer-based group in Figure 5. Since this study attempts to identify the method of teaching that produces greater results, the side by side comparison is useful to visualize weekly data produced from students in each subgroup and each student's average performance.

Table 1

Teacher-led and Computer-assisted student pre and post test scores

Student	Short vowel pretest	Short vowel posttest
T1	0	10
T2	3	7
T3	7	10
T4	0	10
T5	0	8
C1	0	10
C2	0	8
C3	1	10
C4	6	6
C5	0	10

Table 1 displays each pre-test and post-test data per participant in the study. According to LTR criteria, students must have 80% accuracy to move on to the next skill group. A majority of students did meet this goal and move on to the next skill group. One

form each subgroup did not meet that criteria and will then repeat the short vowel skill
group.

Findings and Implications

The quantitative data collected was looked at closely for each student involved and
each subgroup. Results do not imply a staggering difference in weekly performance.
Students in each subgroup performed differently and varied from week to week. When
examining the week of "short a", all students demonstrated an understanding with scores at
80% or above except one. Week two (short e) demonstrated similar outcomes with eight of
the ten participants achieving 80% or higher on the progress monitoring assessment. Week
three (short i) displays a drastic difference with only three participants in the 80% or higher
range; seven students performed with a score of 60% or lower. The following week (short o)
four student's range 80% or better and six perform 60% or lower. Week five (short u) data
shows half of the ten participants above 70%, and half below 50%. Week six (mixed short
vowels) displays seven out of ten understanding the overall concept of using short vowels to
create words with a 70% or higher score, while three students performed below 30%.

The average data shows the Teacher-led group had more members above 80% than
the Computer-assisted group. In this comparison it would seem the direct instruction was
more beneficial to students learning foundation phonics skills. However, students in each
subgroup attained understanding of the skill and the pre/posttest comparison shows that 80%
of the participants in this study succeeded in the program. Students in the teacher-led
subgroup enjoyed the small group interactions, more time with the teacher and working

collaboratively on projects with peers. The computer-assisted subgroup liked the program, activities available and also looked forward to LTR time and visiting the Computer Lab.

To revisit the intentions of this study and answer the questions presented for the research project, I feel the approach that led to a solid foundation of early literacy skills would be a mixture of each teaching method researched in this study. Combining the two methods and allowing students to have a healthy blend of individual exploration on programs that reinforce skills being taught along with direct instruction and activities planned that support peer interaction and teacher assistance would be an ideal technique for instruction.

Limitations

Aspects of the research such as the homework piece may have had an impact on discovering the best method. While all factors were the same for each subgroup, all students received the same homework, the same vowel was the emphasis each week; the only difference should have been the mode in which students received the instruction. However, after reviewing the rate at which students turned in the homework, demonstrating they did that piece of the program; a couple participants did not do <u>any</u> of the assignments during the six weeks, while a few didn't return all homework samples. Omitting this piece of the program for purposes of this research may have generated different results. This element of the study was an outside indicator that could not be controlled in the scope of the study, though it is an expectation of the LTR program and instructed as so in the literature provided for parents.

Reflection and Action Plan

Upon completing this program, I feel the students that participated have excelled in acquiring early literacy skills. As noted, eight of the ten moved into the next skill group focusing on long vowels, and their reading ability has improved. The two that did not move on are repeating the short vowels; they are doing very well and have a solid understanding of blending, segmenting and short vowel identification. I anticipate the use of computer programs that encourage literacy development and the LTR framework will prepare all students in being successful readers. In my future teaching endeavors, I plan to utilize programs such as the one used in this study and LTR to assist in preparing Kindergarteners to be successful in early literacy skills and develop reading ability.

This study has impacted my teaching experience and I intend to share the process and results with my coworkers and administrator. When initiating this project, I was very nervous about "conducting research". After completing the project, I understand this is what we as teachers do daily; try something with our students and weigh the pros and cons. I appreciate the opportunity to focus on one "teaching goal", devote attention to and reflection upon the process and results to find what was working as well as what was not. As we all strive to find "what works" while teaching, I feel this information may be helpful to others attempting to find their own methods of success.

References

Cassady, J.C., & Smith, L.L. (2003). The impact of a reading-focused integrated learning

      system on phonological awareness in kindergarten. *Journal of Literacy Research, 35*,

      947-964.doi: 10.1207/s15548430jlr3504_2

Cavanaugh, C. L., Kim, A., Wanzek, J., Vaughn, S. (2004). Kindergarten reading

      interventions for at-risk students: twenty years of research. *Learning Disabilities: A*

      Contemporary Journal 2(1), 9-21. Retrieved from

      http://www.ldworldwide.org/research/learning-disabilities-a-contemporary-journal

International Reading Association. (2000).

      http://www.reading.org/general/AboutIRA/PositionStatements/PhonemicAwareness

      Position.aspx

Segers, E., & Verhoeven, L. (2005). Long-term effects of computer training of phonological

      awareness in kindergarten. *Journal of Computer Assisted Learning*, *21*(1), 17-27.

      Retrieved from http://www.wiley.com/WileyCDA/WileyTitle/productCd-JCAL.html

Macaruso, P., Hook, P., & McCabe, R. (2006). The efficacy of computer-based

      supplementary phonics programs for advancing reading skills in at-risk elementary

      students. *Journal of Research in Reading, 29*(2), 162-172. doi:10.1111/j.1467-

      9817.2006.00282.x

Macaruso, P., & Rodman, A. (2011). Efficacy of computer-assisted instruction for

      The development of early literacy skills in young children. *Reading Psychology*, *32*,

      172-196. doi:10.1080/02702711003608071

Macaruso, P., & Walker, A. (2008). The efficacy of computer-assisted instruction for

      advancing literacy skills in kindergarten children. *Reading Psychology*, *29*(3), 266-

287. doi:10.1080/02702710801982019

Mioduser, D., Tur-Kaspa, H., & Leitner, I. (2000). The learning value of computer-based

instruction of early reading skills. *Journal of Computer Assisted Learning, 16*, 54-

63.doi: 10.1046/j.1365-2729.2000.00115.x

National Reading Panel. (2000). *National Reading Panel Releases Report on Research*

Based Approaches to Reading Instruction. Washington, DC: U.S. Department of

Health and Human Services. Retrieved from

http://www.nationalreadingpanel.org/Press/press_rel_4_13_00.htm

National Early Literacy Panel. (2002). *A Scientific Synthesis of Early Literacy Development*

and Implications for Intervention. Washington, DC: U.S. Department of Health and

Human Services. Retrieved from

http://lincs.ed.gov/publications/pdf/NELPReport09.pdf

Tracey, D.H., & Young, J.W. (2007). Technology and early literacy: the impact of an

integrated learning system on high risk kindergarteners' achievement. *Reading*

Psychology, 28, 443-467. doi: 10:1080/02702710701568488

Vernadakis, N., Avgerinos, A., Tsitskari, E., & Zachopoulou, E. (2005). The use of

computer assisted instruction in preschool education: making teaching meaningful.

Early Childhood Education Journal, 33(2), 99-104. doi: 10.1007/s10643-005-0026-2

Wild, M. (2009). Using computer-aided instruction to support the systematic practice of

phonological skills in beginning readers. *Journal of Research in Reading, 32*(4),

413-432. doi: 10.1111/j.1467-9817.2009.01405.x

Wright, C., Diener, M., & Kay, S.C. (2000). School readiness of low-income children at risk

for school failure. *Journal of Children & Poverty, 6*(2), 99-117. Retrieved from

http://www.icphusa.org/jcp/

Appendix A

Alphabet Pretest – Students need to score 80% (48/52) on this pretest to move into the next skill group.

A F K P W Z B H O J U C Y

L Q M D N S X I E G R V T

a f k p w z b h o j u c y l q

m d n s w i e g r v t

Short Vowel Pretest – Students are placed in this group upon passing the Alphabet pretest, yet not scoring 80% (8/10) on this pretest.

Unit 3: Short Vowels
Pretest

tam

vell

pid

noss

lut

sim

bec

zuf

dak

hon

Fall 200

Appendix B

Fall Results: Students highlighted in orange participated in this study.

Student	Alphabet /52	Short vowels /10	Long vowels /22
AA	19		
EA	9		
KB	6		
ZB	52	1	
AD	42	0	
AG	42	0	
CG	51	8	0
JG	34		
CH	6		
GH	48	1	
IH			
KJ	42	6	
JL	1		
ML	45	0	
ZP	26		
MR	50	0	
JR	52	7	
AR	11		
AS	48	0	
LS	48	8	0
SS	52	9	0
KZ	48	0	

Appendix C

Dear Parents, 9/18/13

I am working on completing my master's program this fall through Eastern Illinois University. This final course is an opportunity to discover "best practices" in teaching our children, with action research. The topic of my research project includes Leading to Reading (LTR) and I am adding a technology piece. My goal is to test if adding technology to an already successful program will help our students achieve in the learning to read process.

You are receiving this letter because your child has tested into the LTR group of focus for the action research project I am conducting. So, what does that mean?! I will be using data produced by your child from their work in LTR. No names or any way of identifying your child will be used in the research report or project in any way. Coding will be used and identity will be 100% confidential.

If you **_do not_** want your child's data to be used in this action research project, please contact me within 3 days. If you have ANY questions about the information in this letter, please call any time!!

xxx-xxxx (School)

xxx-xxxx (cell)

xxx@xxxx.org (email)

I want to thank you in advance for the opportunity to work so closely with your child. The focus will be to give each student the best education possible!

Appendix D

Weekly progress monitoring data sheet

	short A /10	short E /10	short I /10	short O /10	short U /10	mixed vowels /10	
T1							
T2							
T3							
T4							
T5							
C1							
C2							
C3							
C4							
C5							