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The Effectiveness of Systematic and Engaging Early Literacy (SEEL) Intervention on Word Reading in Kindergarten Students Receiving Tier 3 Services

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ABSTRACT

The Effectiveness of Systematic and Engaging Early Literacy (SEEL)
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This study, a modification of Marshall (2011), evaluated the effectiveness of the Systematic and Engaging Early Literacy (SEEL) intervention method to improve consonant-vowel-consonant (CVC) reading in four students receiving Tier 3 services. The SEEL intervention method was also combined with the use of digital books on an iPad to investigate the effects of using technology in reading intervention sessions. Previous research indicates effectiveness for the foundational principles of SEEL, which include instruction in engaging, meaningful contexts that provide frequent and intense opportunities to practice. This research involved 4 kindergarten students who qualified for Tier 3 services based on their performance on an index of difficulty in early literacy skills. The study contrasted trained with untrained literacy targets of comparable difficulty and was conducted as a single-subject multiple-baseline-across-behaviors design. Intervention was delivered three times a week for 15-20 minutes, depending on the engagement of the participants. An analysis of the results showed improvement in three out of four participants in their reading ability of the target CVC words. It gave mixed results as to the effects of using technology in combination with the reading intervention. The analysis also looked at student engagement during both the hands-on manipulation of the materials and the reading and writing tasks performed on the iPad. It found that the engagement between these two parts of each session was similar; if a student had poor engagement for the SEEL intervention, he or she also had poor engagement for the iPad portion, and vice versa. This study provides further insight into the efficacy of SEEL and the use of technology; it also provides suggestions for future research in the area of reading intervention.

Keywords: Systematic and Engaging Early Literacy Intervention, early intervention, early reading, Consonant-Vowel-Consonant words, Response to Intervention

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Introduction

Acquiring literacy skills comes with only a reasonable amount of hard work and instruction for most children. For some though it can be a confusing and challenging process. Research shows that children who do not read at grade level in the early years of schooling will continue to fall behind their same-age peers and that the gap between the two groups will widen as they progress through school (Cunningham & Stanovich, 1997; Juel, 1998). The effects of this gap are seen on many levels. First, the children at the lower end of the gap begin to struggle in many areas of education because after the third grade there is a fundamental shift in education from "learning to read" to "reading to learn." Second, teachers struggle to educate a classroom full of children with wide-ranging abilities. Third, the reading gap can result in children being placed in special education which reduces the resources available for children with documented intellectual impairments.

Due to the implications of the ever-widening reading gap, the No Child Left Behind Act (NCLB) was passed in 2002 to hold schools accountable for the progress that students make each year in math and reading skills (Dee & Jacob, 2011). However, both the act and its influence are fraught with debate; The Center on Education Policy (2008) concluded that reading and math scores on state tests have improved but could not directly attribute it to the NCLB. However, Dee and Jacob (2011) found that while the NCLB drives improved math skills in fourth grade, it did not lead to significant improvements in reading scores in the same population. In light of this conflicting research the Obama administration has looked into modifying the act in hopes of improving reading skills, especially in low-performing schools. The NCLB left much to be desired; 24 states including Utah (where the current study was conducted) have applied and been approved for waivers to not be subject to certain parts of the NCLB Act. These parts include the

Adequate Yearly Progress measurements and the expectation of 100% of students reaching proficiency in language arts and math (Schencker, 2012, para. 5).

In an attempt to remediate some of the insufficiencies of the NCLB, an intervention framework called Response to Intervention (RTI) was developed as a way to identify and intervene in appropriate situations (Bradley, Danielson, & Doolittle, 2005). RTI is a three-tiered system that allows for children of varying levels of ability to receive intervention services. Within this framework educators can facilitate learning in children of all abilities by providing frequent opportunities for children to practice the reading and writing skills needed as they progress through school. This is known as supplemental and intense instruction.

One program that utilizes this form of instruction is Systematic Explicit and Engaged Learning (SEEL). SEEL is an early literacy intervention program that applies various strategies proven effective to encourage literacy development in preschool, kindergarten, and first-grade children. It seeks to make the acquisition of early literacy skills an enjoyable experience while still explicitly teaching the necessary fundamentals in these early grades. SEEL is supported by a growing body of research for different aspects of reading with a variety of populations (for review, see Culatta, Aslett, Fife, & Setzer, 2004; Culatta, Culatta, Frost, & Buzzell, 2004; Culatta, Setzer, Wilson, & Aslett, 2004; Hales, 2012; Marshall, 2011). However, further research is necessary to ascertain its efficacy.

The current study also investigates the efficacy of technology when integrated into the SEEL interventions. Both Hales (2012) and the current study selected the Pictello application to present a digital book on an iPad. The Pictello application was chosen because of its ease of use and relevance to the activity at hand. This allowed for a smooth transition between the activity to the use of technology and maintained engagement throughout the intervention session. The

Pictello application presented the activity that the participants were doing in storybook form using pictures of other children. During the intervention session the researcher would take a picture of the participants doing some part of the activity and then insert the picture into the Pictello storybook. The participants would then give as many words with the target endings as they could remember. The participants enjoyed then pushing the voice button and hearing the words they contributed become part of the digital book. The Pictello application allowed for the integration of technology into a more mainstream form of reading intervention to enhance engagement and broaden the contexts in which the participants were exposed to the target words.

Review of Literature

Children often enter kindergarten without a functional knowledge of how reading works. However, they are expected to have acquired a foundation of both reading and writing of simple words in simple texts by the end of the school year. Most children are able to meet this expectation; some are not. For those children it is important to tailor both the instruction and its delivery in order to meet their educational needs. In order to make appropriate educational decisions it is important to understand foundational literacy skills and educational practices supported by research to be effective in working with children facing reading difficulties.

Important Early Literacy Skills

The early literacy skills addressed in most reading interventions, and in particular the SEEL method, are phonological awareness, phonemic awareness, and phonics. Research has indicated that these skills may be the most predictive of future reading success (Ehri, Nunes, Willows, et al., 2001). The emphasis on phonological awareness and phonics in intervention programs will help the child develop a foundation on which to acquire higher level reading skills as he or she progresses through school.

Phonological awareness. Schatschneider et al. (1999) defines phonological awareness as "the sensitivity to the sound segments in spoken language" (p. 439). Phonological awareness is considered to be one of the most powerful predictors of future reading ability and research has shown that during the last few months of kindergarten phonological awareness development spikes for typically-developing children (Lonigan, Burgess, & Anthony, 2000; Martin, Claydon, Morton, Binns, & Pratt, 2003; McBride-Chang, 1995; Nithart, Demont, Metz-Lutz, Majerus, Poncelet, et al., 2011). Cunningham and Stanovich (1997) found that good early readers have more print exposure. This leads to stronger phonological awareness which translates to greater success in a number of academic realms. On the other hand, Lonigan et al. (2000) indicated that children struggling to read in the early grades continue in a downward spiral starting with weaker phonological awareness. This can cause them to practice less, fail to practice and develop reading comprehension strategies, and even be expected to read and analyze texts too difficult for them (Allington, 1984; Brown, Palincsar, & Purcell, 1986). This can develop into the *Matthew Effect* (a term coined by Stanovich, 1986) meaning that difficulty in reading results in exposure to reading and pervades into other academic areas. Thus research concludes that phonological awareness is crucial to developing reading skills and its development in the early school years will have a significant impact on the child's future reading abilities.

Phonemic awareness. Phonological awareness, so integral to acquiring reading skills, has a division known as *phonemic awareness* that requires further discussion. There are several definitions of phonemic awareness; however, they all have common elements. Phonemic awareness is "the ability to reflect on and manipulate the phonemic elements of spoken words" (Ryder, Tunmer, & Greaney, 2008, p. 234). Yopp (1992) explains how when children do not yet have phonemic awareness that, "Cat . . . is simply cat, a furry animal that purrs. Young children

are unaware that the spoken utterance *cat* is a word that is made up of a series of sounds, or phonemes" (p. 696).

Research spanning several decades has shown that it is an influential component to reading acquisition (Goldstein, 1976; Juel, 1988; Kame'enui et. al, 1997; Shankweiler & Fowler, 2004). Yet despite the strong research base, the specific role of phonemic awareness in literacy development is highly debated. Some argue that phonemic awareness is a prerequisite to reading (Ehri et al., 2001, Shankweiler & Fowler, 2004), while others contend that it is a consequence of print exposure and reading instruction (Read, Zhang, Nie, & Ding, 1986; Squires, 2006). The middle ground between the two sides is supported by research suggesting that the relationship between phonemic awareness and reading acquisition is one of "reciprocal causation" (Perfetti, Beck, Bell, & Hughes, 1987; Raynor et al., 2001). This means that phonemic awareness is required for the acquisition of literacy skills but a more advanced phonemic awareness is a result of literacy.

In order to add research to the debate, Ryder et al. (2008) concluded that interventions that explicitly teach phonemic awareness and phonemically-based decoding skills are an effective method for children in the early schooling years classified as struggling readers by their teachers. These children were also tested for phonological and phonemic awareness skills with expected low scores. This study further supports longitudinal studies which have found that poor reading performance in the earlier years of school can be both modified and prevented if identified in time. The rationale for this is that "early intervention in kindergarten and grades 1 and 2 is more effective than later intervention because of the intensity and duration of treatment required if later intervention is to be effective" (Foorman, Breier, & Fletcher, 2003, p. 625; Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004). It is evident from the research

that both phonological and phonemic awareness are crucial to the development of reading skills of children in the early years of schooling.

Phonics. Phonics instruction is the other crucial early literacy skill. Systematic phonics instruction is a process that begins with teaching the letter-sound relations explicitly and then provides texts that allow the students to practice decoding words with these relations. The set of phonic elements taught can include elements such as the relation between consonant letters and sounds, vowel letters and sounds, or onset-rime patterns (Ehri, Nunes, Stahl, & Willows, 2001). Phonics instruction differs from other reading instruction, such as whole language programs, in that these other programs do not teach phonics systematically. When the National Reading Panel compared these two styles of reading instruction their meta-analyses found that "systematic phonics instruction makes a bigger contribution to children's growth in reading than alternative programs providing unsystematic or no phonics instruction" (NRP, 2000, p. 108). There are several types of systematic phonics instruction including synthetic, analytic, embedded, analogous, linguistic, onset-rime phonics, and phonics through spelling (Ehri et al., 2001a; NRP, 2000). The techniques employed by these programs vary yet they all have a strong foundation of systematic teaching to enhance reading acquisition.

The alphabetic principle. Similar to the relationship between phonological awareness and phonemic awareness, phonics has a significant subdivision known as the alphabetic principle which develops into more advanced applications known as unitization and automaticity. The alphabetic principle is "the understanding that letters of the alphabet and the phonemes to which they correspond can be used to read words" (Harn, Stoolmiller, & Chard, 2008).The alphabetic principle as described in Harn et al. (2008) is initially developed from preschool, in which children are considered to be in the prealphabetic phase, to the first or second grade, when

children typically enter the full alphabetic phase. Throughout these years the alphabetic principle develops because the child learns the patterns of common letter sounds and blending and can apply them to short, unfamiliar sight words. However, development of the alphabetic principle does not stop once the child reaches second grade; beyond this age the child should enter the consolidated alphabetic phase in which they can use unitization. Unitization is when the child stores fragments of words and letter patterns that they apply to unfamiliar words. For example, once a child learns the word *dark* he can then use his knowledge of the –ark sound and decode words such as *lark, spark*, and *mark*. Beyond unitization comes automaticity. Automaticity, the instant recognition of words, is an indication that the child has a fully developed concept of the alphabetic principle. Automaticity can only come from repeated exposures to word reading for meaning (Ehri & Snowling, 2004, as cited in Harn et al., 2008). The development of the alphabetic principle coincides with the development of other necessary early literacy skills such as phonics, phonological awareness, and phonemic awareness.

Systematic phonics instruction. Systematic phonics instruction, including the alphabetic principle, is considered to be an effective focus of instruction and intervention for many different levels of reading ability. Research specifically indicates those identified as being high-risk for learning difficulties in the early years of schooling (Hudson, Isakson, Richman, Lane, & Arriaza-Allen, 2011; Shapiro & Solity, 2008; Foorman, Fletcher, Francis, Schatschneider, & Mehta, 1998; Vadasy, Sanders, & Peyton, 2006), and typically-developing children (de Graaff, Bosman, Hasselman, & Verhoeven, 2009; Gray et al., 2007; NPR, 2000; Shapiro & Solity, 2008) benefit from systematic phonics instruction. Additionally, Foorman et al. (1998) found that both children who were classified as having more advanced phonological processing skills as well as those classified as having lower phonological processing skills showed improvement in word-

reading with direct systematic phonics instruction. By using systematic phonics educators can reach a spectrum of children and effectively meet the literacy needs of each student.

SEEL Principles

While early literacy skills are crucial they are unlikely to develop without appropriate education. Research has established several pillars of reading instruction that have proven effective in mediating early literacy problems. These have been adopted by Project SEEL and are integrated into the activities and lesson plans. These pillars include engaged learning (indicating meaningful, contextualized activities and responsive interactions), systematic and explicit instruction, and frequent and intense opportunities to practice.

Engagement. Engaged learning allows students to be more involved in reading which results in better retention and application of text. There are several aspects to engaged learning, however, that can affect the quality of the experience of reading and reading acquisition. Three main requirements for engaged learning are motivation, meaningful and contextualized activities, and responsive interactions.

Motivation. The two main types of motivation, intrinsic and extrinsic motivation, play a driving role in the efficacy of reading acquisition. While both can encourage reading development, Wigfield and Guthrie (1997) found that children's motivation predicted reading amount and breadth and that less motivated students read about one third as much outside the classroom as highly intrinsically motivated peers. Furthermore, whether a child is intrinsically or extrinsically motivated can be established as early as midway into the first grade (Morgan, Fuchs, Compton, Cordray, & Fuchs 2008). If a child remains extrinsically motivated there can be poor results; Becker, McElvany, & Kortenbruck (2010) found a negative correlation between extrinsic motivation and reading skills. More simply stated, those children who are extrinsically

motivated to read have poorer reading skills than those children who are intrinsically motivated to read. Furthermore, research by Skinner, Furrer, Marchand, and Kindermann (2008) illustrates that these children can suffer from further academic problems as well as the need for engaged learning:

> Emotional disaffection, especially boredom, seemed to exert a significant downward pressure on children's effort and persistence and predicted their withdrawal from academic tasks. This pattern of findings underscores the idea that when children find learning activities interesting, fun, and enjoyable, they will pay more attention and try harder. (p. 777)

Unfortunately it is these extrinsically motivated students who often require reading intervention. This challenges teachers, tutors, and reading specialists to use extrinsic motivation to help develop a child's ability to read. However, there are two evidence-based techniques -- meaningful and contextualized activities and responsive interactions-- that instructors can use to create a quality learning environment for reading acquisition in children with either form of motivation.

Meaningful and contextualized activities. Meaningful and contextualized activities utilize the students' likes and interests as a framework to provide reading instruction. Meaningful activities include things such as using games, songs, and other child-oriented activities that can be easily and undetectably intertwined with literacy concepts and techniques. According to Richgels et al. (1996), " The entire process of becoming literate can originate in children's meaningful and functional encounters with print . . . all children can benefit from regularly experiencing such encounters at school" (p. 634). Furthermore, there is a strong research base indicating that when instruction and intervention is conducted in meaningful, tailored, and

contextualized ways it can further advance the child's phonological awareness, spelling, and overall literacy acquisition (Barrentine, 1996; Craig, 2006; Curby, Rimm-Kaufmann, & Ponitz, 2009; NRP, 2000; Ponitz & Rimm-Kaufmann, 2011; Ukrainetz, Cooney, Dyer, Kysar, & Harris, 2000). By conducting reading instruction and intervention through these means teachers and interventionists can provide evidence-based, high-quality instruction that is both engaging and educational for the students.

Responsive interactions. Educators can utilize responsive interactions within the meaningful activity to facilitate literacy acquisition. The theory that a relationship between oral language and code-related precursors exists in the emerging reader is garnering a research base (DeThorne, Petrill, Schatschneider, & Cutting, 2010; Storch & Whitehurst, 2002). While the exact mechanics of that relationship are debatable, oral expression facilitates literacy acquisition because it allows a child to "talk things out," thereby creating a link between the text they have read and their own experiences and understanding (Naremore, Densmore, & Harman, 1995). This makes the text meaningful to them personally which benefits the child's early literacy development.

The term "responsive interactions" refers to instructive conversations, which are described in-depth in Goldenberg (1992):

> Students [engaging] in extended discussions-conversations- with the teacher and among themselves. Teachers and students are responsive to what others say so that each statement or contribution builds upon, challenges, or extends a previous one . . . both teacher and students present provocative ideas or experiences to which others respond . . . the teacher assures that the discussion proceeds at an appropriate pace . . . he or she

> manages to keep everyone engaged in a substantive and extended conversation, weaving individual participants' comments into a larger tapestry of meaning (p. 318).

Adopting instructional conversation as a medium to teach literacy skills helps students to make personal connections with the text and serves to use motivation and contextualized activities to provide the highest-quality language instruction and intervention possible.

Systematic and Explicit Instruction

Systematic and explicit instruction, while seemingly intrinsic to the learning process, is gaining a large research literature concerning its efficacy and utilization in the early-year classrooms in schools. This section will outline that research, as well as give descriptions of what systematic and explicit instruction can look like in the classroom setting.

Logical curricular sequence. Systematic and explicit instruction means that the instruction given is organized in a purposeful fashion and that literacy skills are taught in a direct way. While this may seem to conflict with the above discussion of "fun" meaningful and contextualized activities systematic and explicit instruction is incorporated into those activities so that the child is still being directly taught but in a way that keeps the child engaged in the interaction. Research provides evidence that systematic and explicit instruction improves early literacy skills more so than other methods of teaching. For example, Kerins (2006) showed that systematic and explicit instruction improved the phonological skills in children who had either single- or double- deficits in phonological processes; research by Elbro and Peterson (2004), Ryder et al. (2008), and Shankweiler and Fowler (2004), provided evidence that children who struggle with early literacy skills can benefit from explicit instruction.

Furthermore the National Reading Panel report (2000) and Ehri's subsequent analysis of it (Ehri et al., 2001b), besides emphasizing the efficacy of systematic and explicit instruction,

cite three studies in which systematic and explicit instruction enhanced programs designed to teach literacy; two were designed to supplement the Reading Recovery© program and one supplemented a whole-language program. Iversen and Tunmer (1993) and Hatcher, Hulme, and Ellis (1994) showed that adding systematic, explicit phonological awareness training to the Reading Recovery© program lowered the amount of time it took for the child to reach exit criterion; Castle et al. (1994) looked at adding systematic, explicit instruction to whole language programs and found that it improved the students' progress. In summary, when comparing the effectiveness of systematic, explicit instruction to alternative methods used in classrooms, research sides with the former.

Clear expectations. While the efficacy of systematic, explicit instruction is evident, children in classroom settings must have a clear understanding of what is being taught. Ryder et al. (2008) explored these challenges in New Zealand classrooms, which compared uniformed, whole-language reading programs to explicit instruction methods of teaching reading. The researchers worked with struggling readers (as determined by various standardized tests) and included a systematic, explicit intervention. This intervention consisted of 56 semi-scripted lessons delivered four times a week to groups of three or four students by a teacher's aide. The lessons were designed to be presented sequentially, beginning with initial phonemes that could be segmented and manipulated easily, such as */m/, /s/,* and */r/*. Once the children learned the grapheme-phoneme relation the aide moved into teaching reading and spelling of words with those phonemes. The overall structure of these lessons was "phonemic awareness exercises, the main lesson focusing on teaching grapheme-phoneme correspondences that were introduced in a fixed order across lessons, and an activity that reinforced the learning of the new material introduced in the main lesson" (p. 362). The materials used included an alphabet chart, picture

cards, sound mats/letter tiles, bingo cards, phonetic story books, white boards/pens, toy microphones, mirrors, and stretch toys. The activities included using the picture cards to identify and introduce phonemes, using the letter tiles/mats to spell out words, playing bingo, completing decoding worksheets, using storybooks to practice word-reading strategies, and utilizing mirrors to analyze oral cavity and tongue placement during different blending and segmenting activities. By having systematic and explicit instruction the children in the intervention program showed significantly better results in phonemic awareness, pseudoword decoding, and context free word recognition ability. As this example illustrates, having a purposefully organized structure to both the intervention as a whole and within each lesson can make a significant difference in the reading development of children struggling to develop early literacy skills.

Frequent and Intense Opportunities to Practice

The last pillar of SEEL intervention is frequent and intense opportunities to practice the target phonemes and reading skills in emergent readers. This section will outline the research illustrating its efficacy in reading instruction and intervention.

Research as far back as 1970 (Carlin, 1970) provides evidence that intense and frequent exposure to target phonemes and opportunities to practice benefits emerging readers. This is mainly illustrated in the application of previously discussed principles. By presenting literacy instruction and intervention in a systematic, explicit, meaningful, and engaging way the teacher or interventionist creates opportunities for the student to practice different targets several times in many different contexts. By doing so the student can make the crucial connections needed to develop early literacy skills. Additionally these multiple contexts need to include both oral and text exposure and practice with the targets since this allows the students to hear, see, and read each target. Therefore, research concerning reading instruction and intervention of this nature

provides the evidence base that justifies the principle of frequent and intense opportunities to practice. Since there is so much research that fits into this category it is advised that the reader refer to the citations listed throughout this review of literature for further reading. By having frequent and intense opportunities to practice targets as an integrated part of the reading instruction, the student will have higher quality reading instruction and hopefully make substantial gains in their reading abilities.

SEEL Intervention

SEEL was first developed in 1998 to fill the need for a program that utilized the skills and principles described above to improve the reading abilities of the diverse population found in schools. Since then much research has been done to develop and implement it within preschool, kindergarten, and first grade classrooms. In the pilot study (Culatta, Kovarsky, Theadore, Franklin, & Timler, 2003), researchers used SEEL principles in Head Start preschool classrooms. They found that the children made improvements on a number of both quantitative and qualitative measures of early literacy skills using "contextualized hybrid instruction, with . . . systematic attention to letter and rhyme patterns located within communicatively meaningful and motivating activities" (p. 184). Since these initial findings were so positive, further research (Culatta & Kovarsky 2004) concerning many different aspects of SEEL efficacy has continued to strengthen the body of literature on SEEL intervention. The efficacy can be divided into several categories, including use in dual-language classrooms (Culatta et al., 2004a; Culatta et al., 2004b; Culatta et al., 2006), the impact of the level of engagement (Culatta et al., 2007), the impact of using technology with SEEL principles (Culatta, Culatta, Frost, & Buzzell, 2004), and the efficacy of SEEL both when it is implemented by paraeducators (Bingham, Hall-Kenyon, &

Culatta, 2010), or teachers (Bingham, Culatta, & Hall-Kenyon, 2006), and how those educators feel about SEEL (Korth, Sharp, & Culatta, 2010).

This preliminary research has provided a strong foundation for further studies, the most recent being Marshall (2011) and Hales (2012) on the efficacy of SEEL. Marshall identified four kindergarten-aged children who qualified for Tier 3 services under the RTI model. After conducting baseline assessments intervention was given to groups of two and focused on CVC words, specifically words with the *–an, -ap,* and *–at* endings. Once both children in the dyad reached the criterion the intervention moved on to the next ending. To assess treatment fidelity sessions were videotaped and 30% of the sessions were analyzed. Based on the data analysis Marshall concluded that use of the SEEL principles in reading intervention was effective in teaching these 18 CVC words to kindergarten students receiving Tier 3 services. Recommendations for further research were made in order to verify the data and increase the ability of the findings to generalize to larger populations.

Marshall's research is important to the SEEL literature because it shows that SEEL curriculum can be an effective intervention program for students receiving Tier 3 services. While Marshall's study certainly inspired the current study, there are some differences. First, the children used in this study did not come from either English Second Language (ESL) background, or a financially disadvantaged family. This allows the SEEL literature to expand to a larger population of children; in particular, white, middle-class children who qualify for Tier 3 services through RTI. Second, this study followed Hales (2012) in using iPad digital books in the intervention. Being in the technological age it is important to provide data as to if technology in the classroom enhances or distracts from reading interventions.

Hales (2012) built on Marshall's study, but also included the use of technology in the intervention. This introduction of technology was in the form of an iPad used in the session to enhance the intervention and review the words used. Hales (2012) found that all four students were able to read the 18 target CVC words by the end of the intervention.

Purpose of Current Research

The purpose of this study was to examine the effectiveness of SEEL intervention, supplemented by the use of digital books displayed on the iPad, in teaching 18 CVC words to 4 kindergarten students receiving Tier 3 services. This study sought to utilize the benefits of both technology and face-to-face intervention in young children struggling to read. The research question was as follows:

Is the SEEL intervention, in conjunction with the use of digital books presented on an iPad, effective in increasing CVC word reading ability in kindergarten students at-risk for reading difficulties?

Method

Participants

Participants were chosen from the two kindergarten classes of an elementary school in Provo, Utah. This elementary school was in a middle-class residential neighborhood. At the time of research, this school served 561 students. Of those students, 36% qualified for free or reduced lunch, 86% of the students were Caucasian, 10% were Hispanic, and the remaining 4% of the student were Asian, African American, or Pacific Islander. As the researcher, I was looking to identify students within this population who needed additional Tier 3 services.

Selection measures and procedures. The four participants were selected based on their performance on the following measures: the Dynamic Indicators of Basic Early Literacy Skills

(DIBELS), and a Formative 10-Week Assessment, designed by the local school district literacy specialist. Both of these assessments were conducted at the school, either by a teacher or a teacher's aide, at the beginning of the school year. The results of these tests for one of the students were available for inclusion in this thesis.

DIBELS testing. The DIBELS testing assessed the child's phonemic awareness fluency and alphabet knowledge fluency, and was conducted in January, before this study began. Scores were sent to the DIBELS Data System at the University of Oregon and returned with each student labeled as at grade level, below grade level, or significantly below grade level. Students deemed to be significantly below grade level were considered to need the intensive intervention of Tier 3 services. In addition to data provided by these formal measures, the teacher's evaluation of the student's progress and abilities within the classroom were also taken into consideration in identifying students needing Tier 3 services.

Formative 10-week assessment. The local school district assessment was conducted the week before classes began and assessed the child's ability to write his or her own name, recognize beginning and ending sounds in words, rhyming, concepts of print, uppercase and lowercase letter naming, letter-sound association, rhyming, reading CVC words, and reading sight words. Students who scored less than 20/35 on the phonological awareness portion were considered to need Tier 3 services and possible candidates for this study.

Probes of word reading. The four students were also selected because they struggled to read the CVC words used in the intervention prior to therapy. This was evaluated by having each child try to read one CVC word at a time on a Power Point presentation.

Description of participants. The four students identified were comprised of two boys and two girls whose pseudonyms are given as Mark, Nathan, Alyssa, and Samantha. While I

was not specifically looking for behavioral characteristics as qualifications for my study, these children displayed behavioral and academic characteristics which, when considered in light of their testing, separated them from other students and made them prime candidates for this study.

Mark. Mark was a Caucasian six-year-old boy who came from a middle-class background. He was an only child with parents going through a divorce at the time of the study. His general education teacher reported that prior to the study he had a short attention span, and would have difficulty staying in his seat during tasks. Mark scored in the "intensive" category on the DIBELS testing, scoring 60% on the 3rd quarter district LA interim test. On the 10-week formative assessment Mark was able to recognize uppercase and lowercase letters on formative 10-week assessment, but was only able to read 21/30 of the expected kindergarten sight words at the beginning of the year. During the word-reading probes prior to intervention, Mark was able to read 2/54 of the words over the course of four sessions. His performance in the general education classroom was so poor that the school was considering holding him back in kindergarten in order to attain the skills needed to proceed on to the higher grades. While he did not have a formal diagnosis of a learning disability or impairment at the time of this study, it became obvious that he needed supplemental behavioral and reading interventions. He continued in summer school after the regular school term ended in an attempt to attain mastery of essential skills to where they needed to be.

Nathan. Nathan was a Caucasian six-year-old boy who moved into the school in mid-October. He had scored very low on the kindergarten assessment at his previous school, to the point that he received daily tutoring while attending his previous school. He scored a total of 5 on the 10-week formative assessment at the beginning of the school year (at his previous school). By the December testing, he had had only increased to a total of 75. His classroom teacher

reported that this December total score was more similar to scores of children just entering kindergarten. Furthermore, he scored 16/54 on the probes for word reading prior to intervention. His classroom teacher also reported that he did not have mastery of any essential skills, and that Nathan felt that he couldn't learn. However, with exposure and intervention, Nathan ended up being on track with all essential skills.

Alyssa. Alyssa was a Caucasian, middle-class, six-year-old girl who had low scores for her kindergarten assessments. She scored a total of 93 on her 10-week formative assessment. Her general education classroom teacher reported that she made very little improvement as the year continued. Her classroom teacher also reported that she had very little support from home, and needed more structured intervention in order to reach and maintain reading abilities. During the probes for word reading prior to intervention, Alyssa scored 3/54. Overall Alyssa was a somewhat timid child who was eager to learn, but she did not make the gains expected in the general education classroom.

Samantha. Samantha was a Caucasian, middle-class, six-year old girl who also had low scores on her kindergarten assessments, as reported by her classroom teacher. She had trouble retaining essential skills in the general education classroom and did not make the gains expected of her in the classroom. It was this inability to retain skills that made it difficult for her to reach and/or maintain the criterion level in the current study. Her general education classroom teacher reported that she was deemed "at-risk" for learning difficulties, an obstacle that was only strengthened by a lack of support from home. She scored 0/54 on the probes for word reading prior to intervention.

Pairing for dyads. Based on the students' performance on the probes for word reading completed before the intervention sessions began, two dyads were formed: Nathan and Mark,

and Alyssa and Samantha. As the intervention sessions continued it became apparent that the two boys were more interested in playing with each other than in participating in the activity. They would often become uncooperative, and would talk about off-topic subjects or get out of their seats to play with each other. Along with this, a discrepancy between the two girls' performance arose. Alyssa was making substantial, quick progress while Samantha was making slow, unsteady progress. The combination of these issues arising from the pairing of the dyads led to a reorganization of the dyads in the third intervention session; Mark and Samantha were paired together, and Nathan and Alyssa were paired together. As the intervention continued, these dyads were much more similar in scores and progress for both CVC reading and engagement scores.

Design

This study utilized a single-subject multiple-baseline-across-skills design in order to examine the effects of the SEEL intervention with students receiving Tier 3 services. This format allowed for small groups because each participant acted as their own control throughout the process. I used the SEEL principles to teach these target words. I first started with –ot words, comparing the participants' ability to read trained –ot words versus untrained –og and –ap words. Once all six lessons had been taught, I moved to the –og words, comparing trained –ot and –og words against untrained –ap words. Once those six lessons had been taught, I then moved to targeting the –ap words, comparing newly trained words to the –ot and –og words learned previously.

The efficacy of the intervention was assessed by having each child try to read the 18 CVC words presented via a PowerPoint presentation. The –ot words were *hot*, *rot*, *got*, *not*, *pot*, and *dot*; the –og words were *dog*, *hot*, *log*, *bog*, fog, and *jog*; the –ap words were *cap*, *gap*, *lap*, *map*, *rap*, and *tap*. This presentation had 18 slides with one word per slide. There were 10

presentations with the 18 CVC words in random, different order. This prevented the children from memorizing the pattern of the words and not actually reading them. This form of assessment took place before the intervention sessions began as well as after each session of intervention. This assessment served to indicate progress by comparing the trained targets against the untrained targets.

Procedure

The procedure comprised of two phases. The first phase was the baseline assessments and the second phase was the intervention session for the specified target. During the intervention assessment portion each child read the 18 CVC words on a PowerPoint after each intervention session.

SEEL baseline and progress monitoring assessments. After the formal testing qualified the four children to be in the research study, the researcher conducted an assessment with each child in order to collect baseline data on the 18 CVC words to be targeted in intervention. These assessments continued until each child had three baseline points with no upward trend. For these four participants it only took three assessments to reach this. Since this part of the research could potentially be tedious and/or stressful to young children the researcher instructed that if the child did not know a word, they could say so and he or she would simply go on to the next word.

The assessment contained the 18 CVC words, displayed one at a time, on the PowerPoint presentation. The child would attempt to read the word and then the researcher would press the button to continue on to the next one. In order to keep the children from simply memorizing the order of the words, ten PowerPoint presentations were created with the 18 CVC words randomly organized in each one.

This same assessment structure was used for monitoring progress during the intervention sessions. After each intervention session, each student would try and read the 18 CVC words displayed on a PowerPoint presentation. This assessment served to both monitor progress on the trained targets and gather baseline data on the untrained targets. For example, during the –ot intervention, the assessments gathered baseline data on both the –og and –ap targets to compare once treatment for those targets began.

Intervention. In the intervention phase of treatment, the two dyads received intervention on a pull-out basis on Tuesday and Thursday afternoons and Friday mornings; one dyad at a time received SEEL intervention ranging from 15-25 minutes depending on their engagement in the task. Activity plans were both downloaded from the SEEL website and additional activities were created when necessary. The activity plans were taught in the order of *–ot, –og,* and-*ap.*

The intervention targeted 18 words which were divided up into three ending sounds: 6 –ap words: *cap, map, tap, rap, gap,*and *lap*; 6 –og words: *hog, log, bog, dog, fog,* and *jog*; and 6 –ot words: *hot, not, got, pot, dot,* and *rot.* These targets were selected because they were similar enough to be comparably affected by the treatment yet different enough that individual word groups would not be influenced as the treatment was applied to another word group. They were also selected because the participants had been taught these words at the beginning of the school year, but preliminary assessment for this study showed they could still not recognize these words.

Intervention used the SEEL principles to teach specified target words. The sessions first started with –ot words, comparing the participants' ability to read trained –ot words with untrained –og and –ap words. Once all six lessons had been taught, the sessions moved to the –og words, comparing trained –ot and –og words against untrained –ap words. Once those six

lessons had been taught, the sessions then moved to targeting the –ap words, comparing newly trained words to the –ot and –og words learned previously.

Session structure. While each session created a different environment, all 18 CVC sessions had the following structure:

1. Make explicit introduction of target words
2. Complete engaging activity in which the students would receive intense exposure to and use the target words in a playful, meaningful context
3. Practice recognizing onset and rime of the target word in the form of blending cards
4. Use iPad as a literacy task to practice reading and writing target words
5. Assess of all 18 CVC words.

Each session started out with explicit instruction and intense exposure to the target word. This included introductions such as, "Today we are going on a Frog Jog; what sounds are the same in Frog and Jog?" This explicit instruction was followed by an engaging activity that also used intense exposure to teach target words. To continue the example, the children "jogged" down the hall, finding dog prints, jumping over "logs" and "bogs" and then finding frog prints that led to a frog picture. The activity concluded with the children encountering the target words in print; this was usually in the form of word blending cards. For instance, the children would have the *-og* card and the researcher would have a *h-* or *b-* or *l-* to pair with it. This allowed for review of the *–og* words. The researcher then used an iPad, which had pictures of each step of the activity, to take a picture of the children participating in one part of the activity. The researcher would go through the storybook with the children and then insert their picture into the storybook. The researcher then had the children think of words that had the target ending sound,

and she typed them into the iPad. Each session concluded with the previously discussed assessment, after which the child would receive a prize.

Incorporation of Pictello books. During each session the students used an iPad to enhance the exposure to the target words they received during the hands-on activity. The iPad application selected was Pictello. This application created storybooks of the activity that the children had just completed, representing each step in the activity with a picture. The students read the storybook, and then the researcher took a picture of the students performing one step of the activity. After inserting the picture into the storybook, the students would practice writing the target words into the storybook. The students would then get to listen to the words they had just written, as a small reward for their efforts.

Treatment fidelity. In order to ensure treatment fidelity 30% of the sessions were video recorded for the level at which the SEEL principles (meaningful interactions, playful and engaging activities, intense exposure to targets, and reciprocal exchanges) were incorporated into each session. This measurement was conducted by research assistants familiar with SEEL and trained to analyze the sessions. The research assistants were trained by having a discussion of each principle and the proper way to measure it. The research assistants then watched practice videos and rated them. This was done until the inter-reliability reached 90%. The measurement was a treatment fidelity check sheet created by the researcher. The questions on the check sheet (discussed and taught during training), are explained below.

To rate meaningfulness and explicitness of the intervention the research assistants answered questions such as, "Was the activity appropriate for kindergarten children?" and "Did the researcher specifically state the target at the beginning of the lesson?" To measure playfulness and engagement the researchers evaluated the level of these aspects on a four-point

scale. To measure intensity of exposure the research assistants looked for an average of 10 uses of the target ending per minute. To measure reciprocal exchanges the research assistants once again used a four-point scale to evaluate how often reciprocal exchanges between the researcher and the participants occurred.

Ratings of engagement. In order to measure the engagement of the children during the sessions we chose to use the Direct Behavior Rating Scale (DBRS). The DBRS has three defining characteristics: the observation is direct and frequent across days or times, the observation concerns specific behaviors that occur in a naturalistic setting, and the behavior is evaluated via ratings to quantify a person's perception of a behavior (Christ, Riley-Tillman, & Chafouleas, 2009). The DBRS measures each student's academic engagement, respectfulness, and disruptiveness during the intervention session. Higher percentages on the academic engagement and respectfulness scales are desirable, while a lower percentage on the disruptiveness scale is desirable. The percentages do not always total 100%, since some behaviors can and will co-occur.

In order to establish reliability before giving official ratings practice videos were utilized until two unbiased raters achieved 90% agreement with the ratings. The raters then watched 6 videos of the sessions and rated the students on their academic engagement, respectfulness, and disruptiveness.

Data analysis. The data from the baseline assessments and the intervention sessions were first entered into a spreadsheet and then plotted on a graph for each participant. Each student had three graphs with one for each target ending. The graphs were then visually analyzed for several results. First, to note upward trends while learning a new target and then maintenance as the sessions moved on to other targets. Second, to measure how soon into intervention the

participant was able to read words containing a new target ending. Third, to record overlapping data points between the baseline and intervention sessions. Finally, to note any patterns that emerged during the course of the baseline and intervention. Mean scores, standard deviation, and range for each phase of the target were calculated for each child.

Results

This section displays the data for each participant. The data are presented in graph form accompanied by a description of the student's performance throughout the intervention, the accuracy and rate of meeting attainment criterion, and the overall trends of the data points. The mean, standard deviation, and range are also included for each phase of the intervention. The engagement scores for each student are also displayed. The students' engagement ratings were separated into the engagement during the hands-on activity and engagement during the iPad session. This was done to look for any discrepancy in engagement between the two parts of the intervention.

Individual Student Performance on Word Reading

Each student participated in 3 or 4 baseline sessions and 18 or more intervention sessions. The baseline sessions measured the participants' ability to read the target words before any intervention was conducted. Once a baseline was established intervention sessions for each target began. These intervention sessions concluded with an assessment of all 18 words regardless of whether intervention for that target had been conducted or not. Once the child reached a minimum of five out of six words correct per target in these post-intervention assessments the participant was considered to have reached the criterion. As the results show, three out of four students reached the criterion for all three target endings and only one student did not reach criterion for –ap, the final target ending.

Mark. Initially Mark was not able to read the target words during the baseline assessment portion but then read two words. The two words that he could read were both –ot words. Throughout the intervention sessions Mark continued to struggle to attain the criterion in any target endings. Starting June 11th Mark and I worked together in summer school in one-on-one sessions, as he had not reached the criterion. He then missed a whole week of summer school, which only allowed for one more intervention session to occur. The possible effects of his absenteeism throughout the study are explored in the discussion portion.

-ot target. In the baseline assessments Mark was able to read just two out of 24 –ot words, or two words over four sessions. This gave him a mean of 0.5 for this portion of the baseline. During the intervention phase Mark was able to read all six –ot words during one session. However, this was in the second-to-last session, and after a week-long absence, he dropped to reading two –ot words correctly. Overall Mark's mean rose from 0.5 in the baseline assessment to 1.7 at the final assessment; his standard deviation rose from 0.5 to 1.7, and his range increased from 0-1 to 0-6.

-og target. In the baseline assessments Mark was not able to read any –og words correctly. Mark reached the criterion on the fourth-to-last intervention session. Overall Mark's mean words read increased from 0.1 to 2.6, his standard deviation rose from 0.3 to 1.9, and his range increased to 0-6.

-ap target. In the baseline assessments Mark was not able to read any of the –ap words, giving him a mean of zero for the baselines. Once intervention for –ap began he was able to read one or two –ap words in the assessment. At the last intervention session he read five –ap words correct. Overall his mean words read correctly rose from 0 to 1.8, his standard deviation rose from 0 to 2.0, and his range increased to 0-5.

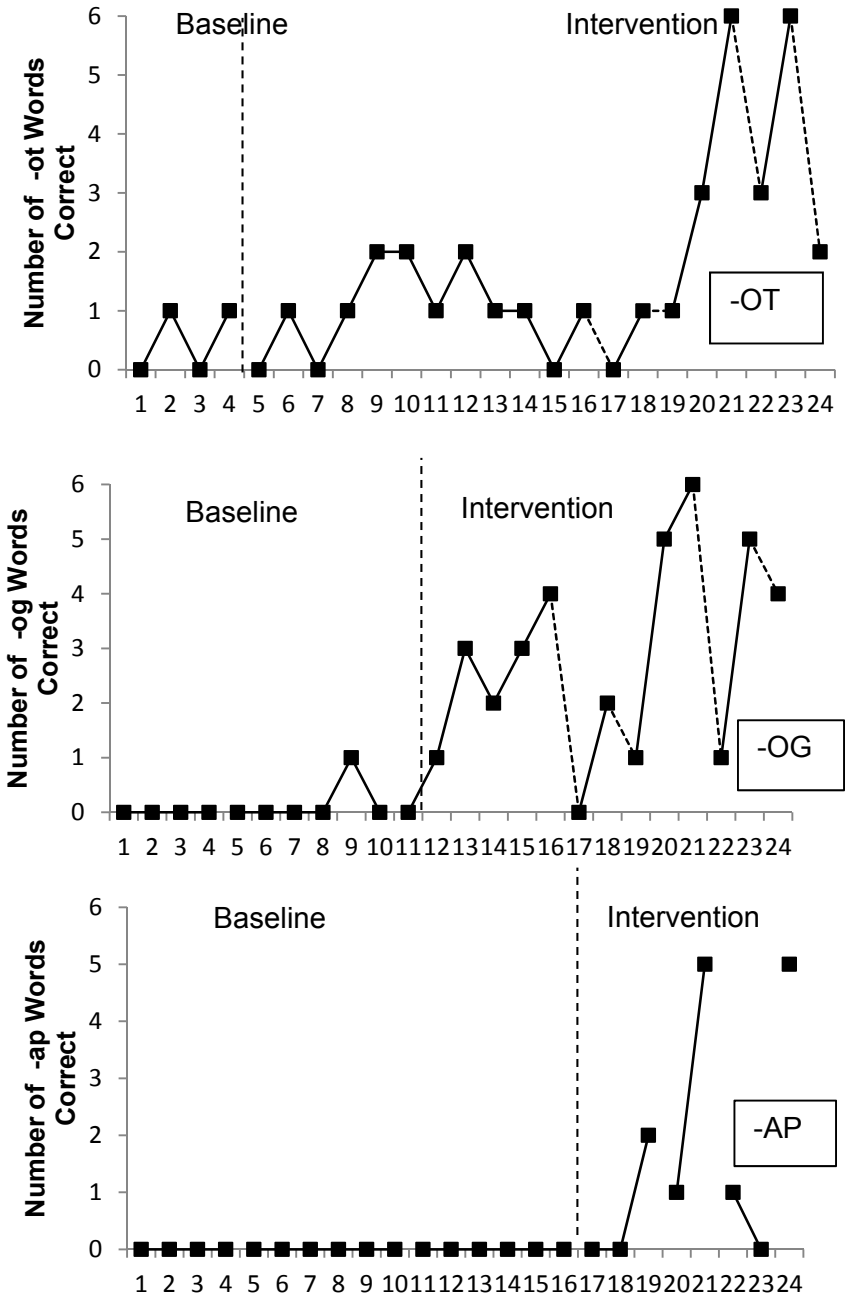

Figure 1. Mark's results for –ot, -og, and –ap targets. The data points show the number of CVC words read for that target for each intervention session. The dates of absence are noted by a gap in between data points. These absences occurred on 3/13-3/16, 3/30, 5/11, and 6/15-6/22.

Table 1

Mark's Mean, Standard Deviation, and Range for all Targets during Each Phase

Target	Phase	Mean	SD	Range
	Baseline	0.5	0.5	0-1
ot	Intervention	1.7	1.7	0-6
	Baseline	0.1	0.3	0-1
og	Intervention	2.6	1.9	0-6
	Baseline	0.0	0.0	0
ap	Intervention	1.8	2.0	0-5

Mark's results indicate that the –og target was the ending which he retained the best. However, the inconsistency of his results makes it difficult to study trends or draw any conclusions. It would appear that towards the end of treatment he generalized his abilities across all three target endings and showed an increase in the words read correctly during the assessment. Mark reached the criterion level for all three targets but was not able to maintain this criterion level for any of the targets.

Nathan. Throughout the intervention Nathan made significant progress and reached the criterion for each target. During the baseline assessments Nathan was able to read one to three words correctly per target. As the intervention sessions ensued he reached the criterion level before we reached the final target ending. In other words, he was able to read –og and –ap ending words before we began intervention for that target ending. It was decided that the remainder of

his assessments would measure the fluency of his ability to read the target words. This change took effect for the eighth intervention session and continued from there. From the eighth data point on, Nathan's chart reflects his ability on his reading fluency, not if he could just read the word. To make the change clear, the eighth data point is an unfilled data point. As seen in the graphs, his fluency progressed throughout the remainder of the intervention.

-ot target. Baseline assessments show that Nathan read 6/18 -ot words over the course of three baseline assessments giving him an average of 2 and a standard deviation of .8. He then made quick progress, reading five –ot words after just two intervention sessions, giving him an average of 4.3, with a standard deviation of 1.1. He then was absent for two sessions. After that it took four sessions to elevate to five and six correct per session. However, he did reach the criterion and maintained that level when he was not absent for subsequent intervention sessions.

-og target. Baseline assessments revealed that the –og target was his weakest ending to start, with an average of 2.3 and a standard deviation of 1.8. Similar to the –ot target he made quick progress during the first three intervention sessions and correctly read all six –og words on the fourth intervention session. He then had fluctuating success, after missing two intervention sessions. His performance jumped up after he returned and remained at or above criterion for the remainder of the intervention sessions with the exception of two instances in which he only read three. He finished the intervention sessions with an average of 5.1, a standard deviation of 1.1, and a range of 3 to 6.

-ap target. Baseline interventions for the –ap target showed that this was Nathan's strongest pre-intervention target, reading an average of 3.5 with a standard deviation of 1.4. Like the other two targets, he made quick progress and reached criterion after four sessions.

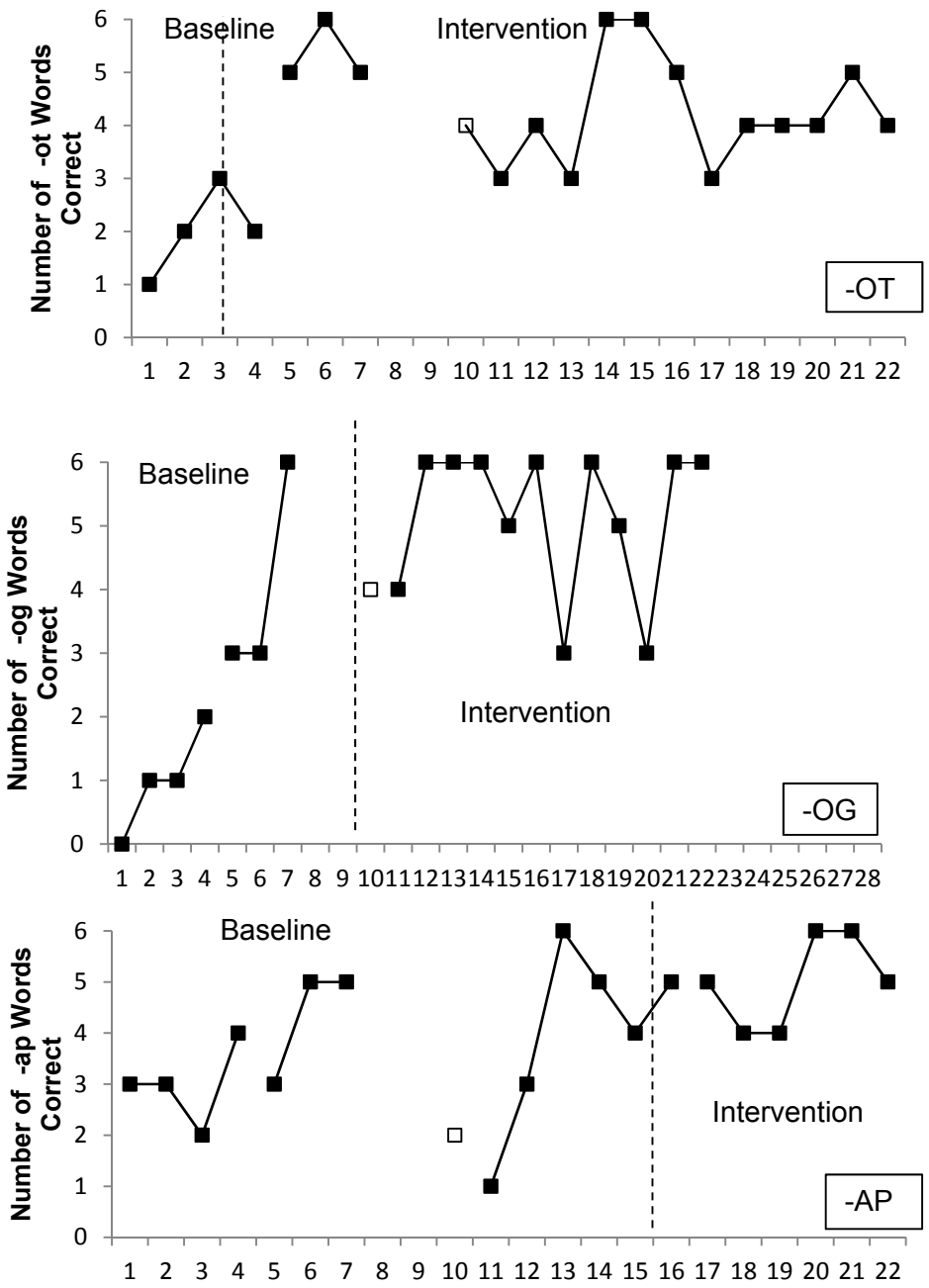

Figure 2. Nathan's results for –ot, -og, and –ap targets. The data points show the number of CVC words read for that target for each intervention session. The dates of absence are noted by a gap in between data points. These absences occurred on 2/14-2/17.

He then dropped back to baseline scores after missing two intervention sessions. He then returned to criterion and finished with a mean of 5, a standard deviation of .8, and a range of 4-6.

Table 2

Nathan's Mean, Standard Deviation, and Range for all Targets during Each Phase

Target	Phase	Mean	SD	Range
	Baseline	2.0	0.8	1-3
ot	Intervention	4.3	1.1	2-6
	Baseline	2.3	1.8	0-6
og	Intervention	5.1	1.1	3-6
	Baseline	3.5	1.4	1-6
ap	Intervention	5.0	0.8	4-6

Nathan's results show that he grasped the concepts taught in the intervention sessions and that he was able to apply them across all three targets. However, he was also the participant who had the highest baseline scores, possibly predicting that he would make the best and fastest progress during the intervention sessions.

After consultation, it was decided that the remainder of his assessments would measure the fluency of his ability to read the target words rather than his ability to simply read the words. This change took effect for the seventh intervention session and continued from there. As seen in the graphs, his reading fluency progressed throughout the remainder of the intervention.

Alyssa. Alyssa showed great improvement during the intervention sessions compared to her baseline scores. I had great concerns about her reading abilities when conducting the pre-intervention assessments; she was only able to read 3/54 words, with all three of those words ending in –og. However, after just a few intervention sessions of each target she showed rapid improvement and generalization of abilities across all target words. She reached the criterion for all three targets, and quickly applied the pattern of the –og and –ot targets to the –ap targets.

-ot target. Alyssa was not able to read any –ot words during the baseline assessments. However, she made remarkable progress and reached the criterion after five sessions. Her performance remained steady throughout the rest of the sessions and she was able to correctly identify all six words in the last eight sessions of treatment. She finished with a mean of 5.6, standard deviation of .8, and a range of 4 to 6.

-og target. Alyssa had an average of 1.3 for the –og target words during the baseline portion and a standard deviation of .7. This pattern continued through the first part of intervention when we were not addressing –og targets specifically. However, once we started –og intervention her scores greatly increased and she reached criterion after three –og sessions. Her performance remained steady throughout the rest of the sessions and she met criterion for the last seven sessions. This gave her a mean of 4.9, a standard deviation of 1.4, and a range of 2 to 6.

-ap target. Alyssa was not able to read any –ap words during the initial baseline assessments and when other endings were targeted until we addressed –ap targets specifically. Amazingly, she met the criterion after only two intervention sessions; she maintained the capacity to read the –ap words. Alyssa finished the intervention sessions with a mean of 4.5, standard deviation of 2.1, and a range of 0 to 6.

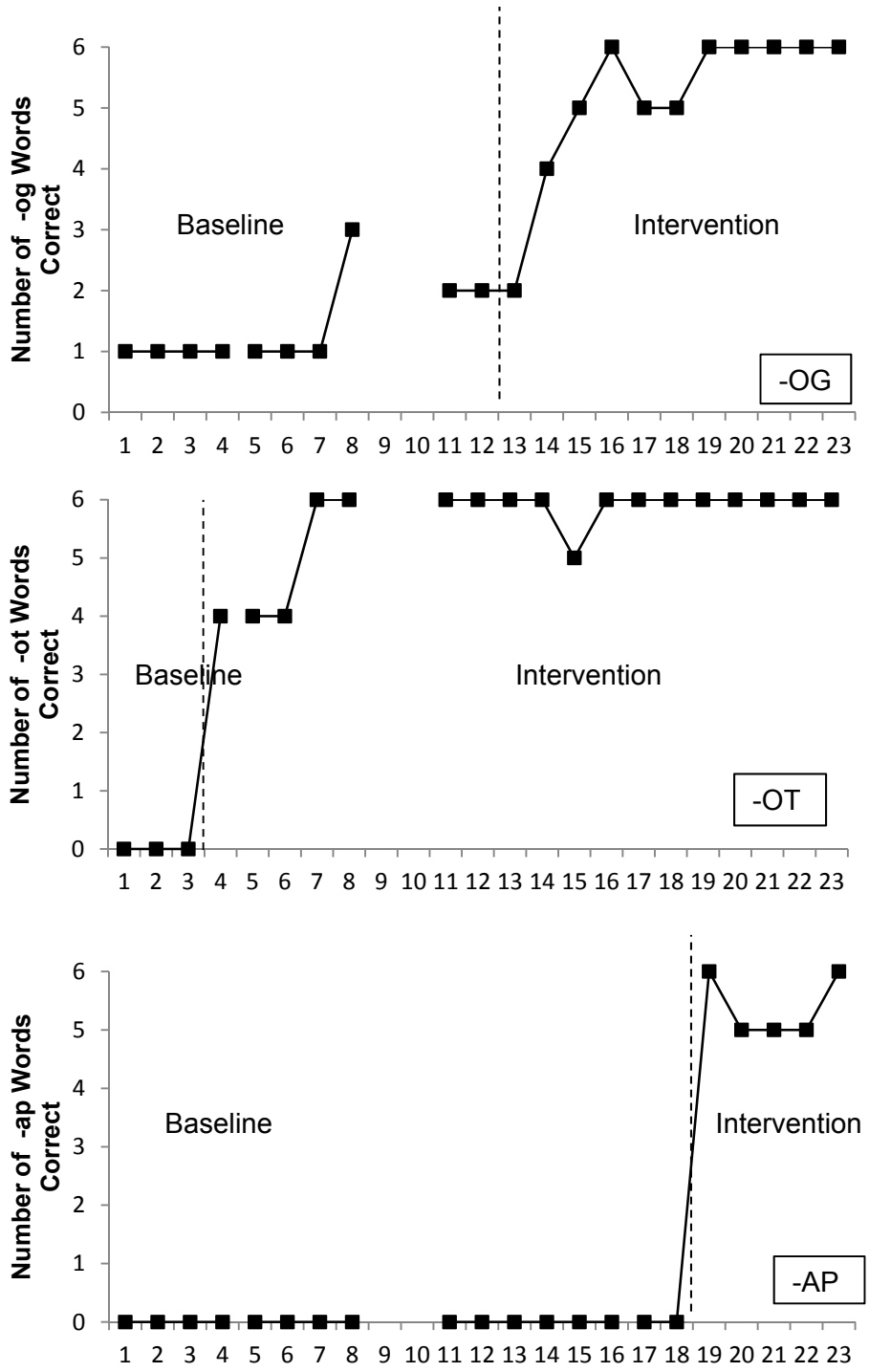

Figure 3. Alyssa's results for –ot, -og, and –ap targets. The data points show the number of CVC words read for that target for each intervention session. The dates of absence are noted by a gap in between data points. These absences occurred on 2/14-2/17.

Alyssa's results indicate that she responded positively to intervention and she was able to recognize words across all three targets. She made quick progress and maintained her performance throughout the intervention and maintenance sessions. Alyssa's performance illustrates the power of the intervention.

Table 3

Alyssa's Mean, Standard Deviation, and Range for all Targets during Each Phase

Target	Phase	Mean	SD	Range
	Baseline	0.0	0.0	0
ot	Intervention	5.6	0.8	4-6
	Baseline	1.3	0.7	1-3
og	Intervention	4.9	1.4	2-6
	Baseline	0.0	0.0	0
ap	Intervention	4.5	2.1	0-6

Samantha. During baseline assessments Samantha's performance was concerning; she was not able to read any of the target words through three baseline sessions. As intervention followed she made variable progress.

-ot target. As stated before, Samantha was not able to read any –ot words during the baseline sessions. However, she was able to read all six words after five intervention sessions. This was startling since there was no steady upward trend.

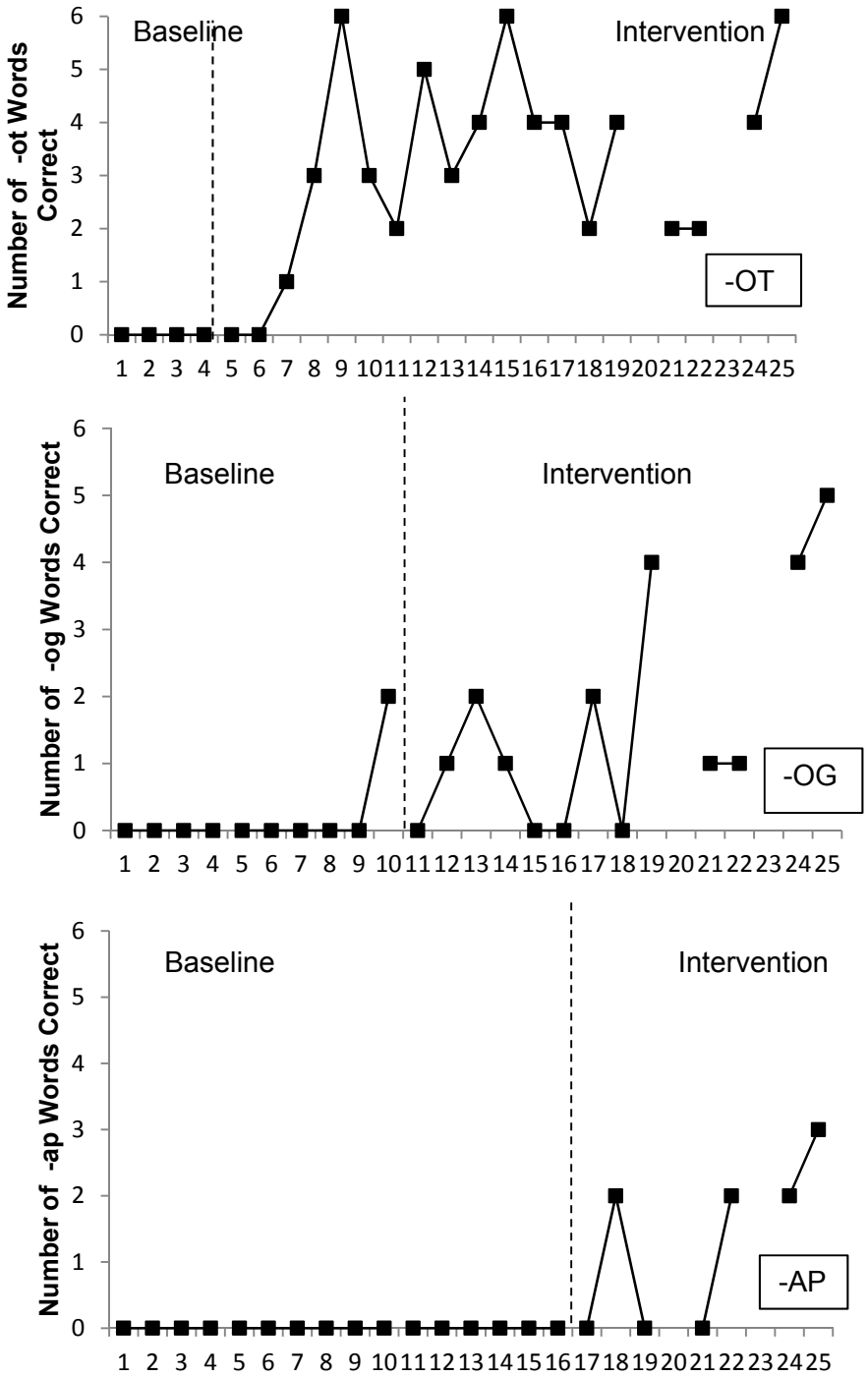

Figure 4. Samantha's results for –ot, -og, and –ap targets. The data points show the number of CVC words read for that target for each intervention session. The dates of absence are noted by a gap in between data points. These absences occurred on 3/16 and 3/27.

Nevertheless her performance did not remain steady and she only reached the criterion level two more times throughout the remainder of the sessions for the –ot words. At the last session she was able to read all six –ot words, not allowing for a maintenance phase for the –ot targets. She finished with a mean of 3.2, a standard deviation of 1.8, and a range of 0-6.

-og target. Samantha was not able to read any –og words during the baseline sessions. This pattern continued until we began –og intervention. She did not make significant progress until towards the end of the intervention sessions. On the last two sessions of intervention she was able to read four and five –og words correctly, respectively. She finished with a mean of 1.6, a standard deviation of 1.6, and a range of 0-5.

-ap target. Samantha was not able to read any –ap words during the baseline sessions or during intervention of the other targets. This inability to read –ap words continued until we targeted –ap words in intervention. Even then she was only able to read nine –ap words over the course of the last six sessions, with three of those coming from the last session. She finished with a mean of 1.3, a standard deviation of 1, and a range of 0 to 3. She did not reach criterion for this last target.

Samantha's results suggest that she was not able to generalize from reading –ot and –og interventions to learning to read the –ap targets. It also shows that she did not ever truly grasp the patterns until the very end of intervention, at which time it was not possible to evaluate any maintenance of abilities. She especially did not show significant progress in the –ap target, which suggests that she needs more time and exposure to understand, apply, and generalize the concepts across various reading tasks.

Table 4

Samantha's Mean, Standard Deviation, and Range for all Targets during Each Phase

Target	Phase	Mean	SD	Range
	Baseline	0.0	0.0	0
ot	Intervention	3.2	1.8	0-6
	Baseline	0.2	0.0	0
og	Intervention	1.6	1.6	0-5
	Baseline	0.0	0.0	0
ap	Intervention	1.3	1.2	0-3

Student Engagement During the Components of Instruction

Student engagement was measured using the DBRS (Chafouleas et al., 2009). Engagement was recorded by two undergraduate research assistants coding six intervention sessions of each student. The DBRS was used to measure engagement based on levels of academic engagement, respectfulness, and disruptiveness.

Along with the DBRS ratings the research assistants were asked to record any differences in engagement they observed between the standard SEEL intervention portion of the lesson and the digital book (iPad) portion.

Hands-on activity. This part of the DBRS ratings served to measure engagement while the students were participating in the traditional SEEL intervention. This included the introduction, the playful activity, and the blending cards portion of the intervention.

Mark. Mark's engagement throughout the interventions was inconsistent but showed a trend towards becoming more disruptive as the intervention continued. Mark required several prompts throughout the sessions to stay focused. The disruptiveness was demonstrated by asking questions about things in the room, starting off-topic conversations, and refusing to stay in his seat during the session. It should also be noted that he had several absences. Typically his engagement was poorer upon returning to intervention after an absence. He was motivated by the prize at the end; however, he never wanted the same prize twice. If the prize was one he had received before it did not encourage active participation in the intervention session. His inconsistent engagement seems to correlate with consistently low scores for all three target endings.

Table 5

Percent of Time Observed in Each of the DBRS Categories for Mark

Session Number	Engaged	Respectful	Disruptive
13	50%	60%	40%
14	40%	60%	40%
15	70%	80%	20%
17	80%	70%	50%
18	40%	50%	50%
20	80%	60%	30%

Note. Session 20 was a one-on-one session revisiting the –ot target.

Nathan. Nathan also showed inconsistent engagement throughout the intervention sessions; his academic engagement ranged from 100% to 10%. His respectfulness, while it also varied, showed more consistency, averaging 60%. He would often become distracted by children passing and usually was concerned about missing part of class. He was the participant that displayed the highest abilities and sometimes rebelled against the routine of the interventions. Like Mark, Nathan was highly motivated to stay engaged when he knew there was a prize at the end of the session. However, I had to bring novel prizes each time and keep the prize's description a secret to encourage active participation. Despite these behaviors Nathan learned the target endings quickly. When he was engaged he manifested it by following directions with minimal prompts, using the blending cards correctly, and engaging in reciprocal exchanges with both the instructor and his peer partner.

Table 6

Percent of Time Observed in Each of the DBRS Categories for Nathan

Session Number	Engaged	Respectful	Disruptive
12	10%	20%	90%
13	80%	70%	20%
14	10%	10%	90%
15	90%	80%	20%
17	70%	80%	40%
18	100%	100%	10%

Alyssa. Alyssa displayed consistent academic engagement throughout the intervention sessions. Her highest academic engagement rating was 100%, and her lowest was 80%. Her respectfulness and disruptiveness had similar ranges. She manifested her engagement by paying attention to the instructor, showing a willingness to participate in the activities, and offering answers using the target endings throughout the session. While she appreciated the prize at the end of each session it was not a highly motivating factor for her. Rather, she displayed an intrinsic desire to stay engaged and learn in the sessions. Her academic engagement correlates with her dramatic acquisition and maintenance of the target endings.

Table 7

Percent of Time Observed in Each of the DBRS Categories for Alyssa

Session Number	Engaged	Respectful	Disruptive
12	90%	100%	0%
13	100%	90%	0%
14	100%	90%	10%
15	90%	100%	10%
17	90%	100%	10%
18	80%	100%	10%

Samantha. Samantha's academic engagement was also consistent throughout the intervention sessions. Her highest academic engagement rating was 100% and her lowest was 80%. Her respectfulness and disruptiveness scores had similar ranges. She was quieter than her

peer partner Mark, but she would try to engage in reciprocal exchanges and attempt to correctly blend the sounds to form words using the target endings. She viewed the prize at the end as motivating but it was not highly motivating as it was for the two boys. She did stay engaged during the sessions but she continued to have low scores upon reading the target endings. She made some progress but more supplemental instruction than time allowed was needed. She did not attend summer school so there was no opportunity for more intervention.

Table 8

Percent of Time Observed in Each of the DBRS Categories for Samantha

Session Number	Engaged	Respectful	Disruptive
13	100%	100%	10%
14	90%	100%	10%
15	90%	90%	10%
17	80%	90%	10%
18	80%	70%	30%

Digital books. The students' engagement during the iPad portion of six sessions was also rated using the DBRS. I chose to separately rate the engagement during the hands-on activity and the use of digital books to examine any discrepancy between the two portions of the intervention. The paragraphs below outline the DBR scores for the iPad portion of each session, followed by the data in table form.

Mark and Samantha. Out of the seven sessions rated for these two students, four of the iPad sessions were rated to have 100% engagement in the academically engaged and respectful scales and 10% in the disruptive scale. It was also the session in which Samantha was absent that Mark had the lowest engagement ratings and the highest disruptive ratings. Based on this it appears that Mark was more engaged during the iPad portion when his peer partner was present.

Table 9

Mark and Samantha's iPad DBRS Results

	Mark			Samantha		
Session Number	Engagement	Respectful	Disruptive	Engagement	Respectful	Disruptive
13	100%	100%	10%	100%	100%	10%
14	70%	90%	40%	70%	90%	40%
15	50%	50%	50%	N/A (absence)		
17	70%	100%	10%	70%	100%	10%
18	N/A (absence)			100%	100%	0%
19	100%	100%	0%	100%	100%	0%

Nathan and Alyssa. Out of the six sessions rated for these two students, four of the iPad sessions had academic engagement and respectful ratings of 80% or higher, and four of them also had disruptive ratings of 20% or higher. Most of the higher disruptive scores came from Nathan. The raters noted that in two of the sessions Nathan was struggling to stay engaged and

was highly disruptive. These results are similar to the other dyad in that the male student had more difficulty maintaining engagement during the iPad portion as opposed to the female student.

Table 10

Nathan and Alyssa's iPad DBRS Results

	Nathan			Alyssa		
Session Number	Engagement	Respectful	Disruptive	Engagement	Respectful	Disruptive
12	80%	100%	10%	80%	100%	10%
13	10%	40%	90%	90%	40%	100%
14	100%	100%	0%	100%	100%	0%
15	80%	80%	30%	80%	80%	30%
16	50%	50%	50%	50%	50%	50%
18	90%	80%	20%	90%	80%	20%

Discussion

This study examined the effects of CVC reading intervention on kindergarten children who qualified for Tier 3 intervention. This reading intervention utilized digital books in the form of the Pictello program on an iPad to provide opportunities for children to practice reading and writing words with targeted endings. This discussion focuses on the major observations and

findings as to the efficacy of combining reading intervention with technological resources. It also discusses the limitations of this study as well as recommendations for future research.

Factors Impacting Student Performance

Each student's performance was impacted by the combined SEEL hands-on lesson activities and the digital books in the form of gains in their ability to read target CVC words. The data shows that each student made an increase from their baseline performance to the end of the intervention sessions. At the conclusion of the intervention all four students read 5 to 6 of the –ot and –og targets, and only Samantha failed to reach the criterion for the –ap target.

The structure of the intervention sessions played a role in the students' acquisition of the target CVC words by encouraging development of early literacy skills. The intervention incorporated the SEEL principles, namely explicit goals, playful interactions, meaningful context, and intense exposure to targets. As each intervention session started the students received explicit instruction as to the target ending of focus for the session and a brief discussion of the activity to follow. It was also at this time that the instructor related the target ending and activity to past experiences to create a meaningful context for learning the words. As the session continued the instructor provided intense exposure to the target words through a playful activity. After the activity the instructor used blending cards to continue the intense exposure and then used the iPad digital book to take a picture of the students doing part of the activity described in the digital storybook. The students would then review the target words by typing the target words into the iPad. The blending cards and use of the iPad digital books helped to develop the students' understanding of phonics by identifying the individual sounds and combining them with the target endings to produce the target CVC words.

The use of digital books allowed the students to increase their exposure to and manipulation of the target words. This in turn influenced their performance by increasing their practice of the target words as well as expanding the number of contexts in which they were exposed to the target words. It gave them a different context in which to view the target words and required their input to complete the activity. This review and novel context strengthened their phonological and phonemic awareness skills. The students were enthralled with the digital book and were eager to see themselves in a photo and contribute words to the text. This created a meaningful context in which the students used the digital books to review the target words. Since these students were already lagging behind their peers in terms of phonological and phonemic awareness skills, the SEEL lessons and the digital books provided the extra practice and expanded contexts needed to encourage generalization and proficiency. In fact, Nathan's classroom teacher reported that Nathan's scores for the end of the school year placed him on-track for mastery of essential skills, and he no longer needed specialized interventions.

Factors Influencing Student Engagement

Student engagement was measured by the instructor's online observations as well as video analysis by two research assistants. There was consistent agreement between these two sources of measurement. Furthermore, inter-rater reliability of 90% between the two research assistants was established prior to video analysis. Below is a combination of these two sources concerning student engagement, outlined in terms of the progression of the intervention sessions, namely, the SEEL intervention portion and the digital books portion. This is then followed by external factors which may have had an effect on student engagement over the course of the intervention portion of the study.

SEEL lessons. When the intervention sessions started all four students were curious as to the nature of the activities and were willing to participate upon the promise of a prize at the end of the sessions. Originally the two girls and the two boys were paired together. This pairing was based on the baseline results. As the intervention sessions continued it became apparent that the two boys were more interested in playing with each other than in participating in the activity. Furthermore, a discrepancy between the two girls' performance led to a reorganization of the dyads in the second intervention session. This change in the dyads increased engagement in the boys and better aligned the performance of each dyad. Each dyad as a whole was more engaged and a positive change in performance was seen. The interventions better served their purpose as the materials stimulated the students in both a meaningful and playful context.

The activities introduced learning in a playful context by having activities that appeared more as a game rather than an assignment. These activities often allowed the students to get out of their seats as they practiced the target words by "going on a frog jog," or "crossing the –ap gap." In fact, the "frog jog" activity was their favorite, as it involved looking for clues to a missing frog down the hall of their school. The children would often request to play that game. Furthermore, the student who struggled the most to make progress showed the most improvement in the –og target words. While there were days in which engagement varied, overall engagement was visible through the students' actions, facial expressions, and responses.

iPad digital books. The students consistently showed interest in using the iPad as part of their intervention session. The students used computers in the classroom on a daily basis so the use of technology at school was not novel to them. But utilizing technology in a portable format in which they could insert pictures of themselves and contribute to the text was most definitely attractive. Each session the children were eager to see the picture the instructor took of them as

well as offer up target words to type into the iPad. The iPad had a synthetic voice feature which would read the words they typed aloud; hearing the words they contributed was not only motivating but it also provided more exposure to the target words in a meaningful context.

The iPad portion of the intervention was in fact a very different type of task than the SEEL intervention portion. The main difference between the two was that the iPad portion allowed the children to practice reading and writing of the target words. In the iPad portion the children were expected to be able to both recognize and produce the target words, whereas the SEEL intervention focused more on exposure. The differences in the type and expectations of the tasks may offer insight into why the two portions of the assessment gave the results they did.

While the female students' engagement during the iPad portion was more consistent, there were some sessions in which the male member of the dyad struggled to stay engaged. This usually corresponded to lower engagement throughout the session. Nathan was particularly self-aware about when he was not willing to participate in the activity. After several cues and attempted behavioral modifications by the instructor Nathan would say, "I am having a hard day," or he would start making excuses such as, "My head hurts. My tummy hurts. My leg hurts." It was obvious that he was trying to get out of doing the activity and that resistance stretched from the beginning of the session through the iPad portion to the assessment. Mark would have difficulty staying engaged throughout the session; he would often require several cues for behavioral modification.. There were some sessions in which I had to remind him to stay in his seat, or to stop running around the hall, or to get off the floor. I found through the course of the intervention that these behaviors were curbed when I brought novel prizes and kept its description a secret until the children had finished the assessment.

The instructor's observations of engagement during the iPad portion were similar to the raters' scales and observations of the offline video analysis. Both found that the students' engagement during the SEEL intervention was often extended to the iPad portion, both positively and negatively. Overall, the iPad portion was helpful to the intervention in that it provided an alternative yet meaningful context in which the students could practice the target words and still contribute to the experience.

Absenteeism. One external factor that is worth discussing in relation to the results of this study is the amount of absences and their effect on the target word acquisition, especially for Mark. Mark was the student with the lowest baseline and intervention scores; he also had an abnormally high number of absences. Over the course of the standard eighteen sessions Mark was absent for five intervention sessions. He then missed an entire week of one-on-one intervention during summer school. These absences made it very difficult to make any forward progress; for instance, he read four –ot words in one session but then missed three sessions in a row. It took four more intervention sessions to get back up to that level. As mentioned above, I worked with Mark in summer school in a one-on-one structure. This was because he continued to struggle to both reach and maintain his progress, and his mother expressed both concern and a desire for me to continue intervention with him. However, after only two one-on-one sessions he told me he would be gone for the next week. I called that week, to verify that he was indeed absent.

It is difficult to list the reasons that Mark had such a high number of absences. Upon looking at the data, my intervention sessions were held on Tuesdays, Thursdays, and Fridays, and three out of five of his absences were on Thursday and/or Friday. It would seem that he had a tendency to miss the last few days of the week for whatever reasons. Furthermore, he told me

that he was going to miss a whole week of summer school because he was going to Disneyland. Since summer school is only four weeks long in the Provo school district, missing 25% of that greatly affected his performance. Based on both the data and the instructor's observations, Mark's absences significantly lessened the impact that intervention made on his reading abilities.

Environment. One other external factor that may have influenced the students' engagement was the environment in which intervention sessions were held. The kindergarten room was divided so that there was the classroom on one side and then there was a room with a table designated for small-group work. When sessions were conducted in this room the students remained more engaged since there were few distractions in this room. However, the majority of the intervention sessions were held out in the hallway at a desk, since the small-group table was often being used for other purposes. This led to distractions as other students filtered through the hall to go to recess, return to class, etc. The students I was working with often knew some of the students passing by and they would lose focus to say hello to their friends or ask them questions. I wish that there had been another place to conduct interventions as I feel the distractions would have been fewer and engagement may have been more consistent.

Recommendations for Integrating Technology into Early Literacy Instruction

This present study suggests that using technology in early literacy instruction can enhance the learning and acquisition of CVC words. However, there are several factors to take into consideration for this integration to be beneficial to young children. These factors can be divided into the quantity and quality of the use of technology. By considering both of these, using technology in early literacy instruction can create a seamless learning environment that still provides expanded, meaningful contexts.

Technology in the classroom may be best utilized as a supplemental tool to enhance learning rather than the main intervention. The students in this study received high-quality, small-group intervention that involved intense and explicit exposure in a playful, meaningful context. The use of the iPad was to provide extra practice of the target words in an alternative context. Since we used the iPad to take pictures of the students and insert their picture and contributions it was a meaningful context. However, had we used the iPad as the sole source of intervention the playfulness and thus the meaningfulness and effectiveness of the intervention sessions would have been lost. Using the iPad as a supplementary measure to high-quality instruction seems to be an effective alternative to relying on technology to facilitate acquisition of early literacy skills.

While we must consider the quantity of technology in early literacy instruction we must also consider the quality of the instruction that the technology provides. Students in today's schools are accustomed to using technology in the classroom that presents itself in the form of a game, whether for learning or recreational purposes. Since iPads do have access to various games and entertainment it is important to have an adult guide the use of the technology in order to maintain focus and facilitate reading acquisition. For instance, in the present study, I made sure that I was the only one allowed to take the pictures and type in the words that the children offered. This kept the children's exposure to the technology at a minimum, yet increased their exposure to the target words. Technology serves as a good medium for increasing exposure to target words and principles but students must be guided by an adult to ensure that using the technology produces the desired effect on their early literacy skills. This conclusion aligns with the National Association for the Education of Young Children's 2012 position statement concerning the use of technology in the classroom, " with guidance, these various technology

tools can be harnessed for learning and development; without guidance, usage can be inappropriate and/or interfere with learning and development" (p. 2). It is the responsibility of providers of education to be knowledgeable as to the types of technology available as well as their effective implementation in the school setting.

Limitations

This discussion would not be complete without mentioning the limitations of this study. First, it appears that one of the students, Nathan, improved on his reading abilities of target words before receiving intervention. He experienced improvement on both the –og and the –ap target words while receiving intervention for the –ot words. There are a few possibilities as to why this occurred.

Spontaneous generalization may have occurred as a result of improved sound blending abilities. The SEEL intervention emphasizes both awareness and decoding of all letters in a word. This extends as well to their ability to blend the various sounds in the word. If Nathan knew all the letter-sounds before intervention started, improving his ability to decode and blend the –og and –ap words may have triggered the generalization before those endings were addressed in intervention.

Another possibility to explain Nathan's spontaneous generalization could be his previous exposure to the target words combined with the above-mentioned improved blending abilities. He had received exposure to the –ap target in the classroom prior to intervention. This may have facilitated his reading ability and explained the spontaneous generalization of the –ap target. As far as the –og target is concerned, it may be that since he learned to decode and blend the short /o/ sound from the –ot intervention he recognized the similar letters and used his newly-strengthened blending skills to read the –og words before it was the target of intervention.

Second, the design of the study required that the study complete an assessment at the end of every intervention session. The students grew tired of this finishing task and they often asked questions like, “Why do we have to do this?” or “Why do you say those same words every time?” There were certain sessions in which engagement during the assessment was reduced and the student displayed various forms of distraction such as fidgeting in their seat or just saying, “ I don’t know” without even trying to read the words just to finish the assessment. I found that the students responded well to a prize. With the assessment being the last “obstacle” to receiving the prize the students maintained motivation throughout the session. The degree of motivation, at least in the beginning of the study, may have influenced the student performance during the assessment portion.

Third, this study can only generalize to students that have very similar profiles as the four students involved in the study. Each student had different strengths, weaknesses, personalities, and motivation that influenced their performance and response to the intervention. The study was designed to measure their performance before and after the intervention. Further research is needed to measure effectiveness in different populations and demographics. While these four students represent a fair portion of kindergarten students (they were all white, middle-class, etc.) the interpretation of the results is limited in its validity on other kindergarten students.

Finally, the fourth limitation to this study is the varied instructional format that the students received. The study was designed to have each session take place in a dyad to create a peer partner learning environment. However, due to the absences discussed earlier, these dyads did not always exist. Sometimes intervention was one-on-one which made the intervention more tailored to the individual student rather than balanced out between the two students. The

inconsistency of the actual intervention course must be noted, as it varies from the intervention design.

Future Research

While this study offers insight into the effectiveness of combining high-quality SEEL intervention with technology, there is still much research that needs to be done before this can be considered a generalized, proven, effective method for early literacy skill intervention. With an increase in the prevalence and variety of technology used in classrooms today more research is necessary to make sure that its use is based on reliable and sound principles of intervention. Research must also be conducted to determine how best to blend technology with face-to-face interactive instruction.

Another branch of future research worth examining is separating out the effects of the technology versus the face-to-face intervention more thoroughly. Since both aspects were part of each intervention session it was much more difficult to determine the relative effect that each component had on each student. For instance, there were two days in which the iPad was not used because the battery died. When looking at those days, it is difficult to attribute the students' performance solely to the absence of the iPad. It would be worthwhile to design a study in which data was systematically collected as to the students' performance on "iPad" versus "non-iPad" days. Research such as this would be useful to identify which style of intervention had the most effect on the acquisition of early literacy skills.

A third recommendation for future research is experimentation with various iPad applications and the personalization and features of the applications. Developing applications that encourage more participation, engagement, and actual reading of the target words may provide a more tailored experience and enhance performance. These newly-developed

applications should also be tested and evaluated in an actual classroom with feedback as to their effectiveness from the classroom teacher as well as supplemental instructors.

Finally, future research should also widen the demographics of the students participating in the intervention. This can be useful in strengthening the validity of the intervention with students of varying abilities and backgrounds. Furthermore, it will add to the reliability of the intervention with kindergarten students struggling to stay on grade-level in terms of literacy skill acquisition. It is imperative to conduct more research into the efficacy of integrating technology into high-quality early literacy intervention because it is a method which is universally attractive and engaging to children. Technology has the potential to provide widened context and exposure to target words and principles inherent in early literacy skill acquisition.

References

Allington, R. L. (1984). Content, coverage, and contextual reading in reading groups. *Journal of Reading Behavior, 16*(2)*,* 85-96.

Barrentine, S. J. (1996). Engaging with reading through interactive read-alouds. *The Reading Teacher*, *50*(1), 36-43.

Becker, M., McElvany, N., & Kortenbruck, M. (2010). Intrinsic and extrinsic motivation as predictors of reading literacy: A longitudinal study. *Journal of Educational Psychology*, *102*(4), 773-785. doi: 10.1037/A:0020084

Bingham, G. E., Culatta, B., & Hall-Kenyon, K. M. (2006). Systematic and Engaging Early Literacy: Examining the effects of a one year intervention in kindergarten. Unpublished Manuscript.

Bingham, G. E., Hall-Kenyon, K. M., & Culatta, B. (2010). Systematic and Engaging early literacy: Examining the effects of paraeducator implemented early literacy instruction. *Communication Disorders Quarterly*, *32*(1), 38-49.

Bradley, R., Danielson, L., & Doolittle, J. (2005). Response to intervention. *Journal of Learning Disabilities*, *38*(6), 485-486. Retrieved from http://ldx.sagepub.com

Brown, A. L., Palincsar, A. S., & Purcell, L. (1986). Poor readers: Teach, don't label. In U. Neisser (Ed.), *The school achievement of minority children: New perspectives* (pp. 105-143). Hillsdale, NJ: Erlbaum.

Carlin, J. (1970). Intensive reading instruction. *The Reading Teacher*, *23*(5), 422-425.

Castle, J. M., Riach, J., & Nicholson, T. (1994). Getting off to a better start in reading and spelling: The effects of phonemic awareness instruction within a whole language program. *Journal of Educational Psychology, 86*, 350-359.

Center on Education Policy. (2008). Has student achievement increased since 2002: State test score trends through 2006–2007. Washington, DC: Author.

Christ, T. J., Riley-Tillman, T. C., & Chafouleas, S. M. (2009). Foundation for the development and use of direct behavior rating (DBR) to assess and evaluate student behavior. *Assessment for Effective Intervention*, *34*(4), 201-213. doi: 10.1177/1534508409340390

Craig, S. A. (2006). The effects of an adapted interactive writing intervention on kindergarten children's phonological awareness, spelling, and early reading development: A contextualized approach to instruction. *Journal of Educational Psychology* *98* (4), 714–731 doi: 10.1037/0022-0663.98.4.714

Culatta, B., Aslett, R., Fife, M., & Setzer, L. A. (2004). Project SEEL: Part I. Systematic and Engaging Early Literacy Instruction. *Communication Disorders Quarterly*, *25*(2), 79-88. Retrieved from http://cdq.sagepub.com

Culatta, B., Hall, K., Kovarsky, D., & Theadore, G. (2007). Contextualized approach to language and literacy instruction. *Communication Disorders Quarterly*, *28* (4), 216-235.

Culatta, B., Kovarsky, D., Theadore, G., Franklin, A., & Timler, G. (2003). Quantitative and qualitative documentation of early rhyme instruction. *American Journal of Speech Language Pathology*, *12* (2), 172-188.

Culatta, B., Reese, M., & Setzer, L. A. (2006). Early literacy instruction in dual language (Spanish/English) kindergarten. *Communication Disorders Quarterly*, *27*(2), 67-82.

Culatta, B., Setzer, L. A., Wilson, C., & Aslett, R. (2004). Project SEEL: Part III. Children's Engagement and Progress Attainments. *Communication Disorders Quarterly*, *25*(3), 127-144. Retrieved from http://cdq.sagepub.com

Culatta, R., Culatta, B., Frost, M., & Buzzell, K. (2004). Project SEEL: Part II. Using

technology to enhance early literacy instruction in Spanish. *Communication Disorders Quarterly*, *25*(2), 89-96. Retrieved from http://cdq.sagepub.com

Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology*, 33, 934−945. Retrieved from http://www.apa.org/pubs/journals/dev/index.aspx

Curby, T. W., Rimm-Kaufmann, S. E., & Ponitz, C. C. (2009). Teacher-child interactions and children's achievement trajectories across kindergarten and first grade. *Journal of Educational Psychology*, *101*(4), 912-925. doi: 10.1037/a0016647

de Graff, S., Bosman, A., Hassleman, F., & Verhoeven, L. (2009). Benefits of systematic phonics instruction. *Scientific Studies of Reading, 13*(4), 318-333. DOI: 10.1080/10888430903001308

Dee, T., & Jacob, B. (2011). The impact of No Child Left Behind on student achievement. *Journal of Policy Analysis and Management*, *30*(3), 418-446. doi: 10.1002/pam.20586

DeThorne, L. S., Petrill, S. A., Schatschneider, C., & Cutting, L. (2010). Conversational language use as a predictor of early reading development: Language history as a moderating variable. *Journal of Speech, Language, and Hearing Research, 53*(1), 209-233.

Ehri, L., Nunes, S. R., Stahl, S. A., & Willows, D. M. (2001). Systematic phonics instruction helps students learn to read: Evidence from the National Reading Panel's meta-analysis. *Review of Educational Research*, *71*(3), 393-447.

Ehri, L., Nunes, S.,Willows, D., Schuster, B., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly, 36*(3), 250–287. doi:

10.1598/RRQ.36.3.2

Elbro, C., & Petersen, D. (2004). Long-term effects of phoneme awareness and letter sound training: An intervention study with children at risk for dyslexia. *Journal of Educational Psychology*, *96*(4), 660-670

Foorman, B. R., Breier, J. I., & Fletcher, J. M. (2003). Interventions aimed at improving reading success: An evidence-based approach. *Developmental Neuropsychology*, *24*(2-3), 613-639. Retrieved from http://www.tandf.co.uk/journals/titles/8756-5641.asp

Foorman, B. R., Fletcher, J. M., Francis, D. J., Schatschneider, C., & Mehta, P. (1998). The Role of instruction in learning to read: Preventing failure in at-risk children. *Journal of Educational Psychology, 90*(1), 37-55.

Goldenberg, C. (1992). Instructional conversations: Promoting comprehension through discussion. *The Reading Teacher*, *46*(4), 316-328.

Goldstein, D. (1976). Cognitive-linguistic functioning and learning to read in preschoolers. *Journal of Educational Psychology*, *68*, 680-688.

Gray, C., Ferguson, J., Behan, S., Dunbar, C., Dunn, J., & Mitchell, D. (2007). Developing young readers through the linguistic phonics approach. *International Journal of Early Years Education*, *15*(1), 15-33. doi: 10.1080/09669760601106869

Hatcher, P., Hulme, C., & Ellis, A. (1994). Ameliorating early reading failure by integrating the teaching of reading and phonological skills: The phonological linkage hypothesis. *Child Development*, *65(1)*, 41-57.

Harn, B. A., Stoolmiller, M., & Chard, D. J. (2008). Measuring the dimensions of the alphabetic principle on the reading development of first graders. *Journal of Learning Disabilities*, *41*(2), 143-157.

Hudson, R. F., Isakson, C., Richman, T., Lane, H. B., & Arriaza-Allen, S. (2011). An examination of a small-group decoding intervention for struggling readers: Comparing accuracy and automaticity criteria. *Learning Disabilities Research & Practice*, *26*(1), 15-27. Retrieved from http://www.wiley.com/WileyCDA/WileyTitle/productCd-LDRP.html

Iversen, S., & Tunmer, W. (1993). Phonological processing skills and the Reading Recovery Program. *Journal of Educational Psychology*, *85*, 112-126.

Jackson, J. B., Paratore, J. R., Chard, D. J., & Garnick, S. (1999). An early intervention supporting the literacy learning of children experiencing substantial difficulty. *Learning Disabilities Research & Practice*, *14*(4), 254-267. Retrieved from http://www.wiley.com/WileyCDA/WileyTitle/productCd-LDRP.html

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology*, *80*(4), 437-447. Retrieved from http://www.apa.org/pubs/journals/edu/index.aspx

Kame'enui, E. J., Simmons, D. C., Baker, S., Chard, D. J., Dickson, S. V., Gunn, B., Smith, S. B., Sprick, M., & Lin, S. J.(1997). Effective strategies for teaching beginning reading. In E.J. Kame'enui & D. W. Carnine (Eds.), *Effective teaching strategies that accommodate diverse learners.* Columbus, OH:Merrill.

Kendeou, P., van den Broek, P., White, M. J., & Lynch, J. S. (2009). Predicting reading comprehension in early elementary school: The independent contributions of oral language and decoding skills. *Journal of Educational Psychology*, *101*(4), 765-788. doi: 10.1037/A0015956

Kerins, M. (2006). The effects of systematic reading instruction on three classifications of

readers. *Reading Research and Instruction, 45*(3), 243-260.

Korth, B. B., Sharp, A. C., & Cullatta, B. (2010). Classroom-based supplemental literacy instruction: Influencing the beliefs and practices of classroom teachers. *Communication Disorders Quarterly*, 31, 113-127.

Lee, J. (2006). *Tracking achievement gaps and assessing the impact of NCLB on the gaps: An in-depth look into national and state reading and math outcome trends*. Boston: Harvard University.

Leslie, L., & Allen, L. (1999). Factors that predict success in an early literacy intervention project. *Reading Research Quarterly*, *34*(4), 404-424. Retrieved from http://www.reading.org/General/Publications/Journals/RRQ.aspx

Lonigan, C. J., Burgess, S. R., & Anthony, J. L. (2000). Development of emergent literacy and early reading skills in preschool children: Evidence from a latent variable longitudinal study. *Developmental Psychology, 36,* 596-613.

MacDonald, C., & Figueredo, L. (2010). Closing the gap early: Implementing a literacy intervention for at-risk kindergarteners in urban schools. *Reading Teacher*, *63*(5), 404-419. doi: 10.1598/RT.63.5.6

Marshall, E. E. (2011). *An examination of the effects of using systematic and engaging early literacy instruction to teach tier 3 students to read consonant-vowel-consonant (CVC) words* (Unpublished master's thesis). Brigham Young University: Provo, UT. Retrieved from http://search.lib.byu.edu/byu/id:byu_unicorn5226801

Martin, F., Claydon, E., Morton, A., Binns, S., & Pratt, C. (2003). The development of orthographic and phonological strategies for the decoding of words in children. *Journal of Research in Reading*, *26*(2), 191–204.

McBride-Chang, C. (1995). What is phonological awareness? *Journal of Educational Psychology*, *87*(2), 179-192. Retrieved from http://www.apa.org/pubs/journals/edu/index.aspx

Morgan, P. L., Fuchs, D., Compton, D. L., Cordray, D. S., & Fuchs, L. S. (2008). Does early reading failure decrease children's reading motivation? *Journal of Learning Disabilities*, *41*(5), 387-404. 10:1177/0022219408321112

Naremore, R. C., Densmore, A. E., & Harman, D. R. (1995). *Language intervention with school-aged children: Conversation, narrative, and text*. San Diego, CA: Singular.

National Association for the Education of Young Children. (2012). *Technology and interactive media as tools in early childhood programs serving children from birth through age 8*. Washington, DC: Fred Rogers Center, Saint Vincent College.

National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: an evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (NIH Publication No. 00-4754). Washington, DC: U.S. Government Printing Office.

Nithart, C., Demont, E., Metz-Lutz, M., Majerus, S., Poncelet, M., et al. (2011). Early contribution of phonological awareness and later influence of phonological memory throughout reading acquisition. *Journal of Research in Reading*, *34*(3), 346-363. DOI: 10.1111/j.1467-9817.2009.01427.x

O'Connor, R. E., Bocian, K., Beebe-Frankenberger, M., & Linklater, D. L. (2010). Responsiveness of students with language difficulties to early intervention in reading. *Journal of Special Education*, *43*(4), 220-235. doi: 10.1177/0022466908317789

Perfetti, C. A., Beck, I., Bell, L. C., & Hughes, C. (1987). Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children. *Merrill-Palmer Quarterly, 33*(3), 283–319.

Ponitz, C. C., & Rimm-Kaufmann, S. E. (2011). Contexts of reading instruction: Implications for literacy skills and kindergartener's behavioral engagement. *Early Childhood Research Quarterly*, *26*(2), 157-168. doi: 10.1016/j.ecresq.2010.10.002

Raynor, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest, 2*(2), 31–74.

Read, C., Zhang, Y., Nie, H., & Ding, B. (1986). The ability to manipulate speech sounds depends on knowing alphabetic writing. *Cognition*, *24*, 31-44.

Richgels, D. J., Poremba, K. J., & McGee, L. M. (1996). Kindergarteners talk about print: Phonemic awareness in meaningful contexts. *The Reading Teacher*, *49*(8), 632-645.

Ryder, F., Tunmer, W. E., & Greaney, K. T. (2008). Explicit instruction in phonemic awareness and phonemically based decoding skills as an intervention strategy for struggling readers in whole language classrooms. *Reading and Writing*, *21*(4), 349-369. doi: 10.1007/s11145-007-9080-z

Schatschneider, C., Fletcher, J., Francis, D., Carlson, C., & Foorman, B. (2004). Kindergarten prediction of reading skills: A longitudinal comparative study. *Journal of Educational Psychology*, *96*(2), 265-282. doi: 10.1037/0022-0663.96.2.265

Schatschneider, C., Francis, D. J., Foorman, B. R., & Fletcher, J. M. (1999). The dimensionality of phonological awareness: An application of item response theory. *Journal of Educational Psychology*, *91*(3), 439-449.

Schencker, L. (2012, June 30). Utah granted waiver to No Child Left Behind. *Salt Lake Tribune*. Retrieved from http://archive.sltrib.com/printfriendly.php?id=54403500&itype=cmsid

Schwartz, R. M. (2005). Literacy learning of at-risk first-grade students in the reading recovery early intervention. *Journal of Educational Psychology*, *97*(2), 257-267. doi: 10.1037/0022-0663.97.2.257

Scull, J. A., & Lo Bianco, J. (2008). Successful engagement in an early literacy intervention. *Journal of Early Childhood Literacy*, *8*(2), 123-150. doi: 10.1177/1468798408091852

Shankweiler, D., & Fowler, A.E. (2004). Questions people ask about the role of phonological processes in learning to read. *Reading and Writing: An Interdisciplinary Journal*, *17*, 483-515. Retrieved from http://connections.ideals.illinois.edu/publications/3569

Shapiro, L. R., & Solity, J. (2008). Delivering phonological and phonics training within whole-class teaching. *British Journal of Educational Psychology*, *78*(4), 597-620. doi: 10.1348/000709908X293850

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology*, *100*(4), 765-781. doi: 10.1037/a0012840

Squires, A. (2006). Phoneme awareness is not a prerequisite for learning to read. *Written language and literacy*, *9*(1), 115-133.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21,* 360-407.

Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structure model. *Developmental Psychology*, *38*(6), 934-947. doi: 10.1037/0012-1649.38.6.934

Taylor, B. M., Pearson, P. D., Clark, K., & Walpole, S. (2000). Effective schools and

accomplished teachers: Lessons about primary-grade reading instruction in low-income schools. *The Elementary School Journal*, *101*(2), 121-165. Retrieved from http://www.press.uchicago.edu/ucp/journals/journal/esj.html

Ukrainetz, T. A., Cooney, M. H., Dyer, S. K., Kysar, A. J., & Harris, T. J. (2000). An investigation into teaching phonemic awareness through shared reading and writing. *Early Childhood Research Quarterly*, *15* (3), 331-355.

Vadasy, P. F., & Sanders, E. A. (2010). Efficacy of supplemental phonics-based instruction for low-skilled kindergarteners in the context of language minority status and classroom phonics instruction. *Journal of Educational Psychology*, *102*(4), 786-803. doi: 10.1037/a0019639

Vadasy, P. F., Sanders, E. A., & Peyton, J. A. (2006). Code-oriented instruction for kindergarten students at risk for reading difficulties: A randomized field trial with paraeducator implementers. *Journal of Educational Psychology*, *98*(3), 508-528. doi: 10.1037/0022-0663.98.3.508

Vellutino, F. R., Scanlon, D. M., Zhang, H., & Schatschneider, C. (2008). Using response to kindergarten and first-grade intervention to identify children at-risk for reading difficulties. *Reading and Writing*, *21*(4), 437-480. doi: 10.1007/s11145-007-9098-2

Wigfield, A., & Guthrie, J. T. (1997). Relations to children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology*, *89*(3), 420-432. doi: 10.1037/0022-0663.89.3.420

Yopp, H. K. (1992). Developing phonemic awareness in young children. *The Reading Teacher*, *45*(9), 696-703.

Appendices

Appendix A

Informed Consent

Systematic and Engaging Early Literacy Intervention
Consent to be a Research Subject

Participant Consent

Introduction
This research study is being conducted by Kendra Hall and Barbara Culatta with assistance from students at Brigham Young University, to investigate the effects of using Systematic and Engaging Early Literacy (SEEL), as a literacy intervention for students needing extra literacy support.

Procedures
Your child will participate in SEEL activities 3 days per week in a small group of 2 students, for approximately 4-6 weeks. Each session will last approximately 20 minutes and will include having children encounter engaging reading and writing activities presented on an iPad. Your child will be assessed on his/her ability to read 18 3-letter words approximately 4 times before the intervention sessions begin and after each intervention session. Your child will also be asked to identify the meanings of two or three words that will be taught during the reading instruction.

Intervention sessions will be video recorded and 30% of them will be watched by 2 research assistants, to determine accuracy of SEEL teaching by the instructor. Similarly, assessment sessions will be video recorded and 30% of them will be watched by 1 research assistant to ensure reliability in assessment practices and agreement in results. Video recordings of the assessment sessions will not be used for future purposes and will be destroyed following data collection. However, video recordings of the intervention sessions may be used for future training and professional development. If you are willing to allow the video footage of the intervention sessions to be used for this purpose, please sign your name here: _____

Immediately following each intervention session your child will be asked what he/she thought of the activity by circling the picture that most accurately describes how they feel.

Risks/Discomforts
There are minimal risks for participation in this study. However due to repeated assessments, your child may experience assessment fatigue and/or frustration. During baseline assessment it is anticipated that your child will not be able to read the words at all, and so may feel a little uncomfortable. To counteract these possible risks your child will be told that he/she may not be able to read these words yet and it is okay to say, "I don't know!" Furthermore, a small prize (e.g., a sticker or a small candy) will be given to your child no matter how he/she performs in the assessment.

Benefits
It is anticipated that the literacy intervention will improve your child's literacy skills and help your child in learning to read.

Confidentiality
All information provided will remain confidential and will be reported using pseudonyms. All data will be kept in a secure place and only those directly involved with the research will have access to them.

Questions about the Research
If you have questions regarding this study, you may contact Kendra Hall at (801) 422-4439 or Kendra_Hall@byu.edu. *contact Audra Hales at 619-204-1989 or avdrahales@gmail.com

Brigham Young University IRB
APPROVED EXPIRES
DEC 29 2011 MAR 06 2012

Questions about your Rights as Research Participants
If you have questions regarding your rights as a research participant, you may contact IRB Administrator, Brigham Young University, A-285 ASB Campus Drive; Provo, UT 84602; (801) 422-1461; irb@byu.edu.

Participation
Participation in this research study is voluntary. You have the right to withdraw your child at any time or refuse to allow him/her to participate entirely without any consequence.

I have read, understood, and received a copy of the above consent and desire of my own free will to allow my child to participate in this study.

Signature:_____Date:_____

Appendix B

Assessment Check Sheet

I'm going to ask you to try to read some words. I may not have taught you to read all of the words yet, so if you don't know how to read a word that's okay, just say, "I don't know" and move onto the next word by pressing this button. When you're done you'll get a prize, even if you don't know the words. Now do your best reading.

Date:

Name:

-ot words	
dot	
pot	
hot	
not	
rot	
got	
-og words	
dog	
hog	
log	
bog	
fog	
jog	
-ap words	
cap	
gap	
lap	
map	
rap	
tap	

Name:

-ot words	
dot	
pot	
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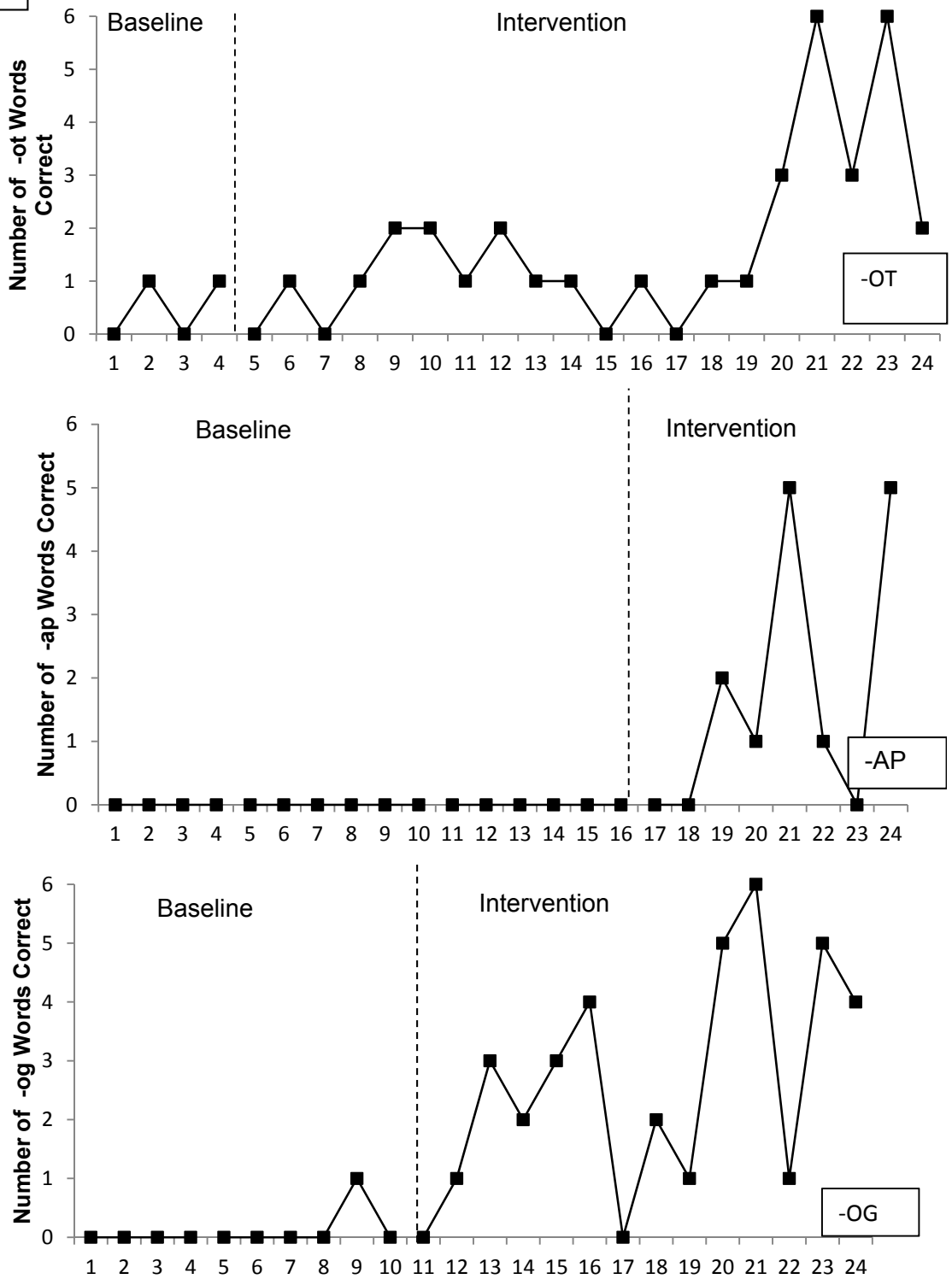
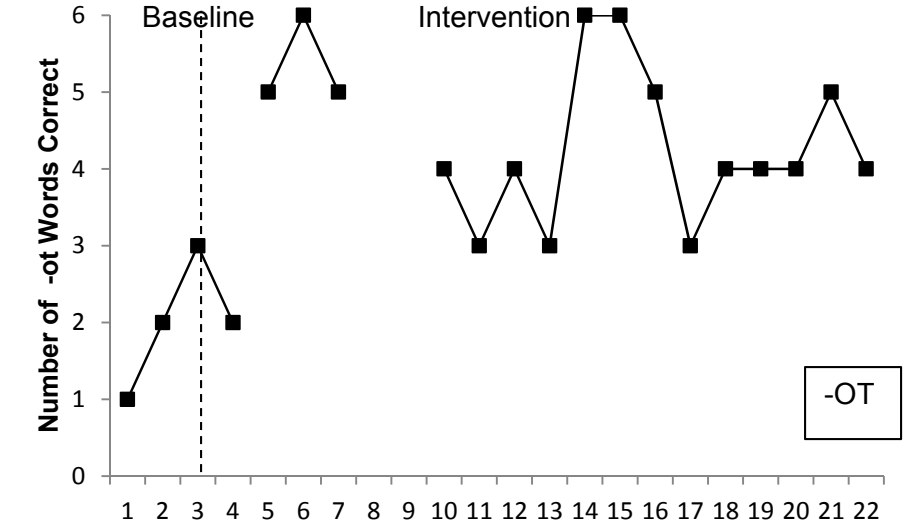
Appendix C

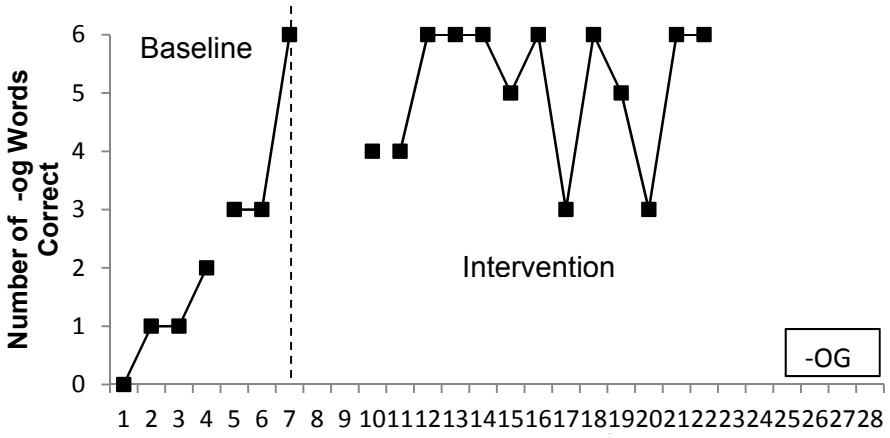
Raw Data

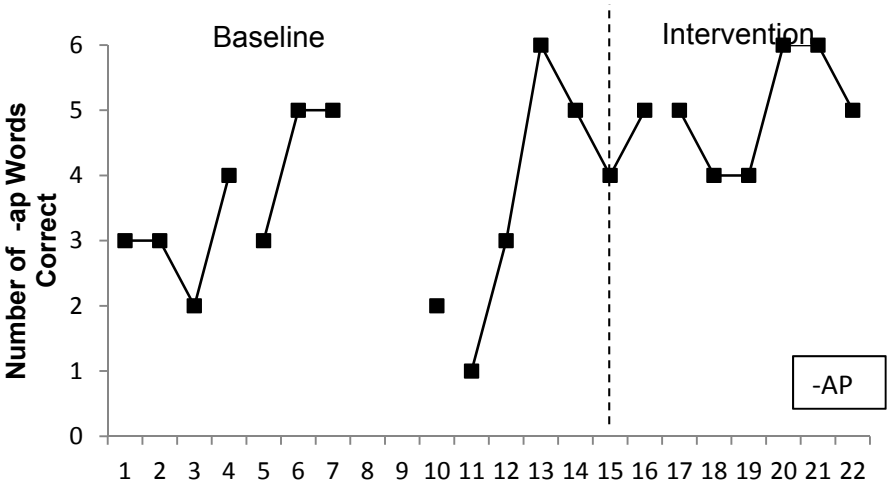
Mark



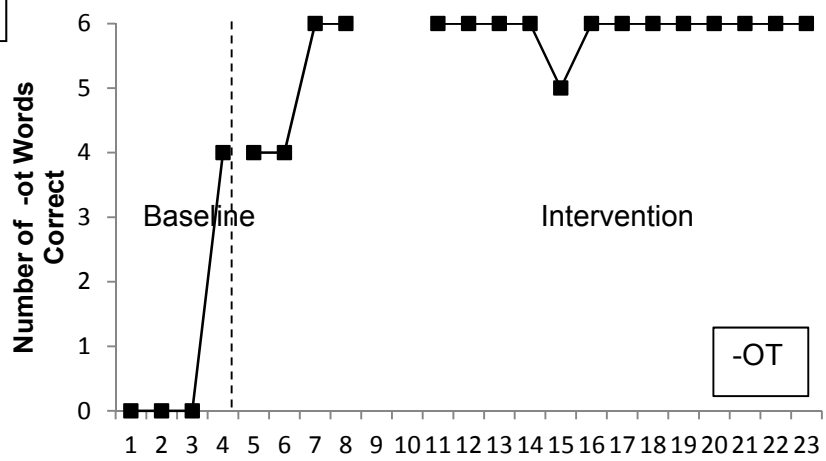
Nathan

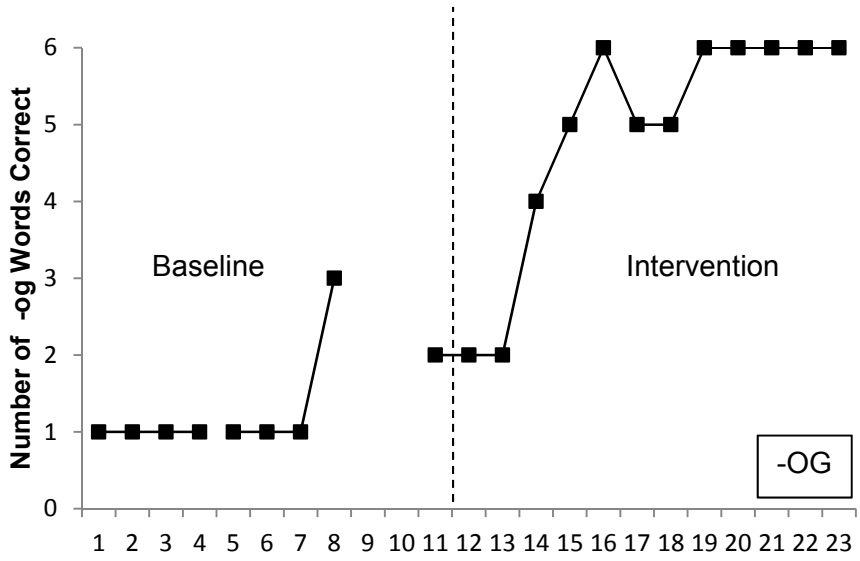


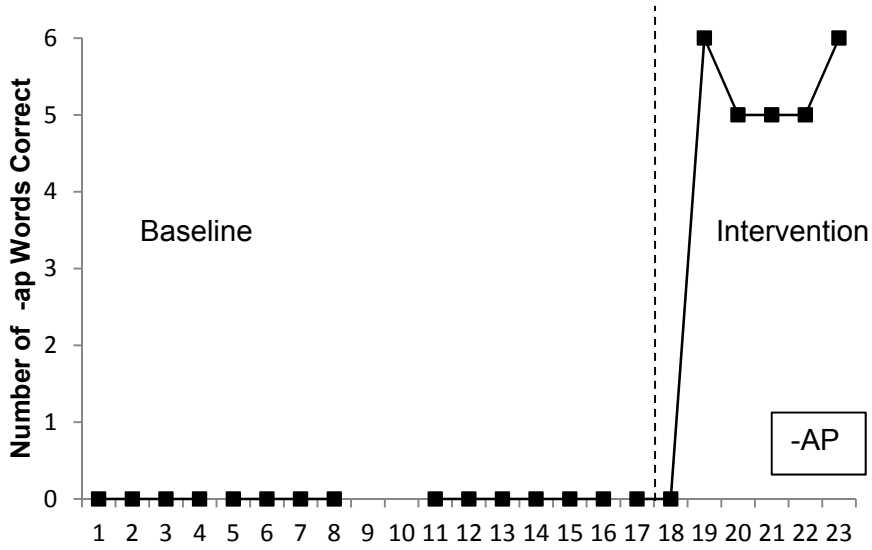




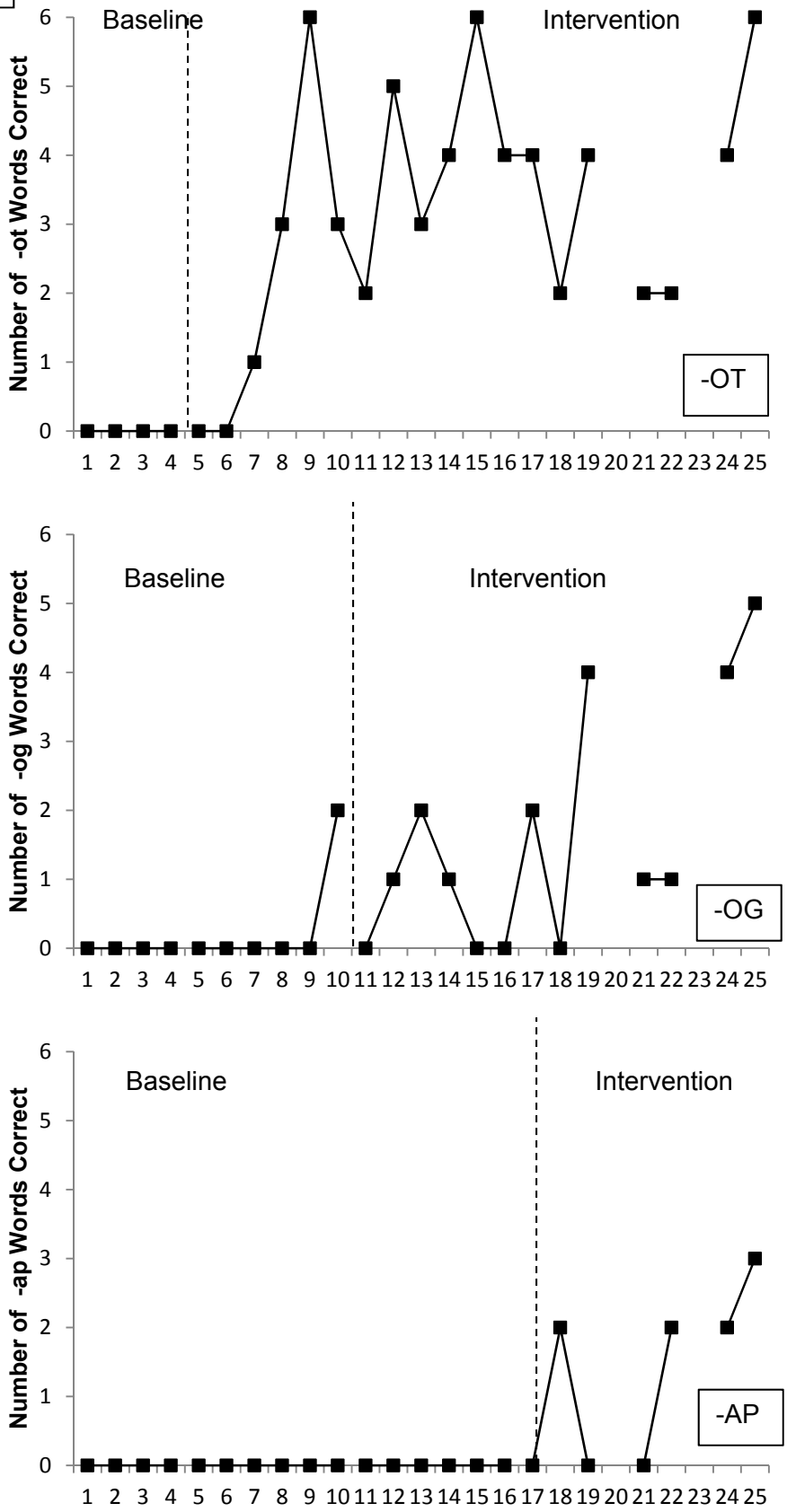
Alyssa







Samantha



Appendix D

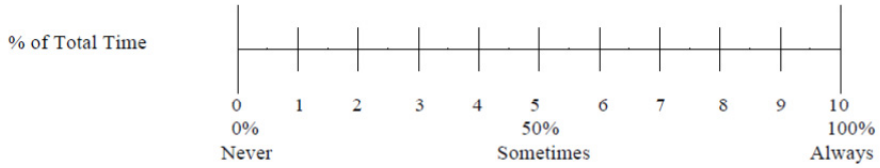
DBR Standard Form

Direct Behavior Rating (DBR) Form: 3 Standard Behaviors

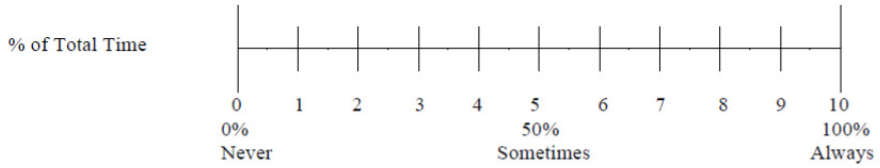
Date: M T W Th F	Student: Rater:	Activity Description:
Observation Time: Start:_____ End: _____ ☐ Check if no observation today	Behavior Descriptions: **Academically engaged** is actively or passively participating in the classroom activity. For example: writing, raising hand, answering a question, talking about a lesson, listening to the teacher, reading silently, or looking at instructional materials. **Respectful** is defined as compliant and polite behavior in response to adult direction and/or interactions with peers and adults. For example: follows teacher direction, pro-social interaction with peers, positive response to adult request, verbal or physical disruption without a negative tone/connotation. **Disruptive** is student action that interrupts regular school or classroom activity. For example: out of seat, fidgeting, playing with objects, acting aggressively, talking/yelling about things that are unrelated to classroom instruction.	

Directions: Place a mark along the line that best reflects the percentage of total time the student exhibited each target behavior. Note that the percentages do not need to total 100% across behaviors since some behaviors may co-occur.

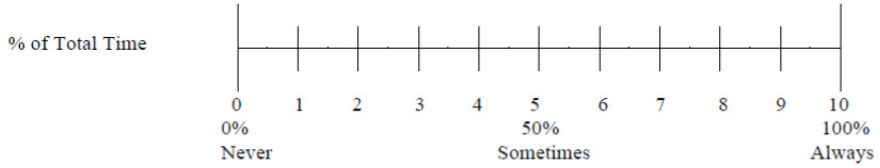
Academically Engaged



Respectful



Disruptive *



* Remember that a lower score for "Disruptive" is more desirable.

Appendix E

Treatment Fidelity Check Sheet

Meaningful Yes/No

a.	Was the activity appropriate for kindergarten age children?	
b.	Did the instructor link the activity to students' prior knowledge and experience?	
c.	If necessary did the instructor illustrate the meaning of target words to students?	

Explicit Yes/No

a.	Did the instructor explicitly state the target at the beginning of the lesson?	
b.	Did the instructor restate the target throughout the activity?	
c.	Did the instructor model the target and the activity for students?	

Playful and Engaging

a. Was the instructor playful with the students?

None of the time	Some of the time	Most of the time	All of the time

b. Did the instructor encourage the students to be playful?

None of the time	Some of the time	Most of the time	All of the time

c. Were the students actively involved?

None of the time	Some of the time	Most of the time	All of the time

d. Did the students appear to enjoy the activity?

None of the time	Some of the time	Most of the time	All of the time

e. Did students appear to be engaged in the activity?

None of the time	Some of the time	Most of the time	All of the time

Intense exposure to targets

How many times did you hear the instructor use the target words and sounds each minute of the activity?

1 min	2 min	3 min	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Were students given opportunities to use the target words and sounds, e.g, through conversation, songs, chants, reading, and writing? _____

Reciprocal exchanges

a. Did the instructor listen to the students and respond to their actions and comments?

None of the time	Some of the time	Most of the time	All of the time

b. How many times did you see this occur? _____