

'Explicitly teaching at risk grade Prep students the link between phonemes and 2-letter dependable rime units improves their phonological knowledge, in particular their phonemic awareness; and their ability to read words in isolation.'

Abstract

A problem some students with reading difficulties have is their inability to connect their understanding of phonemes with the understanding that letters and sounds are what make up words. The first step towards success in this area is to ensure the development of students' phonemic knowledge. This skill of recognising letters (in all their forms) needs to become automatic and somewhat intrinsic. Further to this, students need to understand the reciprocal relationship between phonemes and words.

In this study there were nine participants. Five students were selected as the teacher group. They were involved in pre and post testing, and also received explicit teaching focusing on the relationship between phonemes and two-letter dependable rime units, in the hope that it would improve their ability to read words. Four participants were selected as the control group. They were involved in the pre and post testing phase of the project, but not in the lesson sequence. Their results were used to measure the validity and success of the intervention.

All students participated in formal assessment (pre and post). They were assessed on their phonemic knowledge, phonological awareness and word reading accuracy using the Clay Letter Identification Test (Clay, 1993), Sutherland Phonological Awareness Test- Revised (SPAT-R) (Neilson, 2009) and the Rime Unit Test (Dalheim, 2004)

The ten-lesson sequence was only taught to the teacher group. During this time the students were explicitly taught eight 2-letter dependable rime units. The rime units were chosen based on the results of the pre-testing data, which identified them as rime units the students were unable to read accurately. The focus of each lesson was the introduction of one two-letter dependable rime unit and five or six 3-letter words reinforcing the two-letter dependable rime unit. All ten lessons were recorded to enable analysis of lessons and student learning at a later stage. Anecdotal notes were taken to monitor improvements, difficulties and changes throughout the lessons.

The hypothesis tested was that,

'Explicitly teaching at risk grade Prep students the link between phonemes and 2-letter dependable rime units improves their phonological knowledge, in particular their phonemic awareness; and their ability to read words in isolation.'

The findings of my study indicated that the explicit teaching of the relationship between phonemes and 2-letter dependable rime units does increase an individual's ability to read words in isolation. The study showed that this form of intervention not only promotes the development of phonological knowledge, in particular phonemic awareness, but also supports the development of decoding skills needed to read words.

Implications for this study indicate that in order for students to develop these skills they need to have developed their phonological knowledge in particular phonemic knowledge and phonemic awareness, as well as have developing orthographic knowledge. Further to this, students need to develop an understanding of, and skills in, efficient strategies for decoding words. Opportunities for explicit teaching should be part of a good intervention program and more specifically part of the Literacy block in the foundation years of school. Explicit teaching that includes direct instruction of phonological knowledge more specifically, focusing on phonemic knowledge and phonemic awareness will in turn support the development of reading success in young students.

Introduction

Learning to read is a requirement for our literary society of today. Reading is a multifaceted task that involves accessing texts at multiple levels. When reading a reader accesses the text at word, sentence, conceptual, topic and dispositional level. They also draw on their oral language and experiential knowledge (components of their existing knowledge) to process the text. (Munro, 2011) For the most part children in their foundation years of schooling develop and learn to use these skills in order to be good readers. For those children who have trouble learning this, reading can be a difficult task.

One component of this difficulty is characterized by a child's limited development of phonological awareness. A child's development of phonological awareness and in particular their phonological knowledge is considered to be the foundation of reading acquisition (Hines, 2009).

Love & Reilly (2007) define phonological awareness as an individual's capacity to 'tune into' the sound systems of our language. It is the understanding that language is made up of, and contains sounds, words, rhymes and syllables. According to Trehearne (2003) and Munro (2006) phonological awareness occurs through oral language. Individuals do not have to know how to name letters or their corresponding sounds in order to demonstrate phonological awareness.

Phonological knowledge however requires individuals to have an understanding of the sound properties of our language (Munro, 2006). Munro, (1998, p. 3) defines phonological knowledge as "what we know about the sound patterns in our words." It encompasses at least five sub components: phonemic knowledge, phonemic awareness, phonetic knowledge, phonic knowledge and phonological recoding. How an individual uses these components of phonological knowledge is defined by Munro as the 'phonological processes' (Munro, 1998).

Phonological awareness in a sense could be seen as the 'umbrella' to which the development of phonological knowledge and phonological processes are linked. For the purpose of this study I will be focusing on the development of phonological knowledge; in particular the development of, and relationship between phonemic knowledge (knowledge of individual sounds), and phonemic awareness (awareness of individual sound patterns in speech); and the impact this has on a child's ability to read words.

Phonological knowledge is a crucial stage in literacy development. It forms the foundation of individual's literary skills and is strongly linked to a child's future reading success. Although phonological knowledge can appear to develop naturally for some children through exposure to oral language, rhyme, and the written language, for many individuals' this crucial stage in literacy development is limited and as a consequence learning to read is difficult (Crim, 2008).

Phonological knowledge is acquired developmentally within the first three to four years of schooling (Lenchner, Gerber & Routh, 1990; Vandervelden & Siegal, 1995; Yopp, 1992, cited in Munro, 1998). It is initially characterized by an individual's ability to name objects. Following this stage individuals learn to recognise sound patterns in words, they then segment words into onset and rime, they learn to isolate sounds within words, segment and blend one-syllable words, and in time learn phonological recoding. Developing these phonological skills equips learners with early decoding strategies used in reading. Further development of their phonological knowledge sees individuals manipulating sound patterns in more complex ways. They learn to match sounds in multiple words, they learn to delete sounds from words, substitute and categorise sounds (Munro, 1998).

Orthographic knowledge is learnt gradually alongside the acquisition of phonological knowledge. Munro (2006) defines orthographic knowledge as the understanding of letter clusters. In summary, it is the knowledge an individual has of how patterns of letters are used in written English to write words. It is characterized by an individual's development in, and ability to, recognise the written form of letters and words automatically and accurately. It also includes the ability to segment and recode letters in order to read unknown words (Munro, 1998). Geudens (2006, p.25) summarises this relationship by saying that an individual's "orthographic awareness and phonological awareness crucially depend on each other and ultimately work in concert to help the learner break the code of an alphabetic writing system."

Young learners who have difficulty reading are less able to perform these processes of linking their phonological knowledge and orthographic knowledge. Geudens (2006) highlights that there is an increasing consensus among researchers that a difficulty in learning to read develops from weaknesses in one's phonological knowledge. A child's knowledge of letters, their ability to hear rhymes and phonemes, distinguish syllables, and understand the relationship between written and spoken letters and words are all variables that influence their success in reading, and their development of language skills (Whitehurst & Lonigan, 1998 cited in Crim, 2008). This is evident when some learners for example, may be able to identify individual letters when they see words but do not see groups of letters at a time. They cannot identify letter clusters. Their reading may be indicative of reading words by sounding out individual letters or more often than not identifying one or two letters within a word and guessing what the word is. Characteristically, children at this stage of their development of reading are often unable to transfer what they know about individual sounds (or groups of sounds) to read words. They cannot profitably use their phonological knowledge in partnership with their orthographic knowledge.

A crucial component to these children's success in reading is the explicit instruction and development of their own understanding of how spoken words are structured and composed of individual sounds and combinations of sounds (Geudens, 2006). One of the initial steps towards being able to read is the understanding of letters and letter sounds; the development of phonemic knowledge. This includes the ability to recognise and differentiate between all the letters of the alphabet (their name, sound(s) and

visual representation). This skills of recognising letters (in all their forms) needs to become automatic and somewhat intrinsic. Further to this children need to recognise that letters and sounds are what make words. Explicitly teaching these children phonemic awareness and its relationship with phonemic knowledge improves their ability to read. According to Ball & Blachman (1998, cited in Munro, 1998) combining the teaching of letter-sound relationships in conjunction with phonemic awareness is more effective than teaching phonemic awareness or phonics in isolation.

In saying this, the extent to which this explicit teaching of the reciprocal phoneme/phonemic relationship is effective is also dependent on the implementation of effective 'decoding' strategies an individual can use when reading. One such strategy being the segmentation of words into the onset and the rime.

It is thought that from a young age as children grow to be phonological aware, they become familiar with rhyme through oral language. Munro (1998) suggests that this is part of one's phonological development. He goes on to state that as children learn to systematically recode written words they learn to recognise letter clusters rather than the individual letters. Developing this skill of segmenting words into onset and rime is considered easier than identifying single phonemes, and is a skill that increases word reading efficiency (Munro,1998 & Chard,1999).

In summary, it has been identified that phonological knowledge, in particular phonemic knowledge and phonemic awareness are necessary for learning to read words. It has been acknowledged that the relationship between the two components of phonological knowledge is reciprocal. Further to this it has been discussed that in order for individuals to develop reading acquisition, they also need to develop an understanding of, and skills in, efficient strategies for decoding words.

Many researchers (Geudens, 2006; Chard 1999; & Ellis, 1997) advocate that there is a correlation between early phoneme awareness and later reading success. They link difficulties in reading to poorly developed phoneme awareness skills. Many believe intervention that includes direct instruction of phonological knowledge in combination with the teaching of the grapheme-phoneme relationship has been beneficial in developing individuals' word identification, reading and spelling ability. This view is supported by Chard (1999) who states that success in early reading development has been in many cases dependent on children having an understanding of the internal structures of words, and an awareness of the phonology that makes up words.

Taking this into consideration, the present study will focus on developing students' phonological knowledge; but more specifically will target the explicit teaching of the relationship between phonemes and two-letter dependable rime units, to increase students' word reading accuracy.

The chosen phonemes and rime units will be based on rime units that the children do not read automatically. The study will first explicitly teach students the relationship between chosen phonemes and chosen dependable rime units. It will then explore how this knowledge can be applied to read words through segmenting words into their onset and rime. These skills will be taught in ten lessons over a two week period. Each lesson will run for approximately forty-minutes. The lessons will include a combination of oral language tasks, identification of phonemes, reading, and the segmenting and blending of individual rime units and focus words.

Hypothesis

'Explicitly teaching at risk grade Prep students the link between phonemes and 2-letter dependable rime units improves their phonological knowledge, in particular their phonemic awareness; and their ability to read words in isolation.'

Method

Design

The study was a naturalistic case study using an OXO (Assess, Teach, Assess) design. It focused on the development of individuals' phonological knowledge, and their progress made in reading CVC words in isolation. This development was the result of explicit teaching of the relationship between phonemes and 2 letter dependable rime units for at risk grade Prep students. The study also has an OO (Assess, Assess) design group, to compare pre and post testing results with the OXO group. For the purpose of this research project the participants' in the OXO design will be referred to as the 'teacher group' and the participants' of the OO design will be referred to as the 'control group'.

Participants

The chosen participants attend a Catholic Primary School situated in Melbourne. The school represents a culturally diverse community of middle socioeconomic background. The school implements a sequential Literacy program based on the CLaSS Literacy model and works within the standards contained in the Victorian Essential Learning Standards.

There were ten students chosen to participate in this study, however one declined (a participant of the control group). All students are currently in Grade Prep, with ages ranging from 69 months to 78 months. Four of the nine participants (two from the control group and two from the teacher group) are from families that speak English as a second language.

Participants were chosen from two separate Prep classes. The teacher group was made up of five students from one Prep class, and for this study they are referred to as students 'A, B, C, D, and E'. Within this group there was two girls and three boys. The control group was made up of four students from the second Prep class, and for this study they are referred to as students 'F, G, H, and I'. Within this group there was one girl and three boys.

All nine participants were chosen because they were identified as at risk based on analysis of CEO base line data at the beginning of the current school year. This decision was further supported by ongoing informal assessment, observations and recommendations by their classroom teachers. The decision to choose groups of students from separate classes was based on accessibility to the students for teaching purposes.

The nine participants are all considered 'at risk' readers according to their classroom teachers. Two participants of the teacher group (Students B and D) have trouble pronouncing some sounds in speech.

It should be noted that these students have been referred for further assessment in this area, but have not received any intervention as yet.

An overview of the participants in the study is summarized in Table 1. A detailed Table of the participants and their results can be found in Appendix 1.

Table 1.

Name	Control = 0 Teaching=1	Age in MONTHS	Gender 0=Male 1=Female	Years of Schooling	ESL No=0 Yes=1	LNSLN funding 0=SLD 1=ID 2=Asp	Earlier Intervention No=0 RR=1 Bridges=2 ERIK=3	CEO Baseline Data		EMA No=0 Yes=1
								Letter ID Test	Word Test	
A	1	70	1	8 months	0	0	0	26	0	0
B	1	70	1	8 months	0	0	0	28	0	0
C	1	74	0	8 months	0	0	0	6	0	0
D	1	75	0	8 months	1	0	0	24	0	0
E	1	74	0	8 months	1	0	0	24	0	0
F	0	69	1	8 months	0	0	0	29	1	0
G	0	72	0	8 months	1	0	0	21	1	0
H	0	78	0	8 months	0	0	0	6	1	0
I	0	70	0	8 months	1	0	0	51	1	0

Materials

Formal Assessment Materials:

In pre and post testing for this study the nine participants were administered the following tests.

Clay Letter Identification Test. (Clay, 1993)

This test was used to assess student's ability to identify all uppercase and lowercase letters and the sounds they represent. It also assessed their ability to name a word that starts with the identified letter. This assessment of word association provides knowledge of whether students have connections between known words and initial sounds.

Sutherland Phonological Awareness Test- Revised (SPAT-R). (Neilson, 2009)

This test was used to evaluate student's phonological knowledge. The test includes syllable counting, rhyme detection and production, identification of initial and final sounds, word segmentation and blending and deletion of phonemes. Form A was used for the pre-testing phase and Form B was used for the post-testing phase.

Rime Unit Test. (Dalheim, 2004) (Adapted by teacher. Only sub-test one was administered.)

This test was used to assess student's knowledge of, and ability to read words containing two letter dependable rime units. In this study only sub-test one (the first forty-eight words) was chosen. This was further broken down into two subsets each containing 24 words.

Teaching Materials:

In teaching the sequence of ten lessons for this study the following materials were used. An example of some of the teaching materials can be found in Appendix 3

- Picture flashcards of the target words for each rime unit taught. (Cherry, 2009)
- Flash card of each dependable rime unit.
- Flash cards of the phonemes that make up the rime units.
- Flash cards of the individual consonants' that make up the target words when using the rime units. E.g. 'c, b, h' for 'c/at, b/at, h/at'.
- Individual sets of rime units and onset cards (relevant consonants) used to build target words. (One set for each student)
- RAN PowerPoint's. One for each lesson where a new rime was introduced. These included two font types (Arial and Comic Sans).
- Two sets of flash cards of target words.
- Partner Puzzle cards containing images and target words. (Cherry, 2009)
- Word Slides containing target words. (Cherry, 2009)
- Missing Letter cards containing images and target words. (Cherry, 2009)

Procedure

The project took four weeks to complete. Two weeks for pre and post testing and two weeks to implement the 'sequence of ten lessons' to the teacher group.

Pre and post testing for this study was administered with all nine participants. All tests were administered on a one-to-one basis outside the classroom prior to the implementation of the ten-lesson sequence. Where possible all three tests (Letter ID, Rime Unit Test and SPAT-R) were administered in one sitting for each student.

The ten-lesson sequence was developed and taught based on the 'Model of Teaching and Learning' developed by Collins, Brown and Newman (1989, as cited in Munro J. K., 2011). The model is designed around six key ideas of 'Modelling, Coaching, Scaffolding and Fading, Articulation, Reflection and Exploration'. The 'Modelling Phase' gives students the opportunity to observe the new learning task as the teacher models it. During the 'Coaching Phase' students engage in the new learning task as the

teacher coaches them, providing support, prompts and feedback. This leads to the 'Scaffolding and Fading Phase.' During this phase the teacher scaffolds the students learning providing cues to assist the students in their development of skills. This inturn leads to fading the scaffolding as the students become increasingly competent in completing the tasks independently. The phase of 'Articulation' involves students articulating their knowledge and understanding of the new skills being taught. The

'Reflection Phase' is interwoven at this point, but specifically involves students thinking about what they have learnt that they did not know before. The 'Exploration Phase' is a discussion between the teacher and students focusing on when and how the students can use what they have learnt in a new task or context. (Munro, 2011)

The ten-lesson sequence was only taught to the teacher group. During this time the control group continued to participate in their class Literacy Block, receiving no additional intervention or support in their learning. The ten lessons took place in the classroom environment during the morning Literacy Block. Each lesson was taught as a teacher focus group, and was approximately forty-minutes. These lessons were recorded to enable analysis of lessons and student learning at a later stage. Anecdotal notes were taken to monitor improvements, difficulties and changes throughout the lessons.

An outline of the 'Ten Lessons Sequence' format can be found in Appendix 2

The ten-lesson sequence began with four explicit teaching lessons being taught over a period of four days. Each individual lesson (lessons 1-4) introduced a new two-letter dependable rime unit and five or six corresponding target words. The fifth lesson was designed to 'review and consolidate' the four two-letter dependable rime units and the target words previously taught in the four lessons.

The next four lessons (lessons 6-9) were explicitly taught over a period of four days introducing a further four two-letter dependable rime units and five or six corresponding target words. Lesson ten was designed and implemented to 'review and consolidate' the eight two-letter dependable rime units and the corresponding target words taught over the two-week period.

The rime units explicitly taught in the eight teaching lessons were 'at, it, an, ot, in, ap, ug and ay'. The rime units were chosen based on the results of the pre-testing data which identified that students A, B, C, D and E had difficulty with or were not able to read the rime units within sub-test one of the Rime Unit test. (Refer to Table 2 in Results)

The focus of each lesson was the introduction of one two-letter dependable rime unit and five or six 3-letter words reinforcing the two-letter dependable rime unit. Each lesson was broken into seven parts. The following is an explanation of the lesson(s) format.

Lesson Format

Modeling Phase

- Part One: Oral Language

Identifying pictures of target words and identifying rhyming words.

Students were first introduced to the rime unit through picture cards of the target words that reinforced the rime unit. For example in lesson one the rime unit taught was 'at'. Students were shown images of the target words cat, mat, hat, rat, bat and sat.

The students were then asked to identify the pictures, saying them out loud. As a group they identified the pictures and with teacher support identified that the words rhyme.

The teacher repeated this process of having the students name the pictures for a third time, asking the students to *"Listen to the sounds their mouth makes when they say the names of the pictures."* Doing this tuned the students into 'sound knowledge' as opposed to simply naming pictures. The teacher then asked, *"What sounds can you hear in all of these words?"*

- Part Two: Oral Language

Producing rhyming words.

The teacher and students then brainstormed other words sharing the same rime unit. They discussed whether the words were 'real' or 'nonsense' words.

Modeling and Coaching Phase

- Part Three: Phonemic Awareness

Introducing the letter cluster.

The teacher explicitly introduced the rime unit using 2 flash cards which made up the rime unit e.g. 'a' and 't'. The teacher then modeled the relationship between the individual phonemes and the rime unit saying e.g. *" 'A' says 'a' and 'T' says 't'. When we put them together they say 'at'. 'a/t...at'.* As the teacher did this they modeled the 'making and breaking' strategy used by Reading Recovery. They exaggerated the rime 'at' by bringing the 't' to the 'a' (moving from right to left).

The teacher then supported the students in naming each sound and placing them together to say 'at'. As a group they made the rime unit using actions or other materials. For example, using

their fists to imitate the blending of the sounds to make the rime unit or using magnetic letters to make the rime unit.

The teacher then introduced the onset flash cards (consonants) which when blended with the rime unit made the target words. The teacher supported the students in identifying the name and sound of each letter. The teacher then modeled making a word e.g. 'cat' using the rime unit flashcard(s) and an onset flash card(s). This followed the same 'making and breaking' approach as mentioned earlier.

Coaching Phase

- Part Four: Blending Task

Making Words.

Each student was given a set of rime unit cards and onsets. The teacher guided the students in choosing an onset and a rime card, reading the onset and rime to make one of the target words. At this stage the teacher prompted the students to identify the name of the onset e.g. 'c' and the name of the rime e.g. 'at', and the process of blending the two. E.g. 'c/at-cat'. The teacher encouraged the technique of sliding the rime unit to the onset. Students took it in turns until they had made all the words.

Scaffolding and Fading Phase

- Part Five: Phonological Knowledge

Reading target words, RAN and Games.

Students then took it in turns to read the list of words that they made.

Following this the group was shown a RAN PowerPoint. Together they read the words as they were shown, and then they were read individually.

Students then played two games that helped to consolidate their learning. All the games developed for this teaching sequence required students to recall, read or make the targeted words. Examples of the games played in the ten lessons are listed below.

- Memory
- Snap
- Partner Puzzle
- Word Slides
- Missing Letter

- Part Six: Oral Language

Using target words in a sentence.

The teacher then revisited the target words taught in the lesson using flashcards. As a group they read the words and they were placed in the middle of the group. The teacher then introduced the task of saying a sentence using at least two of the target words. The teacher initially asked students to finish their sentence using one or more of the target words they had learnt. E.g. the teacher said, “*The cat sat on the ___*” and students had to finish the sentence. However as the students became familiar with this process and task, they were asked to make up their own sentence independently.

Articulation, Reflection and Exploration Phase

- Part Seven: Oral language

Reflecting and articulating what they learnt.

Students then reflected on their learning. This was initially prompted by the teacher e.g. “Today we learnt that ‘a’ and ‘t’ say ‘at’ as in cat and bat. Can you think of another word?”

However, once students were familiar with this process of thinking about what they had learnt and the process of articulating it, they were capable of identifying what they learnt, and the strategies they could use when trying to read words. They independently identified the rime units taught and demonstrated how they can break words up.

At the completion of the ten-lesson sequence all nine participants (teacher group and control group) were post-tested using the chosen formal assessment materials (Letter ID test, Rime Unit test and SPAT-R test).

Data Collection

All data collected during the pre and post-testing phase can be found in Table 2 in Results. It was administered, collated and analysed for two main purposes.

1. Pre-testing data was used to identify the student’s knowledge of phonemes, and to identify and analyse their ability to read words. The pre-testing data was also used to direct the teachers planning and implementation of the ten-lesson sequence for this study.
2. Both the pre-testing data and post-testing data was used as a measuring tool enabling the teacher to compare and analyse the growth of both the teacher group and control group post

intervention. These results informed the teacher as to whether intervention in the chosen area was successful.

When analysing the results, 'growth' of the group and individuals' was measured by finding the growth between pre and post-tests and calculating this as a percentage. (Marshu, 2005)

The formal assessment tools used for this study were the Clay Letter Identification Test (Clay, 1993), the Sutherland Phonological Awareness Test–Revised SPAT-R (Neilson, 2009) and the Rime Unit Test (Dalheim, 2004).

Clay Letter Identification Test. (Clay, 1993)

For the purpose of this research the Clay Letter ID test was adapted in the way it was administered. All participants were required to identify the name and sound of every uppercase and lowercase letter shown, as well as identify a word beginning with the associated letter. (This is referred to as the subsets of the Letter ID test). For each correct response they scored 1 point, out of a possible 54 items in each subset.

The Letter ID test was analysed in the following ways:

- Adding the total of the subset scores of each group and finding the average of their total raw score found the groups' 'Total Raw Score Mean'.
- Adding the groups' individual subset raw scores and finding their average found the groups' 'Subset Raw Score Group Mean'.
- Participant's individual raw scores for each subset (name, sound, word) were found by scoring 1 point for every correct response, out of a possible 54 items. These results were represented as raw scores and percentages.

Sutherland Phonological Awareness Test –Revised (SPAT-R). (Neilson, 2009)

This test was used to evaluate student's phonological knowledge.

The SPAT-R was analysed in the following ways:

- The groups' raw scores were scored in accordance with the SPAT-R Manual (Neilson, 2009) calculating the number of items correctly answered out of a possible 60.
- The groups' 'Raw Score Group Mean' was found by adding the groups' raw score results (out of a possible 60) and finding the average.
- The groups' 'Percentile Ranking' was scored in accordance with the percentile equivalents provided in the SPAT-R Manual (Neilson, 2009)

Rime Unit Test. (Dalheim, 2004)

The teacher adapted this test; and only sub-test one was administered. This was further broken down into two sub-sets. One sub-set included 24 3-letter words and the other included 24 4-letter words.

The Rime Unit Test was analysed in the following ways:

- All participants' individual raw scores were found by scoring 1 point for every word read correctly, out of a possible 48 items. These results were represented as raw scores and percentages. They were also divided into two subsets of 3-letter words and 4-letter words.
- Each groups 'Raw Score Group Mean' was found by adding the groups individual raw score results and finding their average.

Results

Analysis of all nine participants' data indicates improvement in their phonological knowledge and in particular their ability to read words in isolation. Pre-test data indicates that on average the control group was stronger in most areas of assessment than the teacher group. Post-test data highlights that the gains made by the teacher group were greater than those of the control group, thus supporting the notion that explicitly teaching the link between individual sounds and 2-letter dependable rime units improves phonological knowledge and the ability to read words in isolation.

A summary of the teacher group and control groups results for the Clay Letter Identification test (Letter ID), the Rime Unit test and the Sutherland Phonological Awareness Test-Revised (SPAT-R) are summarized in Table 2. (A detailed Table can be found in Appendix 1.)

Table 2. Summary of Results

Student	Control = 0 Teaching=1	Attendance No. of sessions	LETTER ID Letter Name Recognition Raw Score PRE	LETTER ID Letter Sound Recognition Raw Score PRE	LETTER ID Word Association Raw Score PRE	LETTER ID Mean Raw Score PRE	LETTER ID Letter Name Recognition Raw Score POST	LETTER ID Letter Sound Recognition Raw Score POST	LETTER ID Word Association Raw Score POST	LETTER ID Mean Raw Score POST	Rime Units Test Raw Score PRE	Rime Units Test Raw Score POST	SPAT-R Test Raw Score PRE	SPAT-R Test Raw Score POST	SPAT-R Test Percentile Ranking PRE	SPAT-R Test Percentile Ranking POST
A	1	10	52	48	34	45	54	54	51	53	7	44	23	39	41	92
B	1	10	50	43	34	42	53	53	50	52	4	37	22	39	40	92
C	1	10	44	32	39	38	50	49	48	49	0	32	19	35	31	87
D	1	10	50	45	40	45	53	54	54	54	5	44	16	36	25	87
E	1	10	49	40	22	37	51	50	50	50	9	42	25	38	47	88
F	0	0	49	43	43	44	52	49	49	50	16	21	27	28	55	63
G	0	0	52	52	50	51	53	53	53	53	8	17	17	16	27	17
H	0	0	43	38	42	41	48	45	49	47	2	18	34	28	77	63
I	0	0	53	53	53	53	54	54	54	54	22	29	26	30	49	75

Clay Letter Identification Test Results

An overview of all students' phonemic awareness was identified by administering the Clay Letter Identification Test (Letter ID test) (Clay, 1993). The Letter ID test results indicate growth for all individual students', both within the teacher group and the control group.

Figure 1

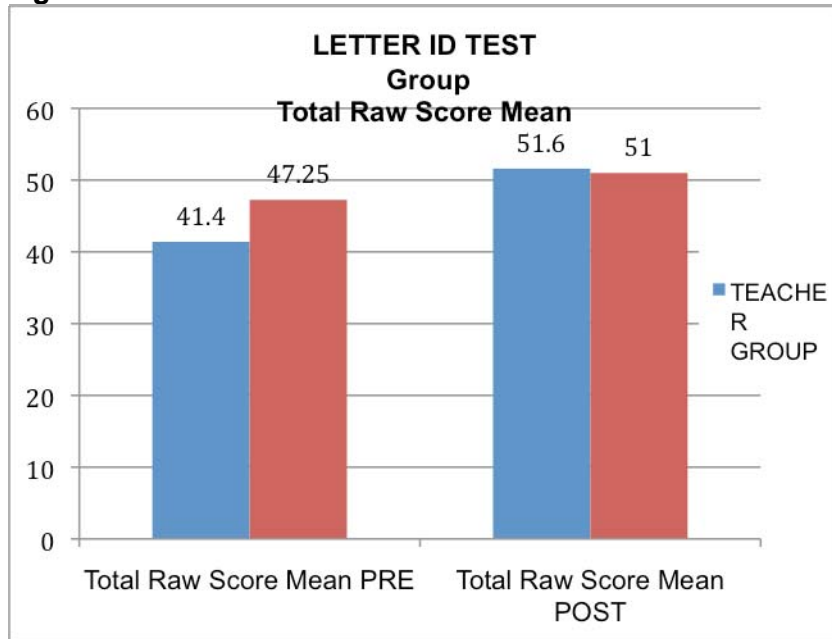


Figure 2

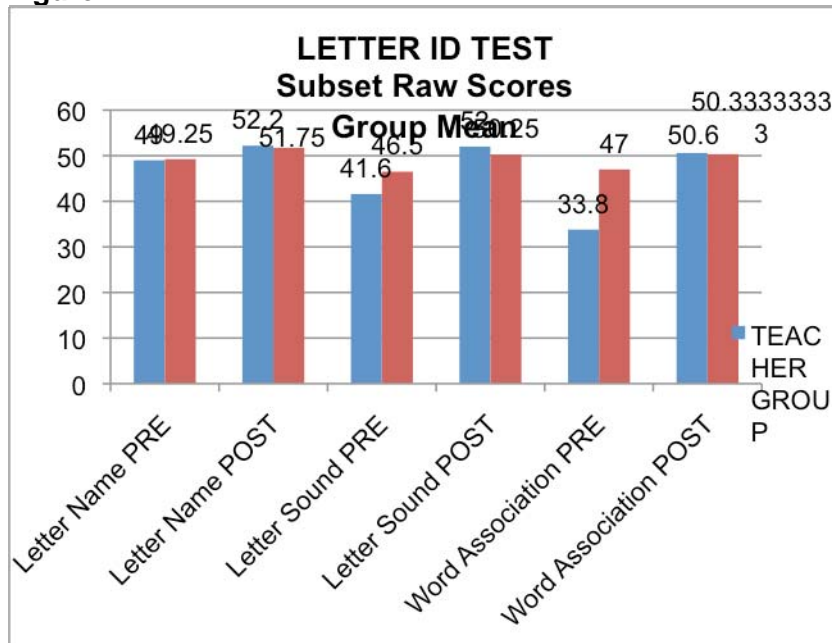


Figure 1 is an overview of the Letter ID test's total raw score mean for both the teacher group and control group. Results of the pre-testing data shown in Figure 1 indicates that the students in the control group began with stronger phonemic knowledge than the teacher group. However post-test data

highlights that (post intervention) the teacher group became stronger in their phonemic knowledge and made the most improvement. The teacher group showed the highest growth in their overall results with 24.6% growth, compared to the control groups growth of 7.9%.

Figure 2 is a representation of the subset scores (letter name, sound and word association) within the Letter ID test. It compares the pre and post-test group mean raw score results of both the teacher group and the control group.

Pre-test results shown in Figure 2 indicate that the control group began with stronger phonemic knowledge than that of the teacher group. Their pre-test results were stronger across all Letter ID test subsets. In their pre-test results when identifying the letter name, the control group scored 0.5% higher in their groups mean raw score than the teacher group. Similarly, when identifying the letter sound the control group scored 9% higher in their groups mean raw score than the teacher groups, and when associating a word to each letter within the test, the control group scored 24.5% higher in their groups mean raw score than the teacher group.

Post-test results shown in Figure 2 highlight the growth made by all participants (both the teacher group and the control group); but in particular, the results highlight the improvement in the teacher group's phonemic knowledge (post intervention). Post-test results of the subset 'letter name' recognition indicate that the teacher group scored 1.1% higher in their group's mean raw score than the control group. Within the subset of 'letter sound' recognition the teacher group scored 3% better in their groups mean raw score than that of the control group, and within the subset of 'word association' the teacher groups mean raw score was 0.6% better than the control groups.

Further analysis of Figure 2 gives strength to the hypothesis of this research project, and supports the notion that the teacher group's gains (post intervention) were greater than the control groups. Figure 2 shows that the teacher group improved their 'letter name' mean raw score by 6%, compared to the control group whose 'letter name' mean raw score improved by 4.6%. The teacher groups 'letter sound' raw score mean improved by 19.2%, compared to the control groups results indicating an improvement of only 7%. Comparison of their 'word association' mean raw scores show that the teacher groups mean improved by 31%, compared to that of the control groups 6%.

Figure 3.

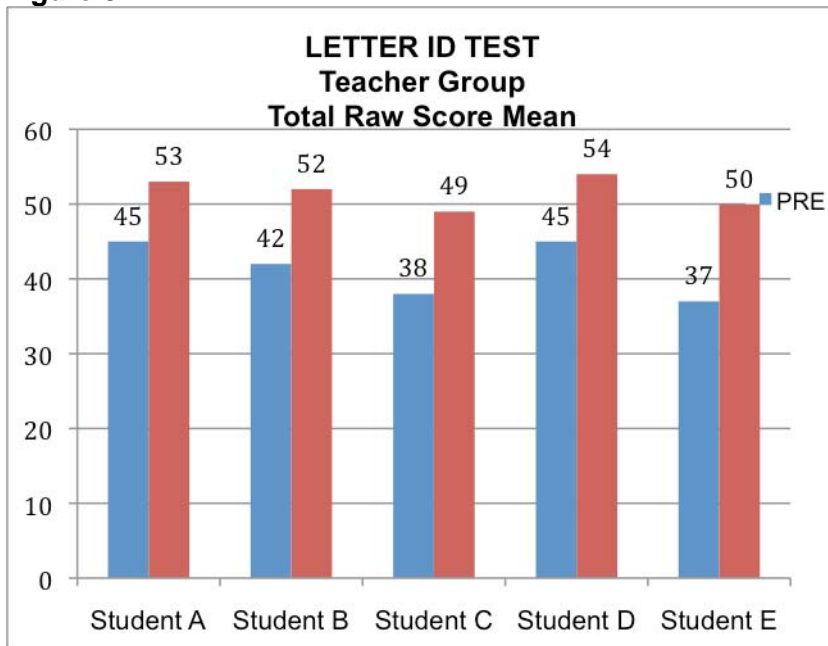


Table 3. Letter ID Test (subsets): Teacher Group Raw Scores

Teacher Group	Letter Name PRE		Letter Name POST		Letter Sound PRE		Letter Sound POST		Word Associati-on PRE		Word Associati-on POST	
	/54	%	/54	%	/54	%	/54	%	/54	%	/54	%
Student A	52	96%	54	100%	48	89%	54	100%	34	63%	51	94%
Student B	50	93%	53	98%	43	80%	53	98%	34	63%	50	93%
Student C	44	81%	50	93%	32	59%	49	91%	39	72%	48	88%
Student D	50	93%	53	98%	45	83%	54	100%	40	74%	54	100%
Student E	49	91%	51	94%	40	74%	50	93%	22	47%	50	93%

Figure 3 and Table 3 show the results of the Letter ID test for all participants of the teacher group.

Figure 3 represents each individual’s total raw score mean, and Table 3 represents their individual subset scores (letter name, sound and word association) within the Letter ID test. The data represented indicates that all students of the teacher group (post intervention) improved in their phonemic knowledge. Analysis of each student’s individual results is explained in more detail below.

Based on the results shown in Table 3, Student A improved their raw score in identifying the ‘letter names’ by 4%. They improved their raw score in identifying the ‘letter sounds’ by 11%, and additionally improved their ‘word association’ raw score by 31%. Student A’s total raw score mean improved by 14.8% (see Figure 3) and their overall growth in the Letter ID test was 17.7%.

Results shown in Table 3 show that Student B improved their raw score in identifying the 'letter names' by 5%, and improved their raw score in identifying the 'letter sounds' by 18%. They showed similar improvement to Student A in their 'word association' raw score, improving by 30%. Figure 3 shows that Student B's total raw score mean improved by 10%. They showed a total of 23.8% growth.

Student C showed a total growth of 29%. Post-test results shown in Table 3 indicate that Student C's 'letter name' raw score improved by 12%, their 'letter sound' raw score improved by 32% and their 'word association' raw score improved by 16%. Their mean total (shown in Figure 3) improved by 20%.

Student D's mean total improved by 17%, showing a total growth of 20%. Based on the results shown in Table 3, Student D improved their raw score of 'letter name' knowledge by 5%. They improved their raw score of 'letter sound' knowledge by 17%, and their raw score in 'word association' by 26%.

Student E made the most improvement in the Letter ID test, with growth of 35%. Results shown in Table 3 show that Student E improved their raw score in identifying the 'letter names' by 3%, and improved their raw score in identifying the 'letter sounds' by 19%. They have shown good results in their 'word association' raw score, improving by 46%. Based on Figure 3, Student E's total raw score average improved by 24%.

Figure 4.

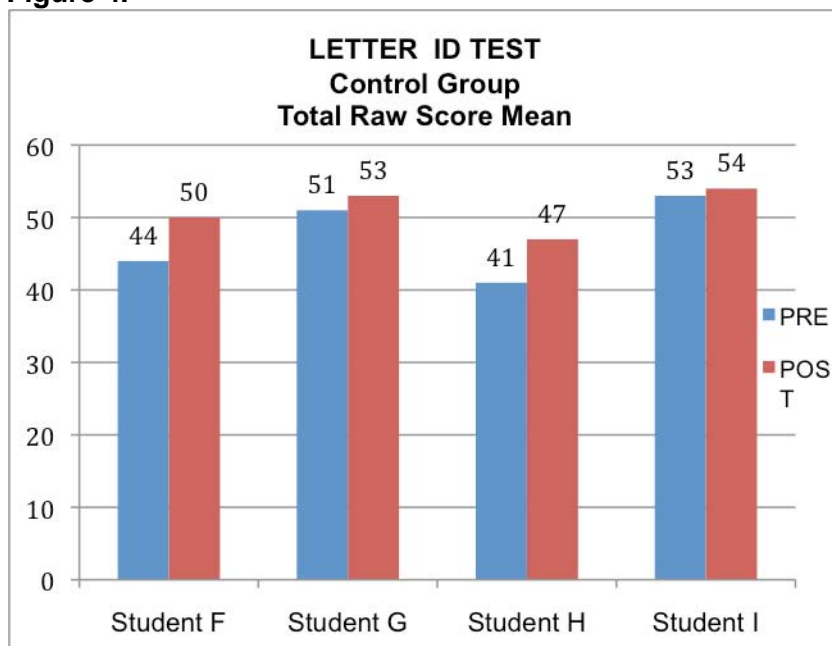


Table 4. Letter ID Test (subsets): Control Group Raw Scores

Control Group	Letter Name PRE		Letter Name POST		Letter Sound PRE		Letter Sound POST		Word Association PRE		Word Association POST	
	/54	%	/54	%	/54	%	/54	%	/54	%	/54	%
Student F	49	91%	52	96%	43	80%	49	91%	43	80%	49	91%
Student G	52	96%	53	98%	52	96%	53	98%	50	93%	53	98%
Student H	43	80%	48	88%	38	70%	45	83%	42	77%	49	91%
Student I	53	98%	54	100%	53	98%	54	100%	53	98%	54	100%

Figure 4 and Table 4 show the results of the Letter ID test for all participants of the control group.

Figure 4 represents each individual's total mean raw score, and Table 4 represents their individual subset scores (letter name, sound and word association) within the Letter ID test. The data represented indicates that all students of the control group (post intervention phase) maintained growth in their phonemic knowledge. Analysis of each student's individual results is explained below.

Pre and post-test results in Table 4 indicate that Student F improved their raw score in 'letter name' knowledge by 5%, and their raw score in 'letter sound' knowledge and 'word association' knowledge by 11%. Based on the results in Figure 4, Student F's total raw score mean improved by 11.5%, making their total growth 13.6%.

Student G's results were the same in two of the three subset areas of the Letter ID test. Results in Table 4 show that Student G's raw score for 'letter name' and 'letter sound' improved by 2% when comparing their pre and post-test results, their 'word association' raw score improved by 5%. Analysis of Figure 4 indicates that Student G made 4% growth when comparing their total raw score average.

Student H showed the most growth when comparing all participants of the control group, showing 14.6% growth. When comparing their pre and post-test total raw score mean (see Figure 4) Student H improved by 11%. Pre and post-test results in Table 4 show that Student H's raw score for 'letter name' knowledge improved by 8% and their raw score of 'letter sound' knowledge improved by 13%. They made the most development in their 'word association' raw score with 14% improvement.

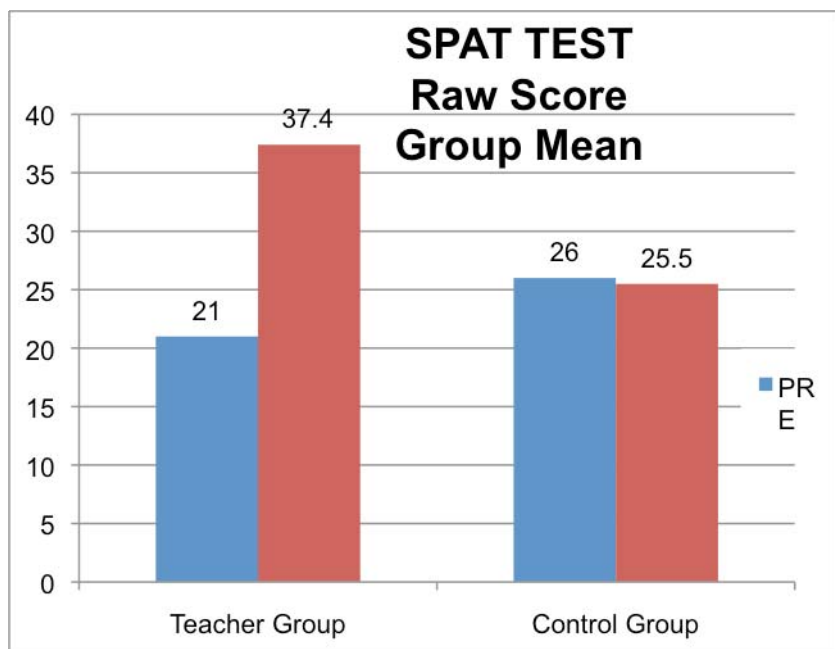
Analysis of Table 4 shows that Student I's results were the highest of all four participants of the control group in both the pre and post-tests. Furthermore, Table 4 highlights that Student I's results in all three

subsets were the same in their pre-test, and again were the same in their post-tests results across all three subset areas. In all three areas Student I improved their raw score by 2%. Figure 4 indicates a 1% improvement in their total raw score mean, which is a 1.8% growth in total.

Sutherland Phonological Awareness Test-Revised (SPAT-R) Results

Administering the Sutherland Phonological Awareness Test identified an overview of the student's phonological awareness. (Neilson, 2009) The SPAT-R results are varied, with the teacher group showing the most growth.

Figure 5



In Figure 5 it is evident based on the mean raw score results that the control group had higher phonological knowledge in the pre-test phase, and made no growth in their post-test results; their score decreasing by 2%. In comparison the teacher group who had lower phonological knowledge based on their pre-test results achieved higher in their post-test results, with an increase of 78% in their average raw score. Table 5 represents each individual's scores in the subtest areas of the SPAT R test.

Table 5. SPAT-R Subtest Scores

SPAT-R Subtest Areas 1-13	Teacher Group										Control Group							
	Student A		Student B		Student C		Student D		Student E		Student F		Student G		Student H		Student I	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Syllable Counting /4	3	4	4	4	3	4	3	2	3	3	4	4	3	2	4	3	2	1
Rhyme Detection /4	2	4	4	4	3	4	3	4	4	4	4	4	4	4	4	3	3	3
Rhyme Production /4	2	4	3	4	4	4	1	4	2	4	2	4	1	1	4	4	3	4
CVC Blending /4	4	4	4	4	3	3	1	4	4	4	4	4	3	2	4	4	4	4
Onset Identification /4	4	4	4	4	3	4	4	4	4	4	3	4	3	0	4	4	4	4
Final Phoneme Identification /4	4	4	3	3	3	4	3	4	3	4	2	4	1	0	4	4	3	0
CVC Segmentation	3	4	0	4	0	4	1	4	0	4	3	0	1	1	4	2	4	4
Segmentation-Blends /4	0	1	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	3
Deletion-Onset /4	0	4	0	4	0	4	0	4	4	4	4	4	0	3	4	4	0	0
Deletion Boundary Consonant /4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Deletion Internal Consonant /4	0	0	0	2	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Non-word Reading /8	1	5	0	3	0	2	0	4	1	5	1	0	1	3	0	0	3	5
Non-word Spelling /8	0	1	0	2	0	1	0	2	0	0	0	0	0	0	0	0	1	2

Figure 6

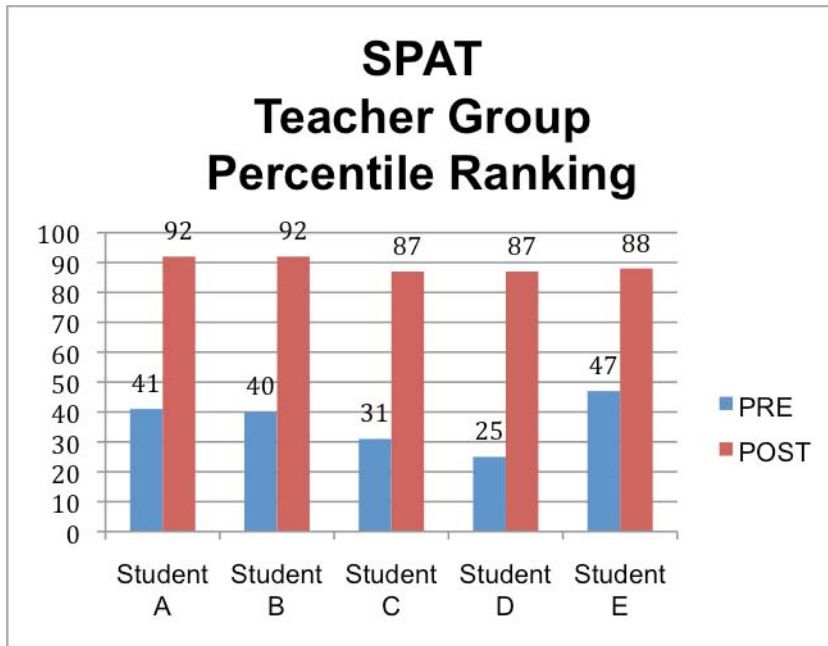


Table 6. SPAT-R: Teacher Group Raw Scores

Teacher Group	SPAT PRE		SPAT POST	
	Raw Score /60	%	Raw Score /60	%
Student A	23	38%	39	65%
Student B	22	37%	39	65%
Student C	19	32%	35	58%
Student D	16	27%	36	60%
Student E	25	42%	38	63%

Results of the SPAT-R (see Figure 6 and Table 6) indicate that all participants of the teacher group showed improvement in their phonological awareness (post intervention.)

Student A showed improvement in their raw score of 27%, which is a total of 70% growth. They moved from the 41st percentile to 92nd percentile, which is an improvement of 51 percentile points. (Neilson, 2009) Student B made 77% growth; with their raw score improving by 28%. They moved from the 40th percentile to the 92nd percentile which indicated growth of 52 percentile points. (Neilson, 2009) Student C's raw score improved by 26% , demonstrating a total of 84% growth. They moved from the 31st percentile to the 87th percentile which is an improvement of 56 percentile points. (Neilson, 2009) Student D showed the most improvement, making 125% growth. Their raw score improved by 33% and they moved 62 percentile points from the 25th percentile to the 87th percentile. (Neilson, 2009) Student E

showed 52% growth with a 21% improvement in their raw score. They moved from the 47th percentile to the 88th percentile, improving by 41 percentile points. (Neilson, 2009)

Figure 7

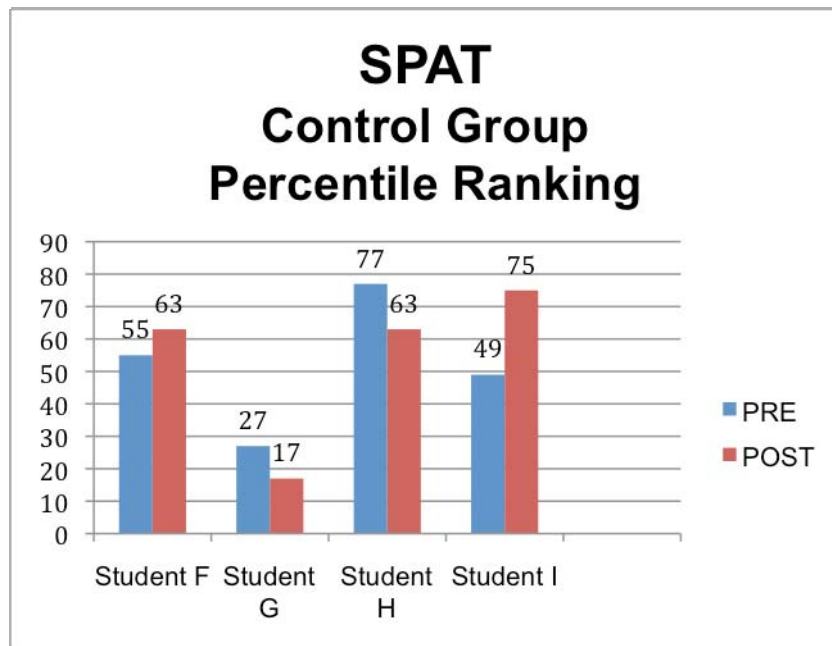


Table 7. SPAT-R: Control Group Raw Scores

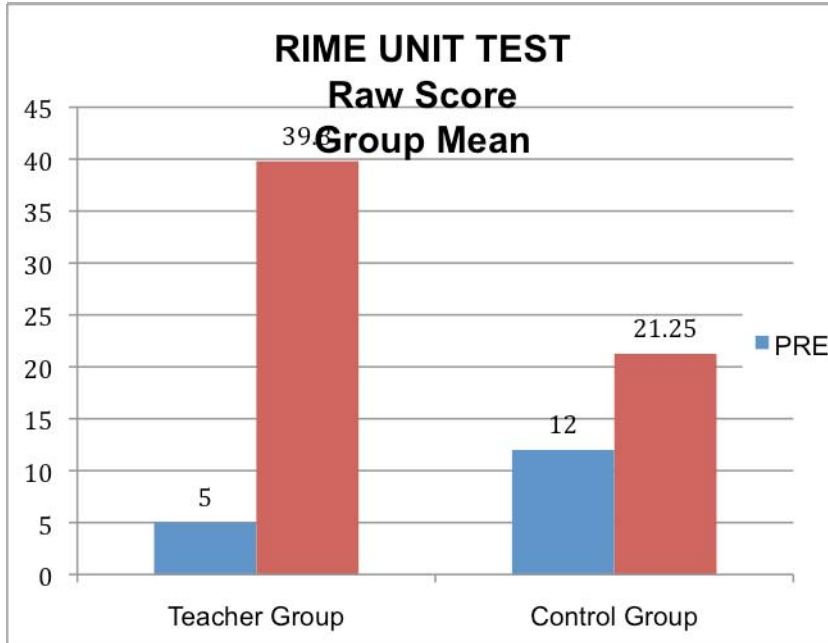
Control Group	SPAT PRE		SPAT POST	
	Raw Score /60	%	Raw Score /60	%
Student F	27	45%	28	47%
Student G	17	28%	16	27%
Student H	34	57%	28	47%
Student I	26	43%	30	50%

Results of the SPAT-R (see Figure 7 and Table 7) indicate that two of the four participants of the control group’s phonological awareness scores decreased (post intervention phase.) Student F’s raw score improved by 2% which moved them into the 63rd percentile. This was a total growth of 4%. Student I also showed 7% improvement in their raw score data. They moved from the 49th percentile to the 75th percentile, showing 15% growth. However Student G’s raw score indicated a decrease of 1% moving them from the 27th percentile to the 17th percentile. This is a decline of 5% in their overall results. Student H’s results also showed a decrease of 10% in their raw score, moving them from the 77th percentile to the 63rd percentile. Their total growth decreased by 18%.

Rime Unit Test Results

Administering the Rime Unit Test gave an indication of the student's ability to read words in isolation. The test administered contained 48 words (24 3-letter words and 24 4-letter words).

Figure 8



In Figure 8 it is evident based on the mean raw score results, that the control group was stronger during the pre-test phase, having a higher mean raw score of 12. They demonstrated better accuracy when reading words in isolation. This is compared to the teacher group's mean raw score of 5. However the post- test data highlights the impact the intervention has had on the teacher group's ability to read words in isolation. The teacher groups average raw score improved by 72.6%, where as the control groups average raw score only improved by 19%. The teacher group showed an average of 695% growth (post intervention), compared to the control group who showed an average of 77.1% growth.

Figure 9

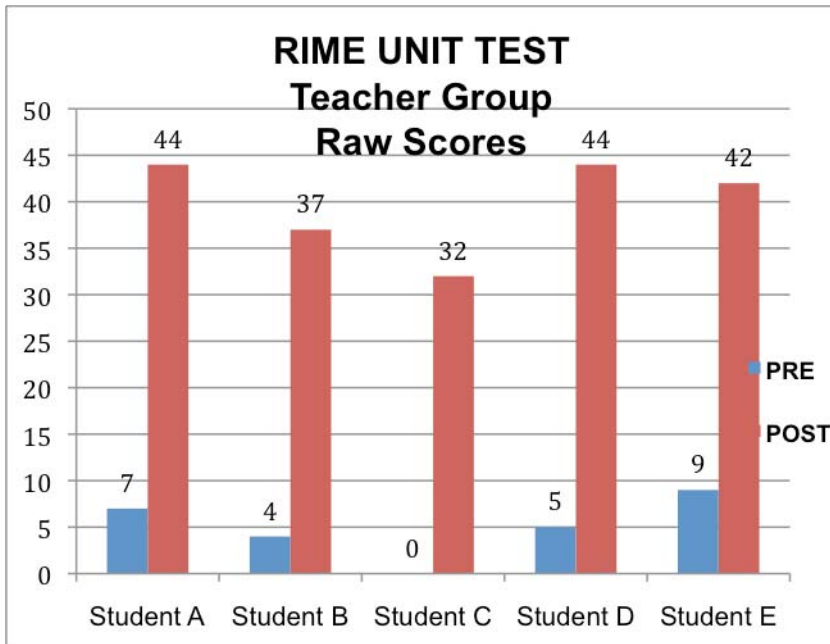


Table 8. Rime Unit Test: Teacher Group Raw Scores

Teacher Group	RIME UNIT TEST PRE				RIME UNIT TEST POST			
	3-letter words	4-letter words	Raw score	%	3-letter words	4-letter words	Raw score	%
	Raw Score /24	Raw Score /24	score /48	%	Raw Score /24	Raw Score /24	score /48	%
Student A	7	0	7	15%	22	22	44	92%
Student B	4	0	4	8%	22	15	37	77%
Student C	0	0	0	0%	20	12	32	66%
Student D	5	0	5	10%	22	22	44	92%
Student E	9	0	9	19%	22	20	42	88%

Results of Figure 9 and Table 8 show that all students of the teacher group (post intervention) made notable improvement in their ability to read words in isolation. Student A showed 528% growth, reading correctly 22/24 3-letter words and 22/24 4-letter words post intervention. Their raw score improved by 77%. Student D’s post-test raw score results were the same as student A’s, however their overall raw score improved by 5% more, and their overall growth was higher with 780%. Student B showed the most growth, with a total of 825%. They read 4/48 words accurately in their pre-test and 37/48 words accurately in their post-test. Student B’s raw score improved by 69%. Student E’s raw score similarly improved by 69%, reading 9/48 words accurately in their pre-test and 42/48 words accurately in their post-test. However they only made 367% growth (post intervention). Student C also made considerable gains. In their pre-test they scored 0, unable to read any words correctly. However their post-test results indicate a score of 32/48. They read 20/24 3-letter words and 12/24 4-letter words accurately; this is 66% improvement in their raw score.

Figure 10

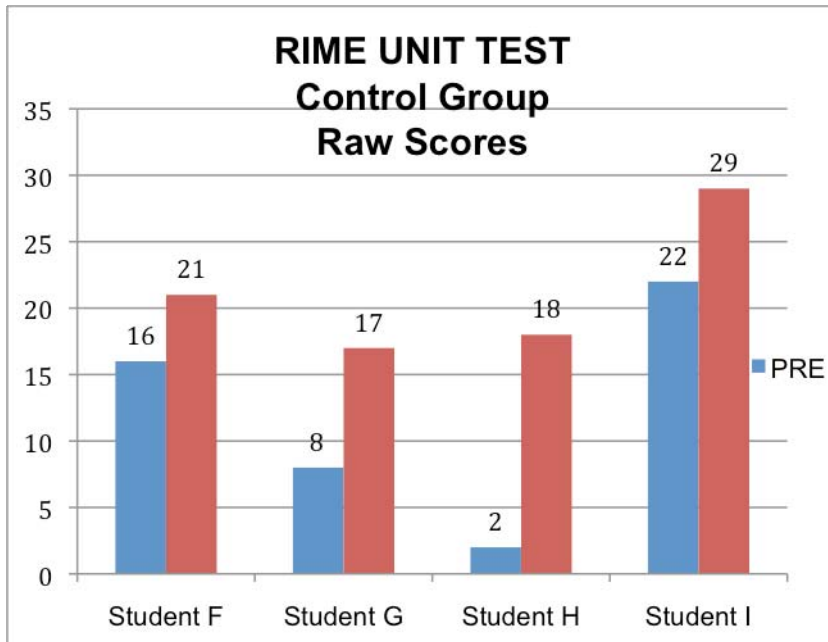


Table 9. Rime Unit Test: Control Group Raw Scores

Control Group	RIME UNIT TEST PRE				RIME UNIT TEST POST			
	3-letter words Raw Score /24	4-letter words Raw Score /24	Raw score /48	%	3-letter words Raw Score /24	4-letter words Raw Score /24	Raw score /48	%
Student F	14	2	16	33%	13	8	21	44%
Student G	8	0	8	17%	15	2	17	35%
Student H	2	0	2	4%	15	3	18	38%
Student I	19	3	22	46%	19	10	29	60%

Figure 10 and Table 9 show that all students of the control group (post intervention phase) maintained growth. Student F showed 31.25% growth, their raw score improving by 10% when comparing their pre and post-test results. However results indicate that they achieved a better raw score in their pre-test results of reading 3-letter words, but showed improvement in their post-test for reading 4-letter words. Student G showed 112.5% growth, which was an 18% improvement in their post-test raw score. They accurately read 17/48 words accurately, compared to 8/48 words in their pre-test. Student H's raw score improved by 34%, reading 16 more words in their post-test than in their pre-test. Their overall growth was 800% (the highest growth of the control group). Student I appeared the strongest within the control group, scoring the highest on the pre and post-test results. They read 22/48 words accurately in their pre-test and 29/48 words accurately in their post-test. This was an improvement of 14% in their raw score, and a total of 32% growth.

Discussion

The research project investigated the hypothesis that, *'Explicitly teaching at risk grade Prep students the link between phonemes and 2-letter dependable rime units improves their phonological knowledge, in particular their phonemic awareness; and their ability to read words in isolation.'* The results of the project highlight that all nine participants' showed improvement in their overall phonological knowledge, in particular their recognition of phonemes, and words containing 2-letter dependable rime units. However the improvements of the teacher group was exceedingly better than the control group.

Analysis of the pre-test data indicates that on average the control group was stronger in most areas of assessment than the teacher group, but post-test data highlights that the gains made by the teacher group were greater than those of the control group. Geudens 2006, Whitehurst et al, cited in Crim 2008 and Ball et al, cited in Munro, 1998 all discuss the importance of children developing their understanding of how spoken words are structured and composed of individual sounds and combinations of sounds. They share a common belief that explicitly teaching the connection between phonemic awareness and phonemic knowledge improves children's ability to read. Comparison of the current results indicates that the study supports the importance of explicit teaching of phonemes and 2-letter dependable rime units in order to develop reading acquisition in young readers.

Results of the Letter ID test (Clay, 1993) shown in Figures 1 and 2 (see Results) indicate that the control group began with stronger phonemic knowledge than that of the teacher group as their pre-test results were stronger across all Letter ID test subsets. However post-test results show that the teacher groups mean raw score improvements were better than the control groups.

Analysis of the teacher group's results (see Figure 3 and Table 3 in Results) indicates that all students' improved in their ability to recognise and recall letter names, sounds and make word associations. Students A and D appeared to have a better knowledge of phonemes than their peers. Although all participants of the teacher group made growth, students A and D maintained the highest individual raw scores; indicating that they could recognise and recall more of the letter names and sounds and make more relevant word associations than their peers. Students C and E have the lowest scores of the teacher group (both in their pre and post-testing) however both students made the most growth in their scores.

This growth and improvement in their individual raw scores could be associated with the explicit instruction given in order to develop their phonemic knowledge. These results also lend support to the beliefs of Munro (1998, p. 4) who states "children's level of phonemic knowledge has an influence on their ability to learn to recognise written words..." These results give strength to the hypothesis of this

research project, highlighting the importance of explicit instruction and teaching in the area of phonemes, and the reciprocal relationship between phonemic knowledge and development in phonemic awareness.

Results of the SPAT-R (Neilson, 2009) shown in Figure 5 (see Results) indicate that the control group had higher phonological knowledge in the pre-test phase, but that the teacher group showed a higher percentage of growth based on the post-test results.

Upon analysis of the SPAT-R results, in particular the contrasting results of the control and teacher group it is evident that the intervention given in the ten-lesson sequence improved the phonological knowledge of the students in the teacher group. The structure of the lessons lent themselves to supporting the development of phonological awareness as they included the use of oral language, rhyme, rhyme alliteration and the development of segmenting and blending skills through onset and rime. Further to this, anecdotal notes of the teacher group's behaviour highlight the improvement in their ability to identify phonemes in words, and in their ability to segment and blend words using the strategy of onset and rime. Deeper analysis of the results (see table 5 in Results) supports this idea further.

The results of subtest 7 (see Table 5 in Results) indicate notable improvement in the teacher group's ability to segment CVC words, showing a development in their phoneme awareness and ability to separate sounds in words. Further to this, students of the teacher group showed improvement in their ability to decode words (both phonologically and orthographically) using the strategy of segmenting and blending through onset and rime. This development was evident in subtest 9 and 12 (see Table 5 in Results). According to Neilson,(2009) and Munro,(1998) an individual's capacity to identify and delete phonemes from words is a very strong indicator of phonological awareness. Neilson (2009, p. 37) states that "Onset deletion is a particularly useful marker for younger children...it is a good indicator that a child is making reasonable progress." Subtest 12 (nonword reading) (see Table 5 in Results) results highlight a development in their skills in decoding words. Although their results were not 'high' in this subtest; there was notable improvement in their attitude and skills in attempting to decode the unknown words. During the pre-test phase all students either refused to read the words, or in attempting to read the words, simply guessed based on the words initial letter. During the post-test phase the students were using the skill of segmenting and blending and using their knowledge of phonemes when attempting to decode the unknown words.

The results of the SPAT-R give further strength to the hypothesis and highlight that the lesson sequence and intervention given in this project did improve the phonological awareness of the individuals in the teacher group.

Results of the Rime Unit Test shown in Figure 8 (see Results) indicate that the control group was stronger during the pre-test phase. However the post-test data highlights the positive impact the intervention has had on the teacher group's ability to read words in isolation. The teacher groups

average raw score improved by 72.6%, compared to the control groups who's improved by 19%. The teacher group showed an average of 695% growth (post intervention), compared to 77.1% growth for the control group.

Further analysis indicates that all participants of the teacher group improved in their ability to read words containing 2-letter dependable rime units. Upon reflection, Students A and E appeared to develop their phonemic awareness more rapidly than the other members of the teacher group. Observations made during the lessons showed that the students appeared to find it easier to use their phonemic knowledge and the strategy of onset and rime to read their words. Towards the end of the lesson sequence and during the post-testing Student A and E's decoding strategies appeared more automatic. This observation gives rise to the correlation between their developing phonemic awareness and the success of the intervention. This conclusion is further supported by Munro (1998), who notes that the strategy of recognising letter clusters over individual letters is an easier and more effective strategy when reading, as it decreases the amount of information an individual has to process at one time.

Student B and D also showed evidence of developing their phonemic awareness and knowledge of phonemes. However, at times they appeared to have trouble blending the phonemes to make a rime unit. Student C started with the lowest test score unable to read any words, but during the teaching phase showed confidence and willingness. They showed development of their phonemic awareness (during the lesson sequence and post-testing) when reading the rime units and the focus words.

As noted in the method, four of the nine students in this study are from families that speak English as a second language. In saying this, results of the project could not conclude as to whether this impacts on a student's phonological development. The results did not show a clear link between the students of ESL background and the progress they made, as the students of ESL background did not show the greatest or least amount of growth. To make conclusions in this area, further research and analysis would need to be carried out.

A further observation made during this project was the change in students' behaviour. Prior to the intervention students in the teacher group were often observed being disengaged during Literacy. They appeared uninterested in the tasks of reading (words and prose) and were reluctant to share their learning. However during the ten-lesson sequence it was evident that there was a change in their behaviour. Participants appeared excited and engaged during the lessons, often asking in the morning if "we were going to do another rime today", and more over during whole class learning (outside the focus group sessions) they began to share their ideas and participate more readily. It could be concluded based on these observations that the intervention not only impacted on the individuals' phonemic knowledge and awareness but also had a positive impact on their self-efficacy as a reader and learner.

Upon reflection it is clear that my study has highlighted the importance of developing phonemic awareness through explicitly teaching the relationship between individual phonemes and 2-letter dependable rime units in order to read words. I felt that all students of the teacher group showed improvement in all areas assessed, thus supporting my hypothesis and the intervention. Based on this conclusion I would recommend using a similar sequence of lessons with the control group in order to further develop their phonemic awareness and reading acquisition.

In saying this, I also acknowledge that there are areas in all the students' learning and development that needs to be explored further, and give rise to implications for this study.

During this project it was evident that all participants of the teacher group and the control group had some level of understanding of the alphabet. However, one area of concern was the uncertainty with the letters 'U' and 'G'. Many participants' knew the name of the letters 'U' and 'G' but had trouble recalling their sounds. It was common that they would associate 'U' with the sound 'a' and 'G' with the sound 'j'. Taking this into consideration I ensured that I made the students of the teacher group aware of the sounds associated with each letter during the lessons but based on letter ID results three of the five students still need further teaching in this area. Further to this, (and based on the letter ID post-test results) I believe that in order to see continued improvement in their ability to read (and decode) words, students of the teacher group (and the control group) would benefit from further teaching of phonemes; more over possibly the use of RAN in their learning in order to increase their recall of letters, in turn building their understanding of how words are made of sounds. As mentioned earlier, research highlights that the development of automaticity in recognising and recalling the alphabet (in all its forms) is an initial step towards being able to read.

Anecdotal notes from the sessions and post-testing indicate that some students appeared to have trouble articulating the sounds of some rime units and trouble blending the phonemes to make a rime unit. Possible reasons for this trouble could be subtle articulation problems, more specifically trouble with their pronunciation of some sounds. This suggestion is supported by Neilson, (2009) who says that articulation problems can be an alert for teachers and examiners of children who are associating learning sounds and words with subtle errors. It could also be an indication of speech articulation difficulties, in which case further assessment would need to be carried out. Or simply an indication of the need to further develop and consolidate students understanding and recall of letter sounds prior to introducing letter clusters. Further assessment in this area would be needed in order to make a sound judgment.

Another recommendation would be that all participants continue learning dependable rime units, and extend this learning to common blends and digraphs. As Chard (1999) notes much success in reading is dependent on individuals understanding of word structures. Looking at the results of the SPAT-R,

although all students of the teacher group improved in their non-word reading score (subtest 12), it was observed that they were unable to decode the vowel digraph items. Additionally, it was observed during the Rime Unit test that some students were unable to decode and read the initial blends and digraphs. These observations highlight that all students (in particular students B and C) need to learn about initial blends and digraphs, to support their success in decoding words. Thus, I believe further teaching to students about blends and digraphs would be beneficial in developing their phonemic awareness. In turn it would also support their development in reading acquisition.

A further recommendation would be to extend students' understanding of, and skill in separating internal sounds in words. They need to learn to isolate single sounds in words. All students of the teacher group and three of the four students from the control group could identify the initial and/or final sound in a word (see subtest 5 and 6 in Table 5 in Results) but all nine participants had trouble deleting the initial or internal sound of a word (see subtest 10 and 11 in Table 5 in Results). In saying this though, Neilson (2009) notes that this skill is often difficult for young children; it is considered a complex task. There are many reasons as to why they are unable to do this at present. One possible reason is that students have not yet adequately automatised the recall and manipulation of sounds. Additionally it could be possible that students have a restricted short-term working memory for sound-based information, meaning they do not have the capacity to retain all of the sounds within a word. (Munro, 1998) To make a conclusion about this further assessment and analysis would be needed.

Overall, results of this study indicate that explicit teaching of the relationship between phonemes and 2-letter dependable rime units is beneficial. It not only promotes the development of phonological knowledge, in particular phonemic awareness, but also supports the development of skills needed to read words.

References

- Chard, D. J. (1999). Phonological Awareness: Instructional and Assessment Guidelines. *Intervention in School and Clinic* , 34 (5), 261-270.
- Clay, M. M. (1993). *An Observation Survey Of Early Literacy Achievement*. Auckland: Heinemann.
- Crim, C. H. (2008). Early Childhood Educators' Knowledge of Early Literacy Development. *Issues in Teacher Education* , 17-30.
- Ellis, E. S. (1997). *LD Online: How Now Brown Cow: Phoneme Awareness Activities*. Retrieved September 12, 2011 from LD Online: <http://www.ldonline.org/article/388/>
- Geudens, A. (2006). Phonological Awareness And Learning To Read A First Language: Controversies And New Perspectives. *Unknown* , Unknown.
- Hines, S. J. (2009). The Effectiveness of a Colour-Coded, Onset-Rime Decoding Intervention with First-Grade Students at Serious Risk for Reading Disabilities. *Learning Disabilities Research and Practise* , 1 (24), 21-31.
- Love, E. & Reilly S. (2004, June). Let's Talk About Rhyme, Rime and Analogy. *Love and Reilly Newsletter* (9). Melbourne, Victoria, Australia: Love & Reilly.
- Love, E. & Reilly S. (2007, September). Phonological Awareness-Preparing for Literacy. *Love and Reilly Newsletter* (21). Melbourne, Victoria, Australia: Love & Reilly. Retrieved September 9, 2011 from <http://www.loveandreilly.com.au/newsletterdownloads/news21.pdf>
- Marshu. (2005-2011). *Find Percentage With Percent Increase Online Calculator*. Retrieved September 14th, 2011 from Marshu.com: <http://www.marshu.com/articles/calculate-percentage-increase-decrease-percent-calculator.php>
- Munro, J. & Dalheim, B. (2006, February 2). *476-696 Project in Literacy Intervention*. Retrieved October 25, 2011 from Glossary and Key Concepts: <http://online.edfac.unimelb.edu.au/LiteracyResearch/pub/glossary.htm>
- Munro, J. K. (1998). *Assessing and Teaching Phonological Knowledge*. Melbourne, Victoria, Australia: The Australian Council for Educational Research.
- Munro, J. K. (2011). Literacy Intervention Strategies. EDU 90247. *Project in Literacy Intervention* . 476 696 . Melbourne: The University of Melbourne.
- Munro, J. K. (1998). The phonemic-Orthographic nexus: The Phonemic-Orthographic Literacy Program. *Australian Journal of Learning Disabilities* , 3,2,15-21.
- Neilson, R. (2009). *Sutherland Phonological Awareness Test-Revised*. Australia: Dr. Roslyn Neilson.
- Trehearne, M. P. (2003). Phonological Awareness. In M. P. Trehearne, *Comprehensive Literacy Resource for Kindergarten Teachers*. ETA Cuisenaire.

Resources List

- Cherry, C. (2009). *Word Family Lists*. Retrieved 8 14, 2001 from Little Book Lane: <http://www.littlebooklane.com/SF1/opSet.pdf>
- Dalheim, B. (2004). *Rime Unit Test*. Melbourne.

APPENDIX 1

Table of Results

Name	Control = 0 Teaching=1	Age in MONTHS	Gender 0=Male 1= Female	Years of Schooling	ESL No=0 Yes=1	LNSLN funding 0=SLD 1=ID 2=Asp	Earlier Intervention No=0 RR=1 Bridges=2 ERIK=3	CEO Baseline Data		EMA No=0 Yes=1
								Letter ID Test	Word Test	
A	1	70	1	8 months	0	0	0	26	0	0
B	1	70	1	8 months	0	0	0	28	0	0
C	1	74	0	8 months	0	0	0	6	0	0
D	1	75	0	8 months	1	0	0	24	0	0
E	1	74	0	8 months	1	0	0	24	0	0
F	0	69	1	8 months	0	0	0	29	1	0
G	0	72	0	8 months	1	0	0	21	1	0
H	0	78	0	8 months	0	0	0	6	1	0
I	0	70	0	8 months	1	0	0	51	1	0

Student	Control = 0 Teaching=1	Attendance No. of sessions	LETTER ID Letter Name Recognition Raw Score PRE	LETTER ID Letter Sound Recognition Raw Score PRE	LETTER ID Word Association Raw Score PRE	LETTER ID Mean Raw Score PRE	LETTER ID Letter Name Recognition Raw Score POST	LETTER ID Letter Sound Recognition Raw Score POST	LETTER ID Word Association Raw Score POST	LETTER ID Mean Raw Score POST	Rime Units Test Raw Score PRE	Rime Units Test Raw Score POST	SPAT-R Test Raw Score PRE	SPAT-R Test Raw Score POST	SPAT-R Test Percentile Ranking PRE	SPAT-R Test Percentile Ranking POST
A	1	10	52	48	34	45	54	54	51	53	7	44	23	39	41	92
B	1	10	50	43	34	42	53	53	50	52	4	37	22	39	40	92
C	1	10	44	32	39	38	50	49	48	49	0	32	19	35	31	87
D	1	10	50	45	40	45	53	54	54	54	5	44	16	36	25	87
E	1	10	49	40	22	37	51	50	50	50	9	42	25	38	47	88
F	0	0	49	43	43	44	52	49	49	50	16	21	27	28	55	63
G	0	0	52	52	50	51	53	53	53	53	8	17	17	16	27	17
H	0	0	43	38	42	41	48	45	49	47	2	18	34	28	77	63
I	0	0	53	53	53	53	54	54	54	54	22	29	26	30	49	75

APPENDIX 2

An outline of the Ten Lessons Sequence

'Explicitly teaching at risk grade Prep students the link between phonemes and 2-letter dependable rime units improves their phonological knowledge, in particular their phonemic awareness; and their ability to read words in isolation.'

Lesson Format:

- Five grade Prep students
- Small group instruction
- 10 sessions approximately 40 minutes
- Pre and Post testing as outline below

The lessons have been designed based on the 'Model of Teaching and Learning' developed by Collins, Brown and Newman (1989) (as cited in Munro J. K., 2011). The model is designed around six key ideas of 'Modelling, Coaching, Scaffolding and Fading, Articulation, Reflection and Exploration'.

Predicted Outcomes:

The activities within the intervention are designed to explicitly teach the relationship between phonemes and two-letter dependable rime units, to increase their word reading accuracy.

At the conclusion of the intervention students will be able to:

- Accurately recall and identify the letters of the alphabet
- Accurately say each rime unit targeted both in isolation and in reading words
- Verbally make and break words that have the target sounds
- Read target words and unknown words that contain the rime units taught
- Decode words using the strategy of onset and rime

The five students are working at the word level of the MOTPL model (Munro, 2011). They need to develop their understanding of the relationship between the letters of the alphabet and words; the notion that words are essentially combinations of letters. At present their reading is indicative of 'guessing' words based on their initial sound. They do not transfer their phonemic knowledge to read words. All five students need to develop their phonemic knowledge and phonemic awareness, as well as develop decoding strategies to read words.

Assessment Procedures:

Pre and Post testing using the following tests

- **Clay Letter Identification Test.** (Clay, 1993)
This test was used to assess student's ability to identify all uppercase and lowercase letters and the sounds they represent. It also assessed their ability to name a word that starts with the identified letter.

- **Sutherland Phonological Awareness Test- Revised (SPAT-R).** (Neilson, 2009)
This test was used to evaluate student's phonological knowledge.
- **Rime Unit Test.** (Dalheim, 2004) (Adapted by teacher. Only sub-test one was administered.)
This test was used to assess student's knowledge of, and ability to read words containing two letter dependable rime units.

Lesson Format

Lessons 1-4:

- Each lesson introduced and explicitly taught a new two-letter dependable rime unit and five or six corresponding target words.

Lesson 5:

- Was designed to 'review and consolidate' the four two-letter dependable rime units and the target words taught in lessons 1-4.

Lessons 6-9:

- Each lesson introduced and explicitly taught a new two-letter dependable rime unit and five or six corresponding target words.

Lesson 10:

- Was designed to 'review and consolidate' all of the two-letter dependable rime units and the target words taught over lessons 1-9.

Rime units taught (in order):

'at, it, an, ot, in, ap, ug and ay'. (The rime units were chosen based on the results of the pre-testing data, which identified that students' could not read or decode these rime units.)

Focus words taught (in order):

Lesson 1: cat, hat, bat, sat, mat, rat

Lesson 2: bit, hit, lit, sit, kit, fit

Lesson 3: can, ran, tan, van, man, fan

Lesson 4: pot, dot, cot, rot, hot, got

Lesson 6: fin, bin, win, pin, tin

Lesson 7: map, cap, nap, zap, gap, tap

Lesson 8: mug, bug, jug, hug, rug, dug

Lesson 9: day, say, lay, hay, ray, pay

Lesson Structure

Phase	Task	The Teacher will	The Student will	Time
Revision (Only Lessons 2-10)	Revision - Revision of rime unit and target words taught in previous lesson	<p>Say: 'who can remember what this rime unit says?' e.g. show the card 'at'.</p> <p>Say: "We are going to use these tiles and the rime unit 'at' to make words."</p> <p>Model the process of making and reading the words. Then support the students to use the consonant cards from last lesson and the rime unit to read and make the words e.g. hat, bat, sat, cat, mat, and rat.</p> <p>Show the RAN PowerPoint recall and read the words</p>	<p>Identify the rime unit taught in the previous lesson</p> <p>Make the target words from the previous lesson. Identifying the onsets and the rime unit.</p> <p>Read the focus words.</p> <p>Take it in turns to read the words on the RAN PowerPoint</p>	5 mins
Modeling	Oral language - Identifying target words through images - Identifying rhyming words	<p>Place images of target words in the middle of the group.</p> <p>Prompt children to identify what the pictures are.</p> <p>Prompt identification of rhyme saying, "listen to the sounds your mouth makes when you say the names of the pictures."</p> <p>Ask: "what sounds can you here in all these words?"</p>	<p>Identify the pictures saying them out loud.</p> <p>Identify that words rhyme. Over time (as lessons progress) identify the common rime unit.</p>	5 mins
Modeling	Oral language - Producing rhyming words	<p>Prompt discussion and brainstorm of other words that rhyme with the focus words/images</p> <p>Discuss if words are real or nonsense</p>	<p>Suggest other words that rhyme with the images/words they have identified.</p>	2 mins

Modeling & Coaching	Phonemic Awareness - Introducing the letter cluster	<p>Explicitly introduces the rime unit using 2 flash cards, which make the rime unit. E.g. 'a' and 't'.</p> <p>Explicitly model the relationship between the individual phonemes and the rime unit saying e.g. " 'A' says 'a' and 'T' says 't'. When we put them together they say 'at'. 'a/t...at'. As they do this they model the 'making and breaking' strategy bringing the 't' to the 'a'.</p> <p>Introduce the consonant flash cards which when blended with the rime unit make up the target words. E.g. b, c, s, h, m, r.</p> <p>Model making a word e.g. 'cat' using the rime unit flashcard and an onset (consonant flash card). This follows the same 'making and breaking' process as mentioned earlier.</p>	<p>Practise identifying the sounds of the rime unit e.g. 'a' 't', and practise making the rime unit as modeled by the teacher.</p> <p>Identify the name and sound of the consonants introduced</p> <p>Students practise making a word using the onset and rime flash cards</p>	6 mins
Coaching	Blending Task - Making words	<p>Hand each student a set of onset and rime cards.</p> <p>Guide the students in choosing an onset and rime card, reading the onset and rime to make one of the target words</p> <p>Encourage the technique of 'making and breaking'</p>	<p>Sort their set of cards into two piles (onsets and rimes)</p> <p>Take it in turns to choose an onset and rime card and make a word.</p> <p>Read the onset and then the rime and make the word.</p> <p>Then read the word.</p>	10 mins
Scaffolding & Fading	Phonological Task - Reading Target words - RAN - Games *	<p>Instruct student to read their list of words</p> <p>Show the students a RAN PowerPoint of the focus words.</p> <p>Teach/instruct/support students in playing two games. (See games list below)</p>	<p>Take it in turns to read their list of words (that they made).</p> <p>Together read the words in the RAN PowerPoint as they are shown</p> <p>Individually read the words in the RAN PowerPoint as they are shown</p> <p>Play two games to consolidate their learning</p>	12 mins

Scaffolding & Fading	<p>Oral language</p> <ul style="list-style-type: none"> - Applying target words to sentence through oral language 	<p>Initially ask students to finish the sentence using one of the target words they have learnt. E.g. "The cat sat on the _".</p> <p>Support the students to say a sentence using at least two of the target words.</p>	<p>Finish the teacher's sentence using one of the focus words learnt in the lesson</p> <p>As students became familiar with the process, they will make up their own sentence independently.</p>	2 mins
Articulation Reflection & Exploration	<p>Reflect</p> <ul style="list-style-type: none"> - Reflect on learning 	<p>Initially prompt student to reflect on their learning by saying, e.g. "Today we learnt that 'a' and 't' say 'at' as in cat, bat etc. Can you think of another word?"</p>	<p>(Once familiar with this process of thinking about what they have learnt)</p> <p>Articulate what they have learnt.</p> <ul style="list-style-type: none"> -Recall of words they learnt to read -Recall of the rime unit -Recall of the onsets -Suggest strategies they used to read the words (making and breaking) 	3 mins

* Games

All the games required students to recall, read or make the target words. Examples of the games played in the eight lessons are listed below.

- **Memory**
- **Snap**
- **Partner Puzzle**
- **Word Slides**
- **Missing Letter**

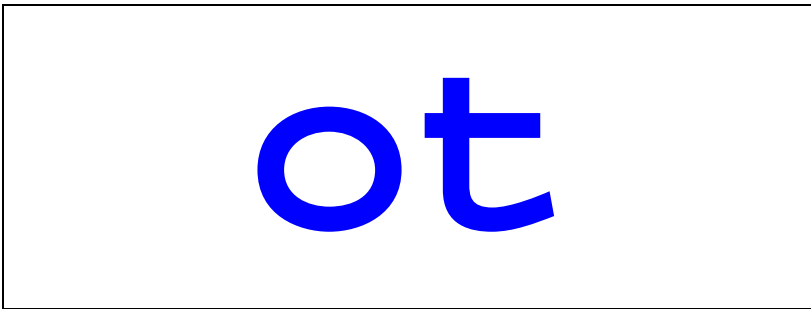
APPENDIX 3

Examples of Teaching Materials

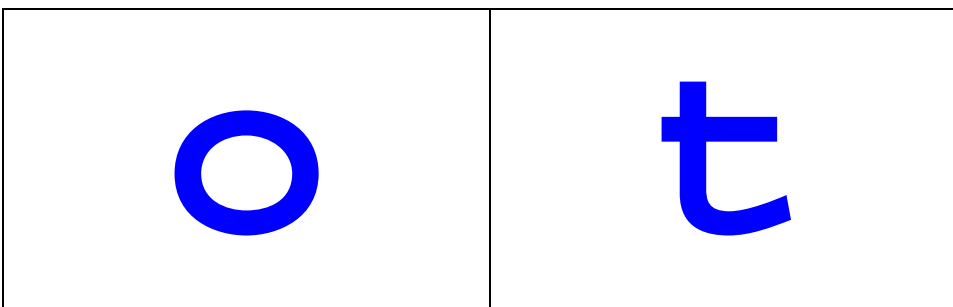
All resources mentioned below were adapted from resources sourced online at Little Book Lane, Word Family Lists. <http://www.littlebooklane.com/SF1/otSet.pdf> (Cherry, 2009)

- **Picture flashcards of the target words for each rime unit taught.**
 - o For example, a picture of 'pot, got, rot, hot, dot, cot.
- **Partner Puzzle cards containing images and target words.** (Cherry, 2009)
- **Word Slides containing target words.** (Cherry, 2009)
- **Missing Letter cards containing images and target words.** (Cherry, 2009)

Flash card of each dependable rime unit (Font used: VicModern Cursive)



Flash cards of the phonemes that make up the rime units (Font used: VicModern Cursive)



Flash cards of the individual consonants' that make up the target words when using the rime units. (Font used: VicModern Cursive)

p

c

h

g

d

r

Individual sets of rime units and onset cards (relevant consonants) used to build target words.
(One set for each student) (Font used: VicModern Cursive)

ot	ot	ot
ot	ot	ot
p	c	d
h	r	g

RAN PowerPoint's

The teacher made these. One PowerPoint was made for each lesson. It contained two repetitions of the rime unit and focus words introduced in each lesson. It also included two font types (Arial and Comic Sans) and different size text where a new rime was introduced.

Two sets of flash cards of target words.

Handwritten flash cards made by the teacher.