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THE EFFECTS OF TEACHING SPELLING SKILLS USING  
WORD-LEVEL INFORMATION AND MNEMONIC  
STRATEGIES ON THE LITERACY  
ACHIEVEMENT OF YEAR 1,  
2 AND 3 STUDENTS.

by

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Abstract

Spelling instruction in New Zealand schools frequently focuses on children learning isolated lists of words, which are generally taken from either errors in their personal writing, or from core vocabulary lists (Brann & Hattie, 1995). This technique does not appear to be sufficient for developing good spelling skills in all children.

In order to understand the spelling difficulties experienced by older poor spellers (years 5 to 8), an initial exploratory study was carried out to examine the nature of spelling errors made by students of this age. A remedial programme was then designed to meet the identified needs of twenty poor spellers from this group of students. The results from a pilot of this programme showed improvements in the spelling performance of participating students. These studies are discussed as preliminary studies in this thesis.

The difficulties experienced by older poor spellers related to some or all of the following: poor letter-sound knowledge, lack of awareness of common spelling patterns, inability to use analogy of sounds and spelling patterns to generalise knowledge from word to word and lack of knowledge of basic rules and

conventions underlying written English. Normally developing spellers begin to use these sources of knowledge from year 1, as they develop reading and spelling skills. These sources of word-level information are seldom taught explicitly in New Zealand schools. Children are expected to "pick them up" through exposure to print. For the children who do not, spelling skills are seriously impaired.

A spelling programme, designed to teach this word-level information from school entry, was developed using the "Letterland" resource, which uses picture mnemonics and story (metaphor) to make information memorable. This programme, designed for year 1, 2 and 3 students, is evaluated in this thesis, by comparing the performance of children exposed to the programme from the training school, with that of students from a comparison school. The schools were matched by their socio-economic decile rating and by the results of their 6 year Observational Surveys, over a three-year period. Measures of performance with phonological awareness, spelling and reading were compared between these two schools.

Students from the training school achieved significantly better results in a number of areas including; letter-sound knowledge (years 1, 2, and 3), sound-letter

knowledge (years 1,2), phonological awareness (years 1, 2), pseudoword spelling (years 2,3), pseudoword reading (years 2,3), and proofreading (year 3). The percentage of students achieving scores in the lowest ranges was smaller in the training school for all year groups.

Since the introduction of this spelling programme to the training school, there have been significant improvements in the results of the 6 Year Observational Surveys in the areas of letter identification, writing vocabulary, dictation, and Burt word recognition and improvements in reading levels almost reached statistical significance. There were fewer children reading in the lowest levels (0-5), a greater number reading at or above levels 12-14 and an increase in the number of children reading in the top levels (i.e., level 19 and above).

Teaching word-level information explicitly, using strategies which made learning memorable, improved the phonological awareness, spelling and reading skills of the children exposed to this spelling programme.

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## Chapter One

## Introduction

Children in New Zealand learn literacy skills predominantly through the Whole Language approach. Nicholson (1997) explains that this approach, developed in the 1980s, was built around the idea that:

Children could teach themselves to read, and that in doing so, they would unconsciously work out for themselves the letter-sound rules. Although children would rely on context clues at first, this strategy would act as a bridge, enabling them to work out the alphabetic system of letter-sound rules. (pp. 5-6)

Nicholson (1997) attributes the theoretical underpinnings of whole language to Marie Clay (1967), Kenneth Goodman (1970) and Frank Smith (1971) and notes that:

According to this theory, children do not learn to read by learning letter-sound rules. If they learn the rules, it will be almost a by-product of reading. The implication was that the reading process did not involve recoding letters to sounds, though writing did require recoding sounds to letters. (p.6)

This view suggests that children become fluent readers by relying mainly on contextual cues rather than word-level information, a view that is being challenged by other researchers. Chapman and Tunmer (1996a) found that most beginning readers used word level information when learning

to read. There is other research evidence to suggest that poor readers rely on context cues more than word level information, while good readers use decoding skills (word level information) to decode unknown words in the first instance (Chapman, Tunmer, & Prochnow, 1999).

It is important to consider this whole language approach to the teaching of reading, since it appears that spelling strategies are expected to be acquired in a similar fashion - children will acquire the skills necessary for spelling as a by-product of reading. Despite the considerable body of research into spelling that is available, Brann and Hattie (1995) found that in the 110 Auckland classrooms they surveyed at least, "research into spelling production and development is either not reaching most classroom teachers or is not articulated in teacher's views about practice in many class programmes" (p.39). The National Education Monitoring Report (NEMP) (Crooks & Flockton, 1999) has raised concerns about standards of spelling achievement. "Although there was a considerable improvement in spelling between year 4 and year 8, there is still concern about level of spelling ability particularly at year 4" (Crooks & Flockton, 1999, no page numbers). The effect of the methods used to teach spelling skills on the standards of spelling proficiency in New Zealand schools today, needs to be examined.

Spelling Practices in New Zealand Schools

Croft (1997) sees spelling as being primarily concerned with writing, but he does suggest that while the major focus should remain on writing, the view that children will pick up spelling is misplaced. He suggests that the personalised spelling list (lists compiled from errors made in the student's own writing) should be the core of a student's spelling words. He goes on to suggest that mastery of the 300 words that make up three quarters of children's writing plus the 100 most commonly misspelled words, is also necessary. He emphasises that words need to be learned as part of the writing process and that direct teaching and learning of core vocabulary should be delayed until year four if it has become clear that students have not mastered high frequency words. Croft does not restrict the teaching of spelling to the learning of word lists. He suggests that students also need to develop spelling knowledge through word study and vocabulary extension.

Allal (1997) states:

Study of word lists is very widespread in elementary schools, but many teachers do not apply the principles that assure instructional effectiveness. Ineffective practices include lack of individualisation (all students study the same lists), badly designed exercises (students manipulate words without engaging in sufficient spelling practice), and limited content

relevance (too much time spent on learning low-frequency words rarely used by students in their writing). (p.136)

Brann and Hattie's (1995) research into spelling practices in New Zealand schools suggests that memorising word lists appears to be the main focus of most spelling programmes in the schools they surveyed. If this is common practice in schools throughout New Zealand, it does not appear to be producing children who are proficient spellers (Crooks & Flockton, 1999).

A review of the literature by Lehr (1984) produced research information around three types of spelling instructional programmes. These were based on phonics, spelling rules and word lists. Lehr (1984) reviews research from a number of sources. Some researchers she reviews advocate phonics instruction as part of spelling instruction. She cites research by Beers (1980) and Graham (1983) who advocate teaching a basic sight vocabulary prior to, or along with phonics instruction. Graham restricts teaching phonetic skills to "base words, prefixes, suffixes, and consonant, consonant blend, digraph, and vowel sound-symbol association" (Lehr, 1984, p.219). Lehr also discusses the views of Allred (1977) and Fitzsimmons and Loomer (1978) who have reservations about phonics instruction. They suggest that there are too many variables in the English language for phonics instruction to be reliable enough for accuracy.

Research studies by Allred (1977), Manning and Manning (1981) and Hillerich (1977), reviewed by Lehr (1984), discuss the case for teaching spelling rules. They all point out the inconsistencies of rules in the English language. Allred's summary of findings provides these guidelines for teaching spelling rules:

Only a few rules should be taught, and they should have no exceptions.

Only one rule should be taught at a time.

A rule should be taught when there is a need for it.

Rules should be taught inductively (from examples).

(cited in Lehr, 1984, p.219)

The research studies reviewed by Lehr (1984) which relate to teaching spelling through learning word lists, provide some differing views on how this should be done. Lehr points out the rationale behind learning lists of words, which is that a relatively small number of words form a large part of written text. As Graham (1983) says, "100 words account for 50% of all words children use in their writing, 1,000 words for 89%, and 3,000 for 97%" (cited in Lehr, 1984, p. 219). She also highlights the differing views about the need to learn the words in context, with Mangiere and Baldwin (1979) believing this to be important, but Hillerich (1977) and Graham believing they should be learned in lists, out of context. De Ath (1984) suggests that in order to make decisions about

which instructional approach is most likely to be successful, more knowledge is needed about how children learn to spell.

"There is, then, a clear need to investigate how spelling ability is acquired. Current instructional procedures seem to lack theoretical justification in this area" (p.2).

It does seem that **how children acquire spelling skills** is at the core of the argument as to which instructional approach best suits their spelling needs. This will be fully discussed in Chapter 2, the Literature Review.

#### The Research Problem

Given the concerns about levels of spelling proficiency in New Zealand primary schools (Brann & Hattie, 1995; de Ath, 1984; Crooks & Flockton, 1999), and given the influence that poor spelling is likely to have on written language performance and academic self-concepts (Moseley, 1993; Chapman & Tunmer, 1996b; Brann, 1997), the way in which spelling is taught and the flow-on effect of spelling skills to other curriculum areas, is of some importance.

This research thesis sets out to investigate the following:

1. **What skills must be acquired by developing spellers for them to become proficient spellers?**

Part 1 of this thesis describes two preliminary studies, which set out to determine the skills that developing spellers need, in order to become good spellers.

2. **What are the effects of teaching spelling skills to year 1, 2 and 3 students, on measures of reading, spelling and**

**phonological awareness?**

Part 2 of this thesis compares spelling, reading and phonological awareness performance of two groups of year 1, 2 and 3 children from two schools of the same decile rating. One school used a spelling programme developed to provide explicit instruction in the skills identified from the preliminary studies and the other school followed a whole-language approach to the teaching of literacy skills (described in chapter 3).

Part 1: Preliminary studies

An analysis of the spelling knowledge and skills of a group of year 5 to 8 students was undertaken. The aim of this study was to identify the nature of errors made in writing samples by children in years 5 to 8, in order to isolate the specific skills and knowledge lacking in their spelling attempts. Secondly, an evaluation of the effects of providing a remedial spelling programme to a group of year 6, 7 and 8 poor spellers was also undertaken. This programme focussed on the skills and knowledge found to be lacking in their spelling attempts. The aim of this study was to measure the effects of a remedial spelling programme based on developing phonological, orthographic and morphological skills that had been found to be lacking in the spelling attempts of poor spellers from years 5 to 8.

## Part 2: Comparison Study

An evaluation of the effects of teaching spelling skills and strategies in the first three years at school, on measures of reading and spelling performances was also undertaken. The aim of this study was to measure the effects of explicit teaching of spelling skills to students in years 1, 2 and 3. The spelling, reading and phonological awareness skills of two groups of children (years 1 to 3) were measured at the beginning and end of the year for each year group. At the time of the first assessment, children in the training group had been exposed to the spelling programme for between two and twenty six months. Children in the comparison group were from a school of the same socio-economic decile rating, but they had not been exposed to the spelling programme.

### Two Hypotheses Investigated in This Study

1. A spelling programme for students in years 1, 2 and 3, that is based on teaching alphabetic, orthographic and morphological knowledge, using word-level information and mnemonic teaching strategies, will improve their spelling performance.
2. Teaching word level information to students in years 1, 2 and 3, will also improve their reading performance and phonological awareness skills.

### Overview

Chapter 2 reviews the literature and research findings related to the importance of spelling as a literacy skill. The process of how children learn to spell, including skills children need in order to become proficient spellers and how these skills should be taught will also be discussed.

Chapter 3, Part 1, describes two preliminary studies. One examines the spelling performance of 126 year 5 to 8 students from a decile 9 school and the second study presents the results of a pilot remedial spelling programme trialled on a group of twenty year 6, 7 and 8 poor spellers.

Chapter 4, Part 2, describes the methods and procedures used to evaluate the effects of the junior-school (years 1, 2 and 3) spelling programme.

Chapter 5 presents the results of the evaluation of the junior-school spelling programme.

Chapter 6 presents conclusions from the evaluation of the junior-school spelling programme and discusses implications for educational practice.

## Chapter 2

## Review of the Literature and Research

This literature review is divided into four parts.

1. Why spelling is an important literacy skill.
2. How children learn to spell.
3. What skills are necessary for the development of good spelling.
4. How spelling should be taught

Why is Spelling an Important Skill?

The Influence of Spelling on Other Curriculum Areas

Literacy is not just about reading. As Waters, Bruck and Malus-Abramowitz (1988) point out: "To become literate, the child must become proficient not only in reading but also in spelling. Despite its importance, there has been less research on spelling than on reading" (p.400).

Children must become proficient with written language in order to communicate with others. As Croft (1983) states: "The only possible justification for learning to spell is that accurate spelling is necessary for effective writing" (p.8). Assessment procedures in most education settings rely on students having good written communication skills. In theory, poor spelling skills should not affect these skills. In practice, it appears they do. Moseley (1993) surveyed 1254, eight and nine year old students in inner-city British

schools and found that 39% of the poorest spellers scored in the average to above-average range in vocabulary tests. He also found that many of these poor spellers made errors in high frequency words and that the errors were often taken to indicate low intelligence. His survey revealed that poor spellers used a lot of high-frequency words, avoided using hard-to-spell words and repeated words they knew how to spell. The results of this research, suggest that children who are poor spellers may limit their written language in quantity and quality, in an attempt to minimise their spelling errors. It is unfortunate that a student's ability and intelligence is often measured by the quality of their written expression - by teachers and by the students themselves (Moseley, 1993).

The flow-on effect of poor spelling to the quality of written language has implications for most curriculum areas. It may also impact on the development of a negative academic self-concept. In their research with five year olds, Chapman and Tunmer (1996b) showed that reading self-concepts were developed after just one year at school and they demonstrated how difficult it was to change a negative reading self-concept, once it had developed. It is possible that a similar process could occur in the development of written language self-concepts, which appear to be influenced by spelling skills and knowledge. This may in turn affect

several curriculum areas, with implications for the student's overall academic self-concept.

### The Relationship Between Reading and Spelling

There are differing views about the nature of the relationship between spelling and reading: Whether they are based on different processes or different styles of learning, whether they are inter-related processes and whether the acquisition of one influences the acquisition of the other. There are numerous studies which suggest a link between the acquisition of spelling skills and reading achievement in beginning readers.

Some researchers suggest that reading and spelling depend on different processes. Frith (1980) argues that reading is a recognition process, while spelling is a retrieval process. She states:

To spell well, words must be represented in a detailed way in the mind of the speller and this memory image must be recoverable. In the absence of spelling knowledge, an individual will be forced to spell words according to the way they sound. (pp. 80,81)

Nelson (1980) and Snowling (1985) also discuss the recognition and reproduction differences between spelling and reading, suggesting that reading is the easier task. Other researchers suggest that reading and spelling are

related skills. Bruck (1988) suggests that the differences she found between reading and spelling processes in dyslexic and non-dyslexic children related to strategy use rather than basic processes. She found that the dyslexic children used different processes to read and spell because of inadequate spelling-sound correspondence knowledge.

Mommers (1987) five-year research project in the Netherlands, revealed components of reading and spelling that were positively related. However, despite the influence spelling and reading skills appeared to exert on one another, Mommers states that they are still relatively independent and discrepancies may exist between the stages of development of the respective skills.

Other researchers have examined the possibility that there are individual differences among children in their spelling and reading styles. Treiman (1984) found that the Phoenician - Chinese continuum (Phoenician referring to children who rely on spelling-sound rules and Chinese, referring to children who rely on word associations as well as, or instead of, meanings) she had identified in beginning readers, also extended to beginning spellers. She also found that a reliance on rules (Phoenician) played a larger role in spelling than it did in reading which suggests that there are differences in the processes used for reading and

spelling.

Castles, Holmes and Wong (1997) described similar results in their study, which found that individual differences existed in children's spelling styles, which corresponded to those previously identified in reading. This study differed from Treiman's (1984) in that it did not find evidence to support the view that either approach was more important in determining children's ability to spell. Castles et al. suggest that since children are capable of using both lexical (storage of visual representations of words) and sub-lexical (sound-letter knowledge) processes in spelling words, the strategy they adopt may have more to do with external factors such as teaching style, than internal factors.

Numerous studies suggest that spelling plays a major part in developing knowledge of the alphabetic structure of the English language and that it has a direct impact on early reading progress. Cataldo and Ellis (1990) state, "Spelling practice, as it occurs in various contexts, may enhance the knowledge base from which novice readers draw information in their attempts at phonetic-cue and cipher reading" (p.106). In their longitudinal study, they found that the early flow of information between reading and spelling appeared to be unidirectional: Knowledge gleaned from spelling contributed to reading. They also discuss

Frith's (1985) framework within which spelling and reading interact to advance the learner towards increasing proficiency in both abilities. They highlight Frith's (1985) suggestion that spelling plays a fundamental role in the movement from a visual, or logographic reading strategy to an alphabetic approach.

Mommers (1987) also found a relationship between decoding speed and spelling. He suggests that:

The ability to spell accurately and the ability to apply basic phonic rules in decoding are closely related. If this relation were found to be causal, it would be expected that ... spelling instruction would have the greatest impact on reading achievement. (p.126)

Ehri and Wilce (1987) suggest that there is a strong positive relationship between learning to read and learning to spell and that each contributes reciprocally to the development of the other. Their research showed that learning to spell did make a contribution to reading acquisition among children who were just learning to read. These findings supported a causal interpretation. Ehri and Wilce state, "Spelling instruction promoted word reading skill in beginning readers... by helping readers to store words in memory using letter-sound associations" (p.61).

Uhry and Shepherd's (1993) study into the effects of teaching phonemic segmentation skills and spelling skills, on the reading skills of first grade readers, showed that trained subjects were superior to controls after six months, on measures of nonsense word reading, timed word reading and timed oral passage reading. At the end of one year they also showed improvements in segmentation, blending and spelling.

The findings from these research studies suggest that there is a strong relationship between reading and spelling and that spelling skills provide the beginning reader with strategies that assist reading acquisition.

### How Do Children Learn to Spell?

#### An Overview of Spelling Development

When children begin to learn that print maps the spoken word they are developing an awareness of the alphabetic principle (Ehri, 1987). In some languages spelling of words mirrors their pronunciation in a reliable fashion - Italian is one such language (Perfetti, 1997). English on the other hand, has a much less reliable link between phonology and orthography. There are many more ways of representing a sound graphemically (turning sounds into correct spellings) than there are ways of turning the graphemic representations into sounds (reading written language) (Ehri & Wilce, 1987;

Treiman, 1993; Bosman & Van Orden, 1997). Perfetti (1997) states that spelling is more difficult than reading. Reading can be accomplished with incomplete word representations, whereas spelling requires the retrieval rather than the recognition of the graphemes. He suggests that retrieval processes are more prone to errors because memory representations of words may be imprecise and there is often interference from competing letter sequences, which represent the same sound. Perfetti says:

... reading by itself will not dramatically improve spelling because reading does not practise the full orthographic retrieval process demanded by spelling. Moreover, it is spelling itself that is most effective at improving the quality of the word representation. Practice at spelling should help reading more than practice at reading helps spelling. (pp. 30, 31)

Although English is an alphabetic writing system, there are linguistic constraints at many levels, which affect the way in which sounds are translated into graphemic units. Perfetti (1997) outlines the significance of the orthographic system (the way in which rules relate graphic units to linguistic units) on developing spellers and readers:

English is generally held to be an alphabet, although the correspondence between phonemes and graphemes is far from straightforward. ... the treatment of English

orthography as a simple alphabet is, in principle, inadequate as an approach to the achievement of competence. Almost any word might, legitimately, be written in a number of ways. Because each word is assigned a unique and conventionally agreed spelling, it becomes essential to know the precise arrangement of letters that is appropriate in each case. (Perfetti, 1997, p. 319)

### Processes That Influence the Development of Spelling Skills

Seymour (1997) describes the different processes that are concerned with development of knowledge of the structure of the English language. He suggests a dual-foundation model, which encodes information at both a lexical and morphemic level as well as at an alphabetic level. This is similar to the dual-route hypothesis for spelling acquisition suggested by Nelson (1980), Jorm (1983) and Stackhouse (1985). These researchers identify both a sub-lexical process, relying on phonological processing, and a lexical process, relying on accurate storage of visual representations of whole words. Seymour suggests that spelling disabilities may take different forms that relate to the lexical versus the non-lexical processes. Children who are having difficulties with spelling mastery need to be assessed to determine which of these processes is difficult for them and instruction

tailored to meet their needs.

Seymour's model of orthographic and morphological development demonstrates how various processes influence literacy acquisition. Using this model, it is possible to identify points at which children might have difficulties.

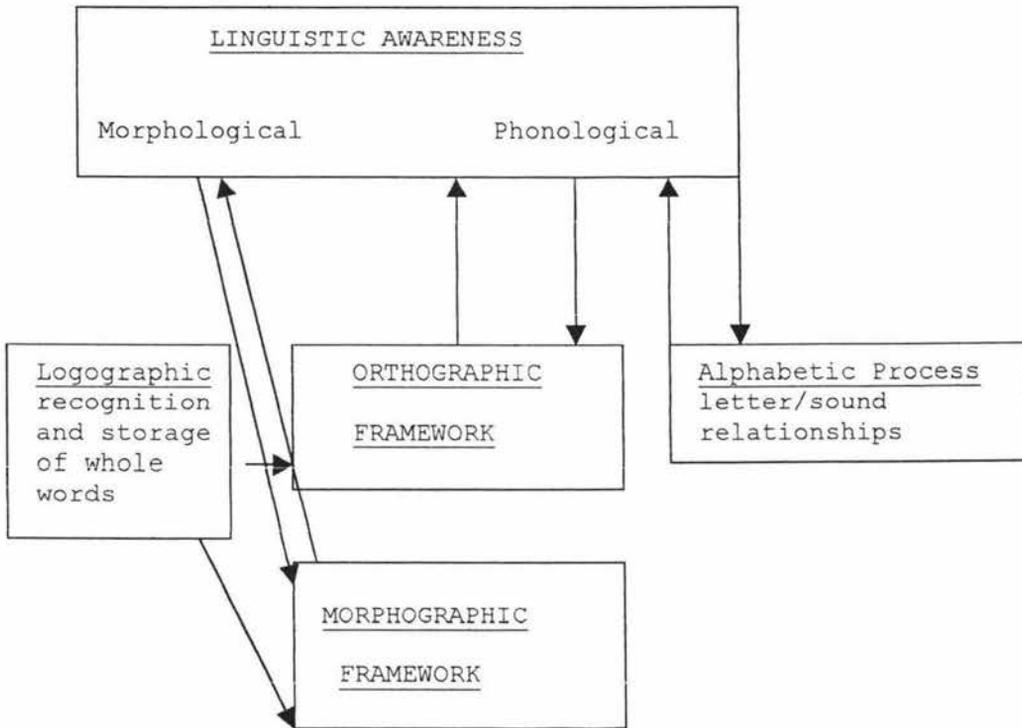


Figure 1. Modified diagrammatic representation of the dual-foundation model of orthographic and morphographic development (Seymour, 1997, p. 324).

#### Phonological awareness.

Phonological awareness refers to the ability to discriminate between and to manipulate sounds in words. This works through a hierarchical system from awareness of rhyme (words and syllables - cat, mat, sat) to awareness of onset (initial

consonant or consonant cluster - c ) and rime (vowel and following consonants - at in cat) to an awareness of individual phonemes (c - a - t ) (Treiman & Zukowski, 1991).

The awareness of individual phonemes is critical to the development of literacy since children must learn how individual letters map sounds in spoken language. This is the beginning of learning the alphabetic principle.

There has been a considerable amount of research into the role of phonological awareness and literacy acquisition (Tunmer & Nesdale, 1982; Rohl & Tunmer, 1988; Bruck & Treiman, 1990; MacDonald & Cornwall, 1995).

Morais (1991) differentiates between phonological awareness skills and phonemic awareness. Aspects of phonological awareness include the ability to discriminate between sound patterns, an awareness of rhyme, the ability to break syllables into onset and rime. Phonemic awareness (the ability to discriminate between and manipulate individual sounds in words) on the other hand, is not thought to develop until children are exposed to the alphabetic writing system (Treiman & Zukowski, 1991; Muter, Hulme, Snowling & Taylor, 1997).

There is considerable debate as to the significance of these two skills in literacy acquisition. Some researchers believe that the ability to segment words into phonemes (phonemic awareness) is more predictive of literacy success than phonological awareness (Muter et al., 1997). There is

no doubt that children must be able to segment words into correct phonemes in order to read and write.

Perfetti (1997) discusses Goswami and Bryant's (1990) theory of literacy acquisition.

The main assumptions of this theory are: (a) Children arrive at the task of acquiring literacy with rhyming skills in place, (b) rhyme-based phonology provides a basis for categorising words in terms of similarity of sound and orthography, and (c) this basis is used to build a lexicon of words by a process of detection of analogies between known words and unfamiliar words.

(p. 322)

Developing readers and spellers need to use analogy in order to make links between words to reduce the cognitive load of word storage and retrieval. Greaney (1992), in a study of the development of rhyme awareness and analogical transfer in normal young and older poor readers states:

Probably the most significant benefit derived from using analogy processes for decoding is that the strategy encourages activation of known phonological knowledge. This was demonstrated in the research when more than 80% of the analogical units in the original reading errors were already known to the reader, suggesting that many poor readers already have a 'substantial analogical unit base' from which to activate the strategy. Teaching

strategies need to be developed that encourage such activations. (p.83)

Phonological awareness skills will contribute to the beginning reader and speller's ability to use analogy between sound patterns in words in their reading and spelling attempts.

#### Logographic process.

This is concerned with the direct recognition and storage of words and it includes both visual and phonetic cues. Young children can however, often "read" familiar logographs such as McDonald's signs, advertisements for Coca Cola and may be able to identify their names before they have any understanding of the alphabetic principle or knowledge of phonetic cues. They are able to use the logographic process to translate some written words into the spoken word. As they learn to read, many familiar words are stored and recognised in this manner, without the need to use phonetic cues. Children who have difficulties with this process will have problems acquiring a sight vocabulary. This can affect fluency with both reading and spelling.

#### Alphabetic process.

The alphabetic process is founded on the knowledge of the letters and their equivalent sounds. It involves basic letter-sound reading, for example c-a-t says cat. Knowledge

of letter names has been shown to cause confusion for children grasping the alphabetic principle because many of them do not give correct information about the sound they make in words (Seymour, 1997; Treiman & Tincoff, 1997; Thompson, Fletcher-Flinn & Cottrell, 1999). Seymour (1997) suggests that learning letter sounds may be easier for children since the target phonemes are embedded in a more systematic and complete way. Children may use this alphabetic processing (sounding out words) frequently in the early stages of literacy development until a base of sight words is established. After that time, it may be used for unfamiliar words. Skills in alphabetic processing form the basis of the development of an orthographic framework (Seymour, 1997).

#### Linguistic awareness.

This has as its primary outcome, an awareness of phonemes. Seymour (1997) points out that the natural development of phonological awareness proceeds from words and syllables to onset and rime and finally to phonemes. Alphabetic literacy on the other hand demands that awareness of phonemes proceed to the onset and rime level and on to syllables and whole words. This may create a conflict in the developing phonological awareness of children since most teaching programmes encourage awareness at the phonemic level in the development of the alphabetic principle. Even when children

have learned to recognise alphabet letters and translate them into the sounds they make in words, it is possible for them to have difficulties mastering spelling if they do not have the linguistic and phonological skills to take words apart and put them back together again (i.e., blending).

Consider children who have excellent letter-to-sound and sound-to-letter knowledge and who can spell a word correctly if someone else breaks the word into phonemes, but who are unable to do this themselves. Linguistic and phonological awareness skills are thus important and necessary for letter-to-sound knowledge to be useful in spelling and reading.

#### Orthographic framework.

According to Seymour (1997) "The heart of the theory of literacy acquisition is the formation of the orthographic framework. This is viewed as a structure that encodes a generalised knowledge of the correspondence system together with word-specific features" (p. 328).

The orthographic framework is seen as a core structure that arises out of the basic phoneme-grapheme knowledge developed in the alphabetic phase. It moves from quite simple structures to multi-letter structures, which include consonant groups and vowel and consonant spelling patterns. As this is developing, so is the store of words in the logographic system. Seymour suggests that the orthographic system stores both phonological and orthographic information,

which is scanned to determine appropriate phonemic and orthographic elements when a word is being read.

Rohl and Tunmer (1988) also link the development of knowledge about the orthographic system with phonological awareness skills: "... the process of acquiring working knowledge of the orthographic system as a map for speech, in turn, provides the basis for performing more difficult phonological awareness tasks" (pp. 348, 349). Once the orthographic core is established, Seymour suggests that it should be possible to read and write all relevant words and non-words without the need to sound out sequences of letters. This suggests that full generalisation from taught to untaught items has occurred. This generalisation distinguishes orthographic acquisition from logographic acquisition and the ability to read words without sounding them out distinguishes the orthographic process from the alphabetic process. Seymour suggests that further development of more complex and variable structures in the orthographic system may in part depend on the teaching that occurs. Explicit identification of such things as vowel and consonant clusters means that they may be assimilated into the core structures. Knowledge of advanced structures in the orthographic system, which aid reading and spelling, develops between 6 and 10 years of age. Children who have not developed this basic structure will not be able to read and spell non-words because they have not generalised the phonological and orthographic patterns of

words.

### Morphological framework.

The morphological framework is the system that underlies the way English is written. It refers to the rules and conventions that dictate spelling patterns in words. For example: Long vowel sounds are spelled using two vowels together (groan), a silent 'e' (bone) or a vowel digraph (sewn); suffixes added to the ends of words usually change the characteristics of the word - invent (verb) plus 'tion' gives invention (noun).

"The orthographic system is not capable of dealing with words composed of more than two or more syllables, including words that have a complex morphemic structure (a stem combined with prefixes and suffixes)" (Seymour, 1997, p 331).

The morphological structure only develops when there is an adequate orthographic framework, adequate linguistic awareness and adequate phonological awareness skills.

Instruction that attempts to teach higher-order processes before skills from more fundamental areas have been established, is unlikely to be successful.

### Different groups of poor spellers

Further examination of the spelling skills of children who are poor spellers, reveals some interesting differences.

Some of these children struggle with reading but others have

no difficulty learning to read and many of them read above their age level. It appears that spelling skills are not necessarily related to reading skills in some of these children at least.

A review of the literature revealed that this phenomenon has been identified in a number of research studies. Frith (1980) describes three groups of spellers: Those who are good readers and good spellers, those who are good readers and poor spellers and those who are poor readers and poor spellers. Frith's (1980) analysis of the nature of the spelling errors in the different groups of spellers suggests that students who are good readers but poor spellers make errors that resemble those of the good readers and good spellers. Their errors appear to be phonetically correct which suggests that they can use sound-to-letter correspondence rules but that they do not seem to know letter-by-letter structures of words (e.g., mend, bend, frend). The spelling errors made by good readers, whether they were good spellers or not, appear to be made in the selection of the conventionally correct graphemes that accompany phonemes, particularly when there is a choice. Children who were poor spellers and poor readers made more non-phonetic errors (for example: sanek for stomach, higey for giddy), which suggest that they had difficulties with phoneme analysis and/or phoneme-to-grapheme conversion.

Ehri (1987) also describes the phenomenon of children who are competent readers but poor spellers. These children are thought to operate with partial memories for spellings. She says:

They know enough letters in words to read them accurately. They can spell phonetically and can recall some letters in words. However, because they lack memory for all the letters, they have difficulty producing perfect word spellings. (p.10)

Sloboda (1980) puts forward the hypothesis that:

... some good spellers may have direct access to some sort of visual memory for words, possibly experienced as visual imagery, which might supplement or replace rule-based spelling. Less good spellers would then be those who did not have access to a comprehensive visual memory. (p.232)

He asks the question "Do good spellers store information about which letters a word contains whilst less good spellers store mainly information about which phonemes a word contains?" (p.246). If this were the case then it is likely that less good spellers should still be able to accurately spell regular words and words where there is a one-to-one phoneme-to-grapheme correspondence. The children who are good readers but poor spellers appear to do just that, but the children who are poor readers and poor spellers appear to make some errors in turning phonemes into graphemes.

Waters, Bruck and Seidenberg (1985) suggest that there may be a difference between older children who are good readers and poor spellers and younger children who show the same pattern.

They say:

It is possible that older children who are good readers but poor spellers have adequate knowledge of spelling-sound correspondences and have more difficulty with spelling than reading because of the greater ambiguity of the mappings for spelling, while younger children who are good readers and poor spellers simply do not know the correspondences between spelling and sound. (p. 528)

This of course raises the question of whether the older group of good readers and poor spellers maintain their difficulties for the same reason as the younger good readers and poor spellers - they continue to lack knowledge about the correspondences between spellings and sounds. Whether this is because of an intrinsic difficulty acquiring this skill or whether it is because of the way in which the skill is taught is open to debate. If it is, as Sloboda (1980) suggests, that less good spellers do not have access to a comprehensive visual memory, they will need to rely on rule-based strategies for spelling. If spelling rules are not taught, as appears to be the case in many New Zealand schools (Brann & Hattie, 1995), these children are left with no alternative

strategies to refer to and must rely on a poor visual recollection of the words they are attempting, or a phonetic sounding-out approach which is not useful when words contain digraphs and phonograms or multiple spelling patterns for one sound.

Castles, Holmes and Wong (1997) suggest that spelling training contributes to developing spelling and reading skills. They found that:

Spelling training enabled subjects to process more letter-sound constituents in words. They could locate and use phonetic cues in reading...Spelling instruction promoted word reading skill in beginning readers...by helping readers to store words in memory using letter-sound associations. (p.61)

The ambiguities of the English language may be at the root of many spelling problems. Jorm (1983) raises the following point:

It is interesting to consider whether people with spelling-only retardation would exist with a language which had a simple regular correspondence between sounds and spellings. In an ideal spelling system of this sort, there would be only one possible spelling for each sound and hence no problem selecting the appropriate spelling from a range of possibilities. (p.103)

These research studies highlight the fact that all children do not acquire spelling skills with the same ease. Some do not appear to have any difficulties mastering the complexities of reading and spelling the English language. Others appear to have no difficulties learning to read in English but find the ambiguities of the spelling patterns difficult to master. Another group of children appears to have difficulties mastering the skills that enable them to read and spell in English. These three groups of spellers were represented in the writing samples analysed by the author, which are discussed in Chapter 3.

#### What Skills are Necessary for the Development of Good Spelling?

Perfetti (1997) suggests that there are two distinct areas of competence that developing readers and spellers must acquire.

1. Knowledge of sound-letter correspondences, which represent the alphabetic basis of the language.
2. Storage of a large amount of word-specific and morphological information regarding the actual spellings of words.

He discusses various studies, which consider reading and spelling disability and concludes, "Developmental orthographic impairments may selectively affect either the lexical or the alphabetic aspects of written

language" (p. 321).

In other words the nature of children's difficulties may be in their acquisition of the sound-to-letter knowledge or in word specific information - the knowledge of various letter and letter cluster representations for sounds.

### Alphabetic Processing

#### Letter-sound knowledge.

Written English is an alphabetic writing system, along with, for example, Italian and French (Perfetti, 1997). Languages that are based on an alphabetic system depend on the translation of sounds within words, to their graphemic representations - letters and letter clusters. The orthographies of different languages "vary in the degree to which they encode the surface phonology of the language relative to the morphology" (Perfetti, 1997, p. 24).

English is considered to be at the deep end of the continuum between a shallow or transparent orthography and a deep orthography. This means that it is less reliable than Italian, for example (a shallow orthography), in the way in which spellings are faithful to the phonology of the language. Despite the influence of a fairly complex orthography, the ability to spell in English still depends on the same skills that all alphabetic systems depend on, in order for the spoken language to be written. The spoken word must be able to be broken into its component sounds,

individual sounds must be identified and these individual sounds must be translated into the correct letters and letter clusters that represent them. The acquisition of phonological awareness skills allows words to be taken apart into component sounds. As the child begins to learn to read, the sound patterns (rhyming sounds, onset and rime, syllables) are further broken down into individual sounds. This is the beginning of phonemic awareness. Once the child can hear individual sounds in words he/she must decide which letter or letter cluster best represents that sound in the written word. The choices made are influenced by the levels of morphological knowledge children have about written English. Letter-sound knowledge and the acquisition of phoneme-grapheme knowledge are therefore critical for learning to spell in an alphabetic writing system.

The relative importance of learning letter-sound correspondences.

The role that letter-sound knowledge plays in the development of literacy skills in an alphabetic, but complex orthographic system, such as English, is discussed by a number of researchers. Treiman, Tincoff, Rodriguez, Mouzaki & Francis, (1998) state that:

Knowledge of letter sounds helps children to decode printed words and to construct the spellings of words in

their spoken vocabularies. Of course, knowledge of basic letter-sound mappings is not the *only* prerequisite to literacy. Children also need to know the contexts in which various mappings occur. (p. 1524)

Adams (1994) also discusses the significance of letter-sound relationships.

Learning about spellings and spelling-sound relations is a very small component of the literacy challenge. Yet, it is also wholly necessary in meeting that challenge. In the end the print on the page constitutes the basic perceptual data of reading. Rather than diverting efforts after meaning, the reader's letter and word-wise processes supply the text-based information on which comprehension depends. (p. 20)

Tunmer, Chapman, Ryan & Prochnow (1998) also emphasise the significance of letter-sound relationships in developing literacy. They state:

...knowledge of spelling-to-sound patterns is necessary for both learning to recognise new words, including irregularly spelling {sic} ones, and for taking advantage of the constraints of sentence context in identifying unfamiliar words. Moreover, knowledge of spelling-to-sound patterns is more strongly related to beginning literacy development than the ability to use the constraints of sentence context. (p. 14)

There seems to be no doubt that learning of spelling-sound correspondences, which includes letter-sound knowledge, is critical to the development of literacy. Advocates of the whole language approach to learning to read might disagree with its relative importance in learning to read, but there is little doubt that in order to spell at least, knowledge of letter-sound correspondences is a necessity.

How do beginning readers and spellers acquire  
letter-sound knowledge?

The approaches to the teaching of reading and spelling skills tend to fall along a continuum, which ranges from an isolated skill-and-drill approach, which emphasises teaching sub-skills in isolation, to a whole language approach, which has minimal emphasis on word analysis activities (Tunmer et al., 1998). Most children in New Zealand schools learn in programmes which tend towards the whole language end of the continuum. For this reason, the teaching of letter-sound correspondences is not explicit. Children are expected to acquire this knowledge as they learn to read and spell.

Thompson, Fletcher-Flinn and Cottrell (1999) conducted three studies designed to examine the sources of knowledge from which beginning readers learned letter-sound correspondences, without explicit instruction. They examined three possible sources of knowledge: Knowledge of letters' names, induction

from accumulated print lexical experience (Induced sublexical relations, IRS) and spelling experience. Thompson et al. (1999) found that letters that had a high level of compatibility between the application of the acrophonic principle ("the initial pronunciation element in the spoken name of the letter is taken as the corresponding phoneme for that letter" (p. 22)) and letters that occurred regularly as initial graphemes in beginning reading books, achieved higher scores for accuracy with a standard phonic response. This work suggests that young children, in the absence of being taught letter-sound correspondences explicitly, use their knowledge of letters' names and their experience with print (particularly with high frequency letters that occur at the beginning of words), as strategies to identify sounds that accompany letters.

There are various research studies that show how children use their knowledge of letters' names to inform them of the letters' sounds (Treiman, Weatherston & Berch (1994, Study 3) cited in Treiman, et al., 1998; Thompson, Fletcher-Flinn, & Cottrell, 1999). Treiman (1994) found that "Letter name effects are larger for some letters than for others, the differences reflecting the phonological properties of the letters' names" (p. 576). Thompson et al. (1999) also found support for this theory. They classified the alphabet letters as compatible or incompatible with the acrophonic

principle. The phonological properties of the letter names will therefore influence the accuracy of the sound children will assign it, if they use the acrophonic principle as a strategy for determining letter-sound correspondences.

Children's knowledge of letters' names is typically better than their knowledge of letters' sounds at school entry (Treiman & Cassar, 1997; Treiman & Tincoff, 1997). If children use the initial sound of the letter name as their cue for its sound, they are likely to make errors such as saying /dih/ for the letter 'w' and /wih/ for the letter 'y'. Treiman et al. (1998) found this to be the case in their research study. They state: "The findings show that children use their knowledge of letters' names when learning the letters' sounds rather than memorising letter-sound correspondences as arbitrary pairings" (p. 1524).

It does seem then, that in the absence of explicit teaching of letter-sound correspondences, young children will use their knowledge of letters' names, in many instances, as a strategy to work out the sound for a letter, if the sound is not instantly known. This strategy will often give inaccurate information. There are 17 letters which have a name that is incompatible with their sound

(*c, f, h, m, s, g, l, n, r, w, y, e, x, a, i, u, q*) (Thompson et al., 1999), which are therefore not likely to produce accurate sounds if

this strategy is relied on. Despite this, the use of letters' names to infer the sound of letters is still the most common strategy used by developing readers and spellers, when the sound is not known. Thompson et al. (1999) found that:

... children, without explicit instruction in letter-phoneme correspondences, used letter name knowledge by application of the acrophonic principle as a major source of knowledge when giving phoneme responses to letters in isolation. The children did not receive instruction on the acrophonic principle; hence, their use of it was self-generated (p. 41).

Thompson et al. (1999) also point out that there is not necessarily a connection between making connections between letters' names and their sounds and knowledge of the alphabetic principle. They state:

The children's use of acrophones for letter names does not imply an ability to use the alphabetic principle. ... In the absence of instruction to the contrary, these children inferred that the letter name labels they already knew would help them provide sound labels for isolated letters. ...As a result of their inference, the children responded to some letters with sound labels that did not coordinate with their use of the alphabetic principle. (p. 46)

These research studies suggest that failing to teach letter-

sound correspondences explicitly may encourage young children to use their knowledge of letters' names to infer the letter-sound correspondences, which is a strategy that frequently gives inaccurate information.

### Orthographic and Morphological Processing

The influence of orthographic and morphological knowledge on spelling acquisition.

It is the orthographic and morphological conventions of written English that make it a complex alphabetic language.

- One sound can be represented in a variety of ways, graphemically (/t/ as 't' in sit or 'ed' in jumped; /or/ as caught, awful, chalk, sore, soar, door, pour, fought, cause, wall)
- One letter or letter cluster may be sounded in a variety of ways (/ed/ may be sounded 't' as in hopped, 'd' as in fanned, and 'ed' as in handed; the letter /a/ may be sounded differently as in grass, apple, ape, war.)
- Clusters of letters may make new sounds that have no relationship to their original letter sounds ( /ch/ in chocolate, /aw/ in awful, /tion/ in invention).

Once the orthographic patterns are learned, children must then learn when they are to be applied in spelling and reading. They need to learn the orthographic and

morphological relationships between letters and words if they are to develop a framework, which will allow them to use context to determine which spelling pattern is appropriate. As Muter and Snowling (1997) state " ...children need to learn hierarchical spelling rules (such as lexical and morphemic word patterns) that go beyond simple and predictable phoneme-grapheme consistency if they are to become proficient spellers" (p. 409). This presupposes that they will also have developed knowledge of the alphabetic principle and accurate sound-letter knowledge. Ehri (1992) proposes, "...the development of orthographic representations depends on the integrity of underlying phonological representations" (cited in Muter & Snowling, 1997, p. 409).

Phonological and orthographic knowledge appear to each influence the development of the other. Children's ability to use orthographic and morphological information to inform their spelling attempts appears to be somewhat developmental, in that it increases as their exposure to print increases (Muter & Snowling, 1997; Nunes, Bryant & Bindman, 1997).

Nunes, Bryant & Bindman (1997) found that:

...when children first adopt...spelling patterns, they do so with little regard for their morphological basis. They generalise the patterns to grammatically inappropriate words (e.g., *sofed* for *soft*). Later these generalisations are confined to the right grammatical

category (e.g., *keped* for *kept*) and finally to the right group of words (regular verbs). The authors conclude that children first see these spelling patterns merely as exceptions to the phonetic system and later grasp their grammatical significance. (p. 637)

In their study which examined the effects of morphology on children's spellings of final consonant clusters, Treiman and Cassar (1996) found that even children with a reading age as low as first grade level, had some ability to use morphological information in their spelling attempts. They state:

Although children's ability to use morphological and orthographic information may be limited at first, the fact that they possess such abilities at all is impressive. Children's spelling is more sophisticated than often believed. (p.168)

Many children appear to 'pick up' this grammatical structure through their exposure to print, but those who do not may be disadvantaged in that they have less knowledge to use when trying to spell unknown or irregular words - they have fewer strategies to rely on. Because of the influence of orthographic and morphological knowledge on the development of accurate spelling skills, it may be necessary to teach this explicitly to ensure all children are able to use such knowledge.

Brann and Hattie's (1995) study of spelling practices in New Zealand schools found that overall, information about research into spelling production and development was not evident in most classrooms they studied. They say:

If spelling programmes in schools are to reflect research findings, they must be directed at increasing children's awareness of the way the orthographic system works by providing information from which children can draw analogies and make generalisations (Marsh, Friedman, Welsh & Desberg, 1980). (Brann & Hattie, 1995, p.40)

#### Proofreading for spelling errors.

Proofreading is a highly complex process. It involves more than just reading text. "In proofreading, the reader must be trained to look consciously at what he (sic) would normally need to ignore--features of the code itself (Shaughnessy, 1977, p.85)" (cited in Davis, 1995, p. 87). Proofreading involves looking closely at orthographic structures in words and using morphological information to check their correct usage. This is a highly developed skill and is a skill that needs to be taught. Children with limited orthographic and morphological knowledge are likely to find this very difficult. Madraso (1993) suggests a number of techniques for teaching proofreading skills, which help the reader focus on aspects of orthographic and

morphological knowledge. These techniques, such as choosing a common error (for example adding the suffix /ly/ to a whole word - gradual + ly = gradually) as a proofreading 'target', not only help the reader find such errors in their writing, but also highlight the orthographic and morphological information contained in such words. The hope is, as Davis (1995) says, "...if teachers help students perform error analyses of their texts, students will correct the tendency to make error (sic) in the first place" (p.87). Proofreading skills, if adequately taught, may be another source of knowledge about the orthographic and morphological structures of written English.

### How Should Spelling be Taught?

#### Principles of Spelling Instruction

##### Explicit strategy instruction versus developmental acquisition.

Groff (1986) discusses the views of researchers who suggest that children's spelling abilities progress through a series of developmental stages. He describes Gentry's (1982) research which categorises young children's spelling into five different stages: pre-phonetic, semi-phonetic, phonetic, transitional and the correct spelling level. Groff states:

When children reach the correct spelling level it is said that they have gained full knowledge of the basic

rules of English spelling. Researchers into developmental spelling infer that children accumulate this knowledge as they proceed through the developmental stages. At each developmental level, children are encouraged to discover the knowledge needed for correct spelling by inventing the spelling of words. The researchers believe it is best that children's progression through these levels not be interrupted with formal spelling instruction. (p.318)

The overall theme that appears to run through the views of advocates of developmental spelling, is that teaching spelling skills to young children before they reach level five ('correct' spelling level) will inhibit their spelling and writing performance. They also state that it is not necessary for children to learn letter-sound correspondences in order to spell (Groff, 1986). Groff presents a number of other research studies, which question the validity of the views put forward by those advocating a developmental approach rather than explicit instruction, to the teaching of spelling. He states:

This advice is not supported by most of the research that has been done on spelling, nor that done on direct (vs. indirect) instruction in general. ... In sum, the researchers of developmental spelling levels have asked teachers to abandon direct instruction in spelling to primary-grade children without providing sufficient

evidence that this radical alteration in instruction will benefit children more than is otherwise possible. (pp.321,322)

Varnhagen, McCallum and Burstow (1997) also examine the theories of developmental spelling acquisition. They state: Children's spelling development, as investigated through their naturalistic writing, cannot be simply described as progressing through a series of stages. A stage description of children's spelling development is too broad and doesn't account for the depth of children's knowledge about the spelling system or for the variability in children's use of their understanding. ... Developmental research on children's spelling needs to be geared toward investigating the multiple strategies children have for spelling specific types of words and examining how children select among those strategies, as well as why and how children discover new strategies and modify old strategies as they attempt to master the English language spelling system. (p.479)

Butyniec-Thomas and Woloshyn (1997) describe their research, which explored whether explicit-strategy instruction combined with whole-language instruction would improve third-grade students' spelling more than either explicit-instruction alone or whole-language instruction alone. They found that the students involved in the explicit-strategy plus whole-language instruction, outperformed students in the other two

instruction groups in measures of spelling dictated training words and dictated transfer words. They state:

Many other researchers have also found that students benefit from explicit-strategy instruction and that they often fail to use effective strategies unless they are explicitly instructed to do so (reviewed by Pressley & Woloshyn, 1995). Our results also corroborate the finding that young students can successfully be taught to use multiple spelling strategies (Kernaghan & Woloshyn, 1995). (p. 300)

Tunmer and Chapman (1993) also point to the need for direct instruction to ensure knowledge from one domain is transferred to another. They cite research by Thomson, Fletcher-Finn and Cottrell (1991), which found that:

Knowledge of phoneme-to-letter correspondences acquired through spelling did not automatically transfer as a source of knowledge for letter-to-phoneme correspondences in reading. ... Direct instruction in word analysis skills must be included in the instructional programme. (Tunmer & Chapman, 1993,p.11)

### Components of Spelling Instruction

Spelling instruction, if it is to be successful, needs to provide explicit information about the processes that influence written English. Seymour's (1997) representation of the dual-foundation model of the development of

orthographic and morphographic development (Seymour, 1977, p.324.) provides an excellent structure for the development of teaching initiatives.

Logographic process.

This emphasises the storage of whole words as patterns to read and spell. Children often learn to spell common essential words by rote, using this process. Learning of essential word lists fits into this category.

Alphabetic process.

Knowledge of letter-sound correspondences allows the developing speller to tackle unfamiliar words. It is the basis for phonological recoding skills. Accuracy with letter-sound correspondences is therefore critical if this skill is to be used effectively. Letter sounding encourages the emergence of phonemic awareness (Seymour, 1997), but children also need to have good phonological awareness skills if they are to be able to use this emerging phonemic awareness in their spelling and reading attempts.

Tunmer & Chapman (1999) also point out the link between letter-sound correspondences and phonological recoding skills. They suggest that:

To discover mappings between spelling patterns and sound patterns, children must be able to segment spoken words into subcomponents... Children who are experiencing

difficulties in detecting sound sequences in words need explicit instruction in the development of phonological awareness skills, a claim supported by a considerable amount of research (Lundberg, 1994). (p.86)

#### Orthographic process.

Seymour (1997) suggests that a stress on word families promotes a 2D organisation of the orthographic framework and onset-rime awareness. Word families may be developed around common letter clusters, which make up spelling patterns. For example, consonant clusters / vowel phonograms / digraphs (tion, ly, ight, est, oi, ch, sh, th) and consonant blends (sl, sc, br, nt, spl, squ). Proofreading skills related to searching for these common spelling patterns will support the learning of the visual images and sound-letter correspondences of these patterns.

#### Morphological process.

An understanding of the morphological framework that underpins written English, is developed through knowledge about the derivational structures of complex words. This involves learning common rules and conventions used in written English. Some examples are:

Adding endings to words -doubling consonant after short vowel- hop - hopping but not after long vowel, hope - hoping  
 Adding endings to words ending in 'y' - crying but cried.

Conventions for spelling words with long vowel sounds - (silent 'e' - like, cake, cute, rope, Pete; two vowels together - train, meat, goat, pie, suit; vowel digraphs and phonograms - show, weigh, flew).

Forming plurals (car - cars, but church - churches)

Using possessive apostrophes (The boy's foot. The boys' heads.)

Forming and expanding contractions (did not - didn't. aren't - are not)

Word origins and meanings (centenary, century, cents - to do with one hundred)

Adding suffixes and prefixes (investigate - investigation, legal - illegal)

It is this advanced knowledge of the complexities that govern written English that beginning spellers are working towards. However, they must have the foundation skills in place before this more complex information will be useful to them in their reading and spelling attempts. As Seymour (1997) says:

If development is blocked at the foundation level...then the appropriate intervention is an attempt to establish the elements of the foundation, with emphasis being directed toward whichever subprocess (logographic or alphabetic) seems more seriously impaired. At more advanced levels, the aim must be the step-by-step construction of an orthographic or a morphographic framework. (p.334)

Strategies for Making Learning MemorableStories.

Research into the memory difficulties of children with learning disabilities showed that these children did not perform poorly on all memory tasks when compared with children without learning disabilities (Torgesen, 1988). Torgesen quotes an experiment where children were required to recall the "gist" of interesting stories that were presented aurally. Children with learning disabilities were able to remember just as high a proportion of important idea units from these stories as children without learning disabilities, but had performance impairments on any task that required short-term retention of sequences of familiar verbal information, whether presented aurally or visually. If children with learning disabilities are able to recall the idea units in stories as well as those without learning difficulties, a strategy for teaching letter-sound correspondences through stories is likely to be of particular benefit for these children. The relevance and logic associated with how print maps the spoken word may not be obvious to young children as they begin to learn to read and spell and often remains this way for children with learning difficulties. One resource which teaches letter-sound links through the use of pictures, stories and sound-letter mnemonics, is "Letterland", developed in England by Lyn

Wendon (1994). It teaches letter-sound relationships in such a way that there is a method and logic behind them and it provides students with an accurate strategy for making sound-to-letter links. Each letter is represented by a character and students learn to listen for **who** they can hear in a word (Dippy Duck or Bouncy Ben?) They are taught to look at a letter and ask themselves **what sound** does this letter make in words? (The letter 'c' makes a "k" sound, as in Clever Cat's name, or the letter 'r' makes a "rrrr" sound as in Robber Red's name).

#### Picture mnemonics.

Mnemonic instruction is a memory-enhancing strategy designed to improve storage and recall of information. The target information to be learned is linked in some way to some other more memorable cue from prior learning. When that cue is activated it promotes recall of all the stored information linked to that cue.

Mastropieri and Fulk (1990) discuss the role of mnemonic instruction in enhancing academic performance in learning disabled students. They discuss the factors that make learning more memorable:

...it is known that effective elaborative techniques facilitate the recall of information. Moreover, it has been seen that when information is more meaningful, it is more memorable. Additionally, when information

is made concrete, it is more memorable than when it is abstract. Finally, it has been seen that when information is encoded effectively, direct retrieval routes are established and thus new information is more readily recalled. ... Each of these variables - elaboration, meaningfulness, concreteness, and effective encoding - contributes toward a theoretical framework for explaining why mnemonic instruction ... facilitates the performance of LD students. (p.119)

"Letterland" uses picture mnemonics to assist beginning readers and spellers learn the letter-sound correspondences between alphabet letters and letter clusters. This technique for teaching letter-sound correspondence learning is described by Ehri, Deffner and Wilce (1984), and Fulk, Lohman and Belfiore (1997). Ehri et al. (1984) state: "For mnemonics to be effective, not only must the response term involve something concrete and meaningful, but the mnemonic must effectively *link* the visual stimulus to the response so that when learners see the letter shapes, they are reminded of the mnemonic pictures or actions" (p.881). They conducted two experiments using picture mnemonics to help pre-readers learn letter-sound associations. Some children were taught using pictures integrating the associations (the shape of the picture included the letter - the letter /f/ drawn as the stem of a flower - and the name

of the picture - flower - began with the letter sound), some children were taught using pictures with no associations and others were taught without the use of pictures at all. The children taught with the integrated picture-mnemonics learned more letter-sound associations and also more letter-picture associations than did the other two groups, which did not differ from each other. Ehri et al. (1984) found that:

Integrated pictures were effective because they linked two otherwise unconnected items in memory. The shapes of letters included in pictures reminded learners of previously seen pictures with those shapes whose names began with the relevant letter sounds. (p.880)

Learning letter-sound relationships is not easy for beginning readers and spellers. Ehri et al. (1984) suggest that the difficulties arise from several sources. The number of associations to be mastered (more than 40 sounds for 52 visual figures, plus sounds for letter clusters); the visual similarities of many letters, particularly lower case letters; phoneme sounds and visual letter symbols are meaningless; associations between letters and sounds are totally arbitrary - there is nothing in the visual symbol of a letter that suggests its sound. Using integrated picture mnemonics overcomes many of these difficulties and provides a highly successful strategy for teaching letter-to-sound correspondences.

Fulk, Lohman and Belfiore (1997) found that the use of integrated picture mnemonics was an effective instructional technique to teach letter-sound acquisition and letter recognition to three transitional first-grade students with special needs. They provide two explanations for the success of this technique.

1. Integrating a picture into the form of the letter provides a strong link between the visual stimulus and the verbal response, which allows a meaningful connection to be made between information that was previously unrelated.
2. Mnemonic techniques provide students with an effective strategy to transform previously un-learnable material into learnable material. The mnemonic makes overt the strategy to use to recall the information. "Higher achieving students may develop learning strategies independently, but this is unlikely for students with learning disabilities" (Fulk et al., 1994, p.40).

#### Summary

Spelling is important to the development of written language skills. This has implications for academic performance in curriculum areas that rely on written language for assessment purposes. Children who have poor spelling skills often limit the quantity and quality of their written language in an effort to minimise errors. Because of this, they may judge themselves, and be judged by others to be less capable

than they really are, in the area of language expression (Moseley, 1993).

The reasons for children's spelling problems vary. Some children have problems with reading and spelling and others are fluent and even excellent readers, but poor spellers. These two groups of poor spellers have problems with different component skills of spelling. The lack of explicit teaching of rules and strategies, which provide a framework for written English, is implicated in the poor spelling skills of many children. Teaching interventions which take into account the process of how children develop spelling knowledge and at which points they have difficulty, are more likely to improve spelling performance than those which aim to fit the child to the needs of a teaching programme. In order to become proficient spellers, children need to acquire the following: Phonological awareness skills, phonemic awareness skills, accurate letter-sound knowledge, knowledge of spelling patterns in words (digraphs, vowel phonograms, blends) and knowledge of the rules and conventions that underpin the way in which letter-sound knowledge and spelling patterns work in words. If this knowledge is taught to children as they are developing spelling skills, in a manner that is memorable, spelling skills should improve. Since spelling skills have also been shown to influence reading skills, it is likely that a good foundation knowledge of spelling skills will also have a

positive flow-on effect to the development of reading skills.

#### The Research Questions

1. To what extent do learning strategies that use picture-mnemonics and metaphor to teach letter-sound correspondences, influence the accuracy of letter-sound and sound-letter knowledge?
2. How significant is letter-sound knowledge in the development of phonological recoding skills?
3. To what extent does explicit teaching of spelling skills (letter-sound correspondences, initial blends, digraphs and simple spelling rules) influence the reading, spelling, phonemic awareness and proofreading skills of year 1, 2 and 3 students, when compared with children of the same age, from a matched school, who have not been involved in the same teaching programme?
4. To what extent does explicit teaching of spelling skills influence the spelling, reading and phonological awareness progress of the lowest performing children when compared with the progress of the lowest performing children of the same age, from a matched school, who have not been involved in the same teaching programme?

## Chapter 3

## Part 1: Preliminary Studies

The preliminary studies outlined in this chapter provided the data that led to the development of the junior spelling programme for children in years 1, 2 and 3, which is evaluated in chapters 4, 5 and 6. During 1997 and 1998, the author was involved in developing a remedial spelling programme for senior students at a decile 9 school, after teachers expressed concern about the poor spelling skills of a number of year 6, 7 and 8 students. The author undertook an analysis of the spelling skills of all year 5 to 8 students in order to determine the nature of spelling errors made by students at these levels. The remedial programme was designed to teach the relevant skills and knowledge that were identified from this analysis, to children with severe spelling problems.

Study 1Analysis of Spelling ErrorsMethod

Spelling errors in writing samples from all children (126) from year 5, 6, 7 and 8 classes were analysed in the following way, to determine the nature of errors made.

Children were given a common story starter, (for example *The first thing I saw when I opened the door was....*) which was written on the board and they were asked to write for 15

minutes. At the end of that time, they were asked to total the words written, then to re-read their writing and correct any spelling errors they could find. They were not allowed to use dictionaries or other kinds of assistance. Each child's writing sample was analysed using a Writing Analysis Sheet (Appendix A) which was developed with reference to the spelling analysis sheet in "Spelling is not a Health Hazard" (Traill & Symes, 1995). The Traill and Symes analysis sheet required the error words to be written next to the correct spelling for each word and the nature of the errors to be determined according to a range of choices provided on the analysis sheet. The Writing Analysis Sheet developed by the author required a similar analysis of errors but errors were classified in the following way:

1. Errors associated with sound analysis skills - vowels, consonants, blends or incorrect number of sounds represented in a word. (back for black; het for hit; invesation for investigation)
2. Lack of knowledge of spelling patterns. (orful for awful; lite for light)
3. Lack of knowledge of spelling rules and conventions. (hiting for hitting; hopeing for hoping)
4. Proofreading errors. (th\_for the; off spelled of and off)
5. Other (pronunciation - persific for specific; homonym confusion - ware for wear; exception or irregular words -

butiful for beautiful).

The author's Writing Analysis Sheet also records the total words written, the percentage of spelling errors made in the writing sample and the number of errors from the core vocabulary lists in Spell Write (Croft & Mapa, 1998).

### Results and Discussion

#### Percentage of spelling errors in writing.

Group 1: Children who made less than 5% errors (41 children, 32.5% of total).

The errors made by children in this group related almost exclusively to homonym confusion, incorrect spelling of irregular or exception words, and proofreading errors (minor slips - of for off; omission of one letter in a word when it was correct elsewhere - bik for bike.)

Group 2: Children who made between 5% and 10% errors (46 children, 36.5% of total).

These children made errors related to orthographic structures (Spelling patterns, for example: lite for light or bight for bite) and morphological structures (Spelling rules and conventions, for example: invension for invention, married for married) in words, but they also confused homonyms, showed a lack of knowledge of irregular and exception words and made proofreading errors.

Group 3: Children who made more than 10% errors (39 children, 31% of total).

The children in this group fell into the two categories of poor spellers described by Frith (1980). One sub-group made errors related to incorrect analysis of sounds associated with consonants, vowels and blends. For example, drink might be written jink, plug might be written plag, black might be written back. Sounds were often incorrectly sequenced in words. Children in this sub-group also made incorrect choices of spelling patterns to accompany sounds, sequenced letter patterns incorrectly, showed a lack of knowledge of rules and morphological structures in words, and made proofreading errors. These children appeared to have a poor grasp of the structure of the English language, both phonologically and orthographically.

The second sub-group of children in this group did not make errors with sound analysis. They appeared to have difficulties using orthographic and morphological information to make correct choices for spelling patterns in words. For example, they might spell all words containing the 'or' sound with an or - tork, pork, chork, por, dor and so forth. They may not understand when to change the 'y' to an 'i' before adding an ending in words such as cried (cryed), happiest (happyest) and so forth.

For many children in group 3, particularly those in the second sub-group, the quantity and quality of their written language was below what could be expected of them, when compared with their reading and oral language skills. These differences

between the different groups of poor spellers are discussed in chapter 2.

The nature of students' errors.

The 15 minute writing samples were administered again in 1998 to students from years 6 to 8. A total of 187 samples from 1997 and 1998 were analysed to identify the nature of spelling errors commonly made by students. There were 1352 errors in total. Spelling errors were classified in the following way.

**Incorrect Vowels:** Students confused vowel sounds particularly 'a' and 'u', (scrab for scrub) and 'e' and 'i' (het for hit).

**Consonant confusion:** Sounds were represented with incorrect consonants - tagil for table, leef for leave.

**Blends:** Students made incorrect spellings for blends.

Usually they omitted the second or third letter of a blend - bame for blame, spat for splat.

**Spelling patterns:** Students were unable to use letter clusters accurately to represent sounds in words. For example; they might not use an appropriate spelling for a long vowel sound (two vowels together or a silent 'e' to represent the long vowel)- fell for feel, tran for train. Sometimes students used appropriate, but inaccurate letter clusters to represent a sound. For example: orful for awful.

**Spelling rules:** The most common rules that were not known were: Contractions, adding endings to words, past tense spellings, suffixes, possessive apostrophes.

**Contractions:** Students were unable to place the apostrophe in the correct place in contractions, or they added extra letters; coulden't for couldn't, did'nt for didn't.

**Adding endings: Silent 'e' and doubling the consonant rules:** Students did not know the rules for adding endings to words. They did not drop the 'e' before adding an ending (smileing for smiling) and/or they did not double the consonant after a short vowel sound at the end of a word (stoping for stopping)

**Changing 'y' to 'i' when adding endings to words:** Students were unable to accurately use the rule of changing 'y' to 'i' when adding endings to words ending in 'y'. They spelled happily, happyly or flying, fliing.

**Past tense - 'ed' endings:** Some students did not demonstrate knowledge of the use of 'ed' to depict past tense. Many of them omitted to use 'ed' at all or they spelled it with a 'd' or a 't', e.g., Yesterday I play with my friend, I jumpt over the hedge.

**Word stem plus suffix:** Students were not aware of rules associated with adding suffixes to word stems - they spelled finally, finaly and gradually, gradualy instead of adding the suffix (ly) to the whole word stem (final + ly = finally, gradual + ly = gradually).

**Possessive Apostrophes:** Students were unable to use apostrophes to determine possession appropriately. They often used apostrophes with plurals, or with the wrong word in a sentence, e.g., The dog's and cat's got wet, The horses

ears' were quivering.

**Proofreading:** Students made errors which they did not pick up when proofreading - 'off' spelled of; 'the' spelled th; the same word spelled two or three ways in the same piece of writing with one being correct.

**Homonyms:** Students used the wrong spelling for a word with the same sound but a different meaning - bear for bare, which for witch.

**Exception or irregular words:** Students showed a lack of knowledge for words that either originated from another language or were exceptions to a commonly known spelling rule. For example: beautiful (butiful), they (thay).

**Pronunciation:** Students spelled words as they spoke them - persific for specific.

Presented in Table 1, are the results of an analysis of the spelling errors in the 187 writing samples studied in 1997 and 1998. Errors are categorised according to the headings explained above and the incidence of each type of error is equated as a percentage of the overall errors made.

Table 1

Incidence of Spelling Errors as a measure of Type, Number and Percentage, in 15 Minute Writing Samples, for Students in Years 6, 7 and 8. (1997, 1998).

Type of Errors	Number of errors ( <u>n</u> = 1352)	Percentage of Errors
Spelling Patterns (Orthographic)	319	23.59%
Proofreading (Orthographic)	250	18.49%
Consonant Confusion (Sound Analysis)	132	9.76%
Homonyms (Morphological)	128	9.46%
Exception Words (Morphological)	107	7.91%
Adding Endings to Words (Morphological)	79	5.84%
Contractions (Morphological)	77	5.69%
Pronunciation (Sound Analysis)	63	4.65%
Incorrect Vowels (Sound Analysis)	60	4.43%
Past Tense - 'ed' Endings (Morphological)	56	4.14%
Adding Suffixes (Morphological)	38	2.81%
Apostrophes (Morphological)	28	2.07%
Blends (Sound Analysis)	15	1.1%

There were 37.9% morphological errors, 23.59% orthographic errors, 19.94% sound analysis errors and 18.49% proofreading

errors. The distribution of errors seems to suggest that the students lacked knowledge about the rules and conventions of the English language (morphological structure) and that they also had difficulties using appropriate spelling patterns to represent sounds (orthographic structure). Poor sound analysis skills (poor pronunciation, inaccurate sound-to-letter knowledge for consonants and vowels) and poor proofreading skills made up the rest of the errors.

Brann and Hattie's (1995) survey of spelling programmes in 110 Auckland schools suggests that the focus was on learning word lists, with little time spent on acquiring orthographic and morphological knowledge. In their research they emphasise the importance of teaching these. Perfetti (1992) also suggests that knowledge of letter sequences (orthographic knowledge) is necessary because of the many ways of mapping phoneme-to-grapheme sequences in the spelling of words. He sees the development of lexical representations as fundamental to the development of rapid word recognition skills in reading and spelling. The morphological structure of the English language also affects spelling skills. Many children appear to 'pick up' this structure through reading, but those who do not may be disadvantaged in that they have less knowledge to use when trying to spell unknown or irregular words. Lack of knowledge of morphological structures accounted for the

largest number of spelling errors in the analysis of spelling errors of the children in the author's study in 1997/98.

These skills are developed as exposure to the English language increases and it is therefore logical to assume that many of them will not be acquired until the final years of primary school or early in the secondary school years. The complexity of morphological structures varies however, and even young children have been shown to possess various levels of morphological awareness. Treiman and Cassar (1996) demonstrated this in their research (see chapter 2).

Proofreading errors were also noticeable in the analysis of spelling errors of year 5 to 8 students. The National Education Monitoring Project report (Crooks & Flockton, 1999) also highlights a lack of skill in this area (see Chapter 2). The English language is a morphologically and orthographically complex alphabetical system, with one-to-many possibilities in both phoneme-to-grapheme alternatives (/k/ sound = ch - school, k - kitten, qu - queue, ck - sick, c - carry) and grapheme-to phoneme alternatives (ch may sound as 'ch' as in cherries, /k/ as in school, /sh/ as in machine) (Ehri and Wilce, 1987; Treiman, 1993). Instruction programmes that fail to provide children with strategies and knowledge about orthographic and morphological structures in words will fail to provide developing spellers and readers with knowledge that will help them make correct choices for writing and reading words.

Study 2Remedial Spelling Programme for Year 6 and 7 StudentsMethod

Twenty year 6, 7 and 8 students (aged between 10 and 13 years) were identified by their teachers because of their poor spelling skills. They generally scored poorly in classroom and standardised spelling tests, made frequent errors in words from core vocabulary lists (Croft & Mapa, 1998) and made many errors in their draft writing. They had difficulties proofreading for spelling errors and teachers commented that many of them wrote using much simpler language and ideas than they demonstrated in oral presentations.

The Daniels and Diack (Peters, 1975) spelling test is one standardised test in common use in New Zealand schools. This is a list of 67 words of increasing complexity, which produces a raw score that can be translated into an approximate spelling age. Students were administered this test at the beginning and end of this study.

Programme Content.

The content of the programme was developed to teach orthographic (spelling patterns - for example; aw, au, or, le, tion and so forth), and morphological (rules and conventions - for example; doubling the consonant after a

short vowel, 'ed' endings to depict past tense) structures, using the "Letterland" resource.

The spelling programme aimed to:

1. Highlight the many skills and strategies the students already had. This was done by analysing writing samples from each student, to identify skills and strategies they already demonstrated in their spelling attempts.
2. Evaluate the nature of the student's spelling errors to determine phonological (difficulties with sound-to-letter analysis), orthographic (difficulties with selection of spelling patterns to represent sounds) and morphological (lack of knowledge of rules and conventions of the English language) knowledge and proofreading difficulties.
3. Encourage the students to develop metacognitive strategies. To understand how they learn, what they need to do to remember information and to understand the relationship between effort, knowledge, strategy use and success. This was done by highlighting the factors that made information memorable, by teaching questioning techniques to recall information already learned, and by providing constant feedback about reasons for success and failure throughout the programme.
4. Teach rules and strategies that were based on developing phonological, orthographic and morphological knowledge to provide a logical framework to the English language.
5. Provide classroom follow-up to ensure the skills and

strategies learned in the programme were transferred to the student's writing. Students were encouraged to use the following questions when attempting unknown words or when trying to fix spelling errors.

*What do I know about this word?* (For example: Is it a past tense word - do I have an /ed/ on the end?)

*What sounds can I hear in this word?* (break it into syllables and then into phonemes).

*What letters could go with the sounds?* (For example: What letter patterns could spell the /or/ sound?)

*Does the spelling look right? If not, what could I change it to?* (For example: does orful look right? How else could I write /or/ ? If I don't know, how will I find out?)

#### Procedure.

Students worked in two groups of 10 (only 19 completed the trial as one student left the school). They met for two, 45 minute sessions per week, for nine weeks in term one.

During term two, they met for one, 15 minute session per week for ten weeks and each student received approximately 10 minutes per week individual support during writing time in the classroom. This was used to proofread draft writing in order to identify spelling errors and to use knowledge gained from the spelling programme to correct errors. The programme was based around teaching rules and spelling patterns through the use of the "Letterland" resource using

the story and picture mnemonics inherent in it. A variety of practice activities and spelling games were used to encourage participation and recall of material. For example, blend or digraph Bingo, miming, team competitions for recall of previously taught material and weekly practice activities both in the group and for homework.

### Results and Discussion

#### Changes in spelling age.

Children were administered the Daniels and Diack (Peters, 1975) spelling test at the beginning (May) and end (September) of the trial. Tables 2, 3 and 4 demonstrate the changes that occurred in the spelling ages recorded in May and September. Unfortunately, the student's exact ages were not recorded and they are therefore presented as approximate ages for their year level.

Table 2

Spelling Age in Years, of Year 8 Students as a function of Student and Time of Testing.

Student	Chronological Ages (Years)	Spelling Ages (Years)			
		Pretest (May)		Posttest (Septemer)	
		Raw score	Spelling Age	Raw score	Spelling Age
A	12-13	37	10.5	45	12.8
B	12-13	40	12.3	47	13.0
C	12-13	40	12.3	44	12.7
D	12-13	39	11.5	44	12.7
E	12-13	36	10.2	39	11.5
F	12-13	37	10.5	43	12.6
G	12-13	37	10.5	48	13.1
H	12-13	37	10.5	43	12.6

Table 3

Spelling Age in Years, of Year 7 Students as a function of Student and Time of Testing.

Student	Chronological Ages (Years)	Spelling Ages (Years)			
		Pretest (May)		Posttest (Septemer)	
		Raw score	Spelling Age	Raw score	Spelling Age
A	11-12	37	10.5	45	12.8
B	11-12	36	10.2	42	12.5
C	11-12	34	9.5	39	11.5
D	11-12	31	8.7	33	9.2
E	11-12	29	8.3	37	10.5
F	11-12	31	8.7	34	9.5

Table 4

Spelling Age in Years, of Year 6 Students as a function of Student and Time of Testing.

Student	Chronological Ages (Years)	Spelling Ages (Years)			
		Pretest (May)		Posttest (September)	
		Raw score	Spelling Age	Raw score	Spelling Age
A	10-11	24	7.7	34	9.5
B	10-11	27	8.1	38	11.0
C	10-11	16	6.7	27	8.1
D	10-11	33	9.2	39	11.5
E	10-11	29	8.3	36	10.2

Changes in writing.

As shown in Tables 2, 3 and 4, all children in the programme showed an improvement of between .5 and 2.9 years over a four month period. Teachers commented on improvements, not only in the nature of spelling errors in the students' draft-writing, but on the quantity of writing and the quality of words used. For example, children who had struggled to write a page were writing more than one page and many were continuing stories over a series of days. They were also tackling more complex words - writing difficult instead of hard, gigantic instead of big and so forth.

At the beginning of the programme, most students were unable

to identify errors in their writing and they could not fix them readily, even if someone else underlined them. At the end of the four month period, students were able to fix most errors when they knew the rule to apply. Identifying the errors was still a problem for many students but if they were given a proof-reading target (search for all words with an /ed/ or /ing/ ending and check the rule for doubling the consonant), they were able to locate and fix errors associated with that rule, without assistance.

#### Discussion.

This programme was not conducted as a research study as there was no comparison group of students who did not receive the programme. It would have been useful to have obtained more detailed assessments of the quantity and quality of each student's writing, detailed measures of proofreading skills, more diagnostic spelling assessments and the exact ages of all students before the programme began. However, the improvements in spelling ages did appear to reflect a change in the students' spelling skills. Teachers noted changes in attitudes to writing and gains in confidence in tackling unknown words. Many students began to use more advanced vocabulary, despite making errors in their spelling. For example, instead of writing He had no friends because he was bad, a child might write He had no friends because he was meen and narsty. They were prepared to 'have a go' and ask

for help afterwards, because they knew there were strategies they could use to find out how to correct errors.

The programme was implemented using as many spelling games and practice activities as possible. The students were very enthusiastic about the programme and in a revision session at the end of the programme, they demonstrated excellent recall of much of the information they had learned. Spelling rules and letter patterns were taught using stories to make them memorable. The most difficult part of the programme was helping the students to learn how to use the information in spelling attempts in their writing. They needed instruction about *how* and *when* to apply their knowledge. This difficulty in developing effective and efficient strategies for learning and knowing when and how to use knowledge and strategies that have been acquired, is described by Reid (1988) and is typical of many children with learning difficulties.

#### Implications for Teaching Practice

Research by Nuthall and Alton-Lee (1994) suggests that pupils need to meet a concept or idea on four separate occasions if they are to learn and remember it and that these occasions should not be separated by more than two days. The results of this trial remedial spelling programme suggest that the students benefited from learning specific spelling skills but

this benefit was significantly enhanced by the follow-up support they received in the classroom which enabled them to learn how to apply their new knowledge to writing.

Remedial programmes are generally provided in a withdrawal situation and are often taught by someone other than the classroom teacher. This makes it difficult to link the new learning to classroom-based learning and often restricts its application to other areas. It is a costly exercise to provide withdrawal tuition and if it is to be applied to classroom activities, some sort of in-class support is also required. The best option is for the classroom teacher to provide the spelling instruction and follow-up support, as part of the regular classroom programme.

Brann and Hattie's (1995) research into spelling tuition in primary schools found that senior class teachers tended to operate spelling programmes based on learning individual words spelled incorrectly, or on interest word lists. Very few teachers analysed children's spelling to discover the meaning and significance of the errors. Rarely were correct strategies identified - the focus tended to be on identifying errors and then requiring children to learn the incorrectly spelled words.

Our trial remedial programme, based on teaching skills and

strategies associated with learning phonological, orthographic and morphological structures in words, produced good results in poor spellers in the senior school. Treiman and Cassar (1997) state that:

Young children also have some budding knowledge about the orthographic regularities of the written language and about the role of morphology in spelling. Children begin to use this knowledge earlier than they are given credit for in existing theories. (pp. 64, 65)

This raises the possibility that making the orthographic and morphological structure of the English language overt when children are learning to read and write, may improve spelling skills at an earlier age. This budding knowledge may be strengthened in children who are already developing a sensitivity to it and may be highlighted for those children who are not yet able to use analogy to make the connections themselves.

Nunes, Bryant and Bindman (1997) suggest that developing spellers are heavily dependent on their phonological awareness skills. As they encounter a wider range of words and spelling patterns, they begin to learn that there are other factors that affect spelling. They then begin to use common spelling patterns without regard for their grammatical correctness and later still they begin to understand that there is a correct grammatical usage. For example,

developing spellers may learn the spelling pattern for the sound /or/. As their knowledge of the English language increases they will discover that there are several other spelling patterns for this one sound and will begin to develop an awareness of the appropriateness of each pattern according to grammatical conventions. Research by Nunes et al. (1997) suggests that there is a strong link between children's grammatical awareness and their spelling development. They say:

... we need intervention studies: we need to strengthen children's grammatical awareness and see how this affects their spelling. ... What should we teach our children about grammar? We have no ready answer to this question, and we think that the answer must wait for research on how to increase children's awareness of grammatical distinctions. That should be the needed [sic] move. (p.169)

Current research suggests that knowledge of the orthographic and morphological structures of the English language, contributes to the development of young children's spelling skills (Backman, Bruck, Herbert & Seidenberg, 1984; Goswami, 1993; Bowey, & Hansen, 1994; Brann & Hattie, 1995; Landerl, Frith & Wimmer, 1996; Cassar & Treiman, 1997; Muter & Snowling, 1997; Nunes, Bindman & Bryant, 1997; Bowey, Vaughn & Hansen, 1998). Spelling skills have a direct impact on

written language skills (Brann, 1997; Mosely, 1993). Chapman and Tunmer (1996b) have demonstrated that children's reading self-concept develops in their first year at school, as they are learning to read. It is very likely that young children's writing self-concept also develops early, as they are learning to write. Chapman (1998) highlights the importance of avoiding the development of a negative academic self-concept because of its effects on motivation and achievement outcomes.

It seems that knowledge and strategies about spelling may have significant impact on the acquisition of written language skills, which will affect a variety of curriculum areas. Success with written language contributes to children's developing academic self-concepts and to achievement outcomes. If young children need to use these strategies from the time they begin to read and spell, it seems logical that they should be taught at the same time. The results of the pilot study suggest that if a progressive, developmental spelling programme was introduced from year 1, there might not be a need to run remedial programmes for students in year 5 and beyond.

## Chapter 4

## Part 2: Evaluation of Junior Spelling Programme

This study set out to determine whether teaching spelling skills to year 1, 2 and 3 students, using the "Letterland" resource which makes learning memorable through the use of story and picture mnemonics, would improve their spelling, reading and phonological awareness skills. Measures of achievement of these skills were compared between students in years 1, 2 and 3, from two schools that were matched by their decile rating. The students were also matched on literacy-based skills at age 6, using the 6 Year Observational Survey results (Clay 1993).

Measures of alphabet knowledge, spelling skills, phonemic awareness skills, reading skills and proofreading skills were compared between groups of students from the two schools. Alphabet knowledge was measured by children's knowledge of letter names and sounds and their ability to write a letter that corresponds with a spoken sound. Spelling skills were measured using a pseudoword spelling task, modified from Richardson and DiBenetto's (1985) Decoding Skills Test and a standard spelling test - Daniels and Diack (Peters, 1975). Phonemic awareness was measured in years 1 and 2 using the Test of Phonemic

Awareness (TOPA) (Torgesen & Bryant, 1994). Although the TOPA tests children up to the age of 8 years 11 months, the results of the year 2 children suggested that many year 3 children would reach ceiling and for this reason, no phonemic awareness test was administered to year 3 students. Reading skills were measured using a pseudoword reading task which was an adapted version of Section 3 (30 monosyllabic words) of the Decoding Skills Test (Richardson & DiBenetto, 1985) and a sight-word reading task, using the Burt Word Recognition Test (New Zealand revised edition, Gilmore, Croft & Reid, 1981). Proofreading was measured in years 1 and 2 using a recognition task which involved searching a piece of text for specified spelling patterns. For example, children were asked to circle all the 'ed' and 'ing' endings they could find in a piece of text. This test was devised by the author. In year 3, proofreading skills were measured using the Proofreading Test of Spelling (PRETOS) (Croft, Gilmore, Reid & Jackson, 1981).

### Method

#### Participants

The participants were year 1, 2 and 3 students who were being taught in classrooms that practised whole-language instruction. A total of 183 students took part in this study: 100 training students and 83 comparison students.

The breakdown by year level was as follows: 30 year one (15 training, 15 comparison), 72 year two (35 training, 37 comparison) and 81 year three (50 training, 31 comparison). The training school and the comparison school were from different suburbs, north of Wellington and were both decile 9 schools. The decile rating reflects a scale from 1 to 10, with 10 indicating the children attending are from the highest socio-economic group. Factors affecting children's preparation for school, such as the educational backgrounds and educational expectations of parents and children's preschool attendance and exposure to books, could be expected to be similar in schools of the same decile rating.

Initial testing took place in March 1999, by which time all children had been at school for periods of time between 6.2 months (year 1 students) and 26.74 months (year 3 students). It was not possible to collect data from children in the training school, prior to their involvement in the trial spelling programme, as it was part of their classroom programme from school entry and they had therefore all been involved in it for some months prior to initial testing.

In order to determine the similarity between the

educational achievement of beginning readers and spellers in the training and comparison schools, the 6 Year Observational Survey results (Clay, 1993) from both schools for a period of three years were compared. The Observational Survey is a standardised assessment of reading, spelling and writing skills, which is undertaken by most children in New Zealand, when they reach 6 years of age.

The "Letterland" resource, around which the trial spelling programme was developed, was introduced to the training school in 1996. For this reason, the 6 Year Observational Survey results from the training school, used in this analysis, were taken from the period 1993 to 1995, prior to the introduction of "Letterland". The results at the comparison school were taken from the period 1997 to 1999 as they were the only records available. Both periods were for three years. Table 5 presents these results.

Table 5

Comparison of Means and Standard Deviations of 6 Year  
Observational Survey Results Between Students in the  
Training School (1993-1995, Prior to the Introduction of  
Training Programme) and Students in the Control School  
(1997-1999)

Variable	Max. Score	Training Group		Comparison Group		F
		M	SD	M	SD	
		n = 135		n = 159		
Letter ID	54	51.18	5.48	50.92	6.29	0.14
Concepts about print	24	17.65	4.14	16.37	3.72	7.85*
Word Test	15	10.38	4.44	9.77	4.64	1.29
Writing Vocabulary	83	37.44	19.84	37.92	19.71	0.04
Dictation	37	29.33	8.59	29.64	8.43	0.09
Burt Word Recognition	110	20.65	13.69	20.09	12.25	0.13

\* $p < .01$

Results from these 6 Year Observational Surveys suggest that at age 6, students in the training school (prior to the introduction of 'Letterland") and students in the comparison school were performing at very similar levels on measures of reading (Word Test, Burt Word Recognition), writing (Writing Vocabulary) and spelling (Letter Identification, Dictation), since there were no significant differences in the mean scores in these

areas. There was however a small difference between the groups on the Concepts About Print measure that favoured the training group.

At the time of the first testing in March 1999, the average age of students in both schools was similar. Students in both schools had therefore been exposed to school-based, literacy instruction for the same periods of time. (Details of the instructional approaches used at both schools are discussed later in this chapter.) Table 6 presents data on the number of students, gender mix and mean age of students in both the training and comparison schools.

Table 6

Number, Gender, Mean Age of Subjects and Year Group, in Training and Comparison Schools.

	<u>Training School</u>			<u>Comparison School</u>		
	Number	Gender M F	Mean age (months)	Number	Gender M F	Mean age (months)
Year 1	15	7 8	66.46	15	9 6	66.20
Year 2	35	18 17	74.88	37	21 16	74.42
Year 3	50	22 28	86.55	31	17 14	86.74

In March 1999, the students at the training school had been exposed to the trial spelling programme since they started school at age 5. Therefore the year 3 students

had been on the spelling programme for an average of 26.55 months, the year 2 students for 14.88 months and the year 1 students for 6.46 months. Students in the comparison school had no exposure to this spelling programme, but had been at school and exposed to reading, writing and spelling instruction for an average of 26.74 months in year 3, 14.42 months in year 2 and 6.20 months in year 1.

### Design

After "Letterland" was introduced to the training school in 1996, teachers' observations suggested that it was having noticeable positive effects in children's development of reading, writing and spelling skills. A spelling programme was developed, using "Letterland" as the teaching resource, which was designed to inform children about letter-sound correspondences and orthographic and morphological patterns in words. It was run as part of the daily language programme for children from new entrant level to year three.

### The Spelling Programme

This junior spelling programme set out to provide young children with explicit teaching of the skills and strategies necessary for spelling development. These

skills were identified through studying spelling errors made by older poor spellers and by reviewing the literature on spelling. "Letterland" was the resource chosen as a teaching tool because it provides strategies which make learning memorable.

#### Aims of the Programme

The spelling programme in the junior school had the following aims:

1. To develop an understanding of the alphabetic principle - to ensure students develop an understanding of the relationship between print and the spoken word.
2. To provide instruction that encourages phonemic awareness and opportunities to develop phonological awareness skills.
3. To encourage an awareness of orthographic structures in words and to develop links between these structures and the sounds they make.
4. To provide instruction about some common rules and conventions of written English in order to develop an awareness of morphological structures in written English.
5. To provide practice with skills relating to the development of proofreading abilities.

#### Description of the "Letterland" Resource

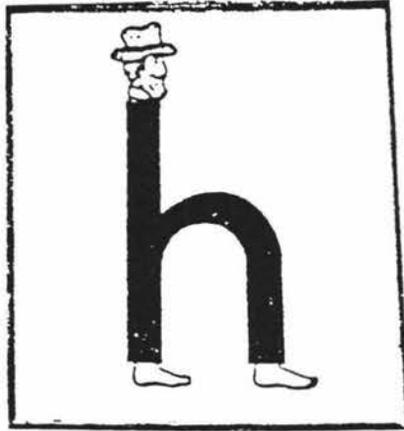
"Letterland" concentrates on two areas: Sound/symbol

correspondences (the analysis and synthesis of letters and letter strings) and language development (oral and written language, listening and speaking skills, speculating, remembering, initiating and communicating ideas).

It teaches through the use of metaphor and picture mnemonics. The information being taught is stored in a story, which is accompanied by a picture (or pictogram as it is called), which incorporates all the information about the shape of the letter and the sound that the letter makes in words.

For example; each alphabet letter is given a character and a name (e.g., the letter /h/ is represented by the Hairy Hat Man). A pictogram provides a visual image of the character, which is incorporated into the shape of the letter it represents. This links the visual image of the letter, to the sound it makes in words (the character's name always makes the common sound of the letter). The characters that represent each letter have their own little idiosyncrasies, which contribute to making them memorable for young children. Children learn, for example that the Hairy Hat Man always walks in bare feet because he **hates** noise. His **h h h h** sound is so quiet that if he wears shoes he can't hear himself speak. He loves helicopters and hamburgers and wears a hairy hat.

This is what The Hairy Hat Man looks like.



This may not seem very different from other approaches which link letters to objects, for example; a - apple, b - ball and so forth. However, many children are unable to use this letter-sound knowledge when they meet letter strings and digraphs because the sounds of the letters in these letter clusters do not resemble the sounds of the individual letters. "Letterland" capitalises on the previously learned information that the children have about the characters, to teach the new sounds that accompany letter clusters and digraphs. It provides a structured link between the letters in the cluster, in the form of a new story, which incorporates the characters represented by the letters. This new story is also represented with a pictogram, to provide a strong visual image of the letters in the story.

For example: The letter /s/ and the letter /h/ make a new sound when they are next to each other in words. Why is this? Remember that the Hairy Hat Man hates noise.

What do you think he does when Sammy Snake comes slithering along behind him in a word saying his s s s s sound? He turns around and says "Sh". Whenever Sammy Snake is behind the Hairy Hat Man in a word, the only sound you can hear, is the Hairy Hat Man saying "Sh". Children readily remember the story and when they see these two letters in a word they associate the "sh" sound with them. They are also readily able to write down the two letters in the sound "sh" if they are asked, "Who makes this sound?" - Sammy Snake (s) and the Hairy Hat Man (h).



Another example is in the word trawler where the respective sound values of /a/ and /w/ shift for no apparent reason. There is nothing in the rule "a beside w makes the aw sound as in awful" to help young children remember it when they need to use it in word-attack strategies for unknown words in the future.

"Letterland" uses a pictogram and accompanying story, which supplies a reason for this phonic rule. Children become "detectives" on the lookout for the Wicked Water

Witch who tries to steal Annie Apple from inside the letter /a/. Her spell goes wrong and all she does is make Annie Apple taste awful. The story reason and picture fused into the letters, make the new sound logical, dramatic and therefore memorable (Wendon, 1994).



Many letter clusters (e.g., tion, sion), vowel digraphs (e.g., ew, or, ir, au, er,) and alternative sounds for individual letters (e.g., the sound of the letter /e/ in they, the sound of the last /a/ in bananaa, the sound of the /o/ in love, the sound of the /a/ in after) are explained through a simple, memorable story about the new sound made by one of the characters, or about the sounds made by the characters in the letter cluster.

Children's learning load is reduced because of the way in which the previously learned letters (characters) reappear in new stories, giving meaning to the new sounds that letter clusters make.

"Letterland" also teaches some spelling rules through the

use of the story analogy and previous knowledge of letter sounds. For example, the rule for doubling the consonant before adding endings such as ing, ed, er, est, and so forth is made highly memorable through the following story. Children learn the short vowels as characters that belong to the vowel men, or long vowels. They learn that the silent /e/ is really a silent 'magic e' and when it appears on the ends of words it sends magic sparks to jump over one letter. If the sparks land on a vowel, they make the short vowel character (and sound) disappear and the long vowel character (vowel men) and sound appear. This happens in words like hop - hope, cut - cute, Pet - Pete, bit - bite. The exceptions to this rule are explained by saying the silent /e/'s magic wand sometimes has a power failure and students search for words where this happens - words like: love, gone, come, give.

Students learn to associate the presence of the silent magic /e/ ending as being responsible for making the vowel men (the long vowel sounds) appear in words. Students then learn that other endings can work magic the same way as the silent magic /e/. When one of these 'magic' endings (ed, ing, est, er, en) is added to a word with a short vowel sound (such as stop) the students must prevent the magic sparks landing on the vowel or it will turn into a long vowel sound. The way they do this is

to call in "Friends to the Rescue" - the letter between the vowel and the ending is doubled to prevent the short vowel turning into a long vowel (remember the magic sparks can only jump one letter). Thus stop + ing becomes stopping. For example: Hop contains the short vowel character Oscar Orange. If ing is added (a magic ending), Oscar Orange would disappear and Mr O the Old Man from Over the Ocean would appear (the long vowel sound). Thus hop+ ing would say hoping with the long vowel sound for O. To prevent this happening, the letter 'P' (Poor Peter) calls in a "Friend to the Rescue" (Poor Patsy) and prevents the short vowel sound disappearing (hopping) since the magic sparks can only jump one letter. Rules are learned by analogy, through the use of a story metaphor and picture mnemonics, entertaining the students while they inform.

### Materials

A variety of tests were used to measure acquisition of skills associated with literacy development.

### Alphabet Knowledge

Three different measures of alphabet knowledge were used: Knowledge of alphabet names, letter-to-sound knowledge, and sound-to-letter knowledge. (See Appendices B & C)

In the first two tests, students were asked to identify

lower-case alphabet letters by name and to say what sound they make in words. The letters were jumbled so that they did not follow the usual ABC sequence. If a vowel was identified by its long vowel sound, students were asked if they knew any other sound that letter made in words. The item was scored as correct if they were able to identify the short vowel sound (a-apple, e-egg, i-ink, o - orange, u - umbrella). Students who said 's' for the letter /c/ and 'j' for the letter /g/ were also asked if they knew another sound that these letters make in words. They were only scored correct if they said the 'g', as in go sound for /g/ and the 'c', as in cat sound for /c/. These two tests were administered individually.

The sound-to-letter test (devised by the author) was administered to the whole class and students were asked to write down the letter that made a particular sound (for example, the 's' sound in so, the 'o' sound in orange, the 'o' sound in open). Consonant sounds and long and short vowel sounds were included in this test.

### Phonological Awareness

#### Test of phonological awareness (TOPA).

The TOPA (Torgesen & Bryant, 1994) was administered to year 1 and year 2 students. Year 1 students were administered the kindergarten version and year 2

students, the early elementary version. There were some year 2 children who had not yet turned 6 at the beginning of the year when the tests were first administered, which is below the age for which the early elementary test is designed (6.0 to 8.11 years), but the test was still used to provide comparison data with end of year results. This test was administered simultaneously to all children in a class. To avoid copying, children were asked to do 'secret' work and all placed a large hard-covered book around their work. Where possible, seating was arranged to provide more space and privacy between children. It was not possible to completely avoid the possibility of some children copying, but most children enjoyed the 'secret' aspect of the work and quickly reported anyone who looked at their work.

In the kindergarten version, children were asked to listen for the initial sound in a word and then find another that was the same from a list of three. Each word was represented by a picture on each child's paper and the children marked the picture that started with the same sound as the target word. For example: The first word is bat. The other words are horn, bed, cup. Mark the picture that begins with the same sound as bat. There were ten of these stimulus-response items.

The second part of the test involved listening for beginning sounds again, but children were asked to identify and mark the word that had a different first sound. There were four words, three started with the same initial sound and one was different. For example: "Listen to these words. Bed, bus, chair, ball. Mark the picture that begins with a different first sound from the others." There were ten of these stimulus-response items.

The early elementary version, administered to year 2 children followed the same procedure except the children were listening for final sounds in words instead of initial sounds. Children were asked to listen for a final sound that matched an initial stimulus word. For example: "The first word is coat. The other words are fan, seat, van. Mark the picture that has the same last sound as coat." There were ten of these stimulus-response items.

The second part of this test involved children listening for final sounds and identifying the one that was different from a group of four words. For example: "The words are net, duck, mat, goat. Mark the picture that has a different last sound from the others."

There were ten of these stimulus-response items. Prior to the test items being administered for both versions of the test, children participated in three practice items, which ensured that they were able to understand and follow the instructions. They were shown how to mark the pictures and how to decide between pictures that were the same and different, to ensure that these concepts were known.

### Reading

Burt word recognition test (New Zealand Revised edition, Gilmore, Croft & Reid, 1981).

This is a sight-word reading test where words of increasing complexity are read in isolation. There are 110 words and children read until they make ten consecutive errors. This test was administered to individuals. The raw score can be interpreted to give an approximate reading age. For the purposes of analysis in this study the raw scores were used. The Burt reading scores for year 1 students, were obtained from their 6 Year Observational Survey results which were administered between 3 and 8 months after initial testing occurred in March 1999. Year 2 and 3 children were administered the Burt Reading test in March and November 1999.

Pseudoword reading test (Adapted version of Section 3 (30 monosyllabic pseudowords) of the Decoding Skills Test (Richardson & DiBenetto, 1985).

This test is made up of non-words and was used to assess students' phonological decoding skills. It requires students to:

1. Read CVC words (short vowel sounds - for example; wob, med).
2. Read words with long vowel spelling patterns. (silent 'e' - pake, two vowels together - dail, vowel digraphs - sewn)
3. Read words containing blends (for example, blesh, grake ).
4. Read words containing /h/ digraphs (for example, fleach, thut).
5. Read words containing vowel digraphs (for example, zoin, taw).

This test was administered to individual students.

Scoring was based on the total number of pseudowords read correctly (maximum score = 30) and the number of sounds correctly pronounced in each word (maximum score = 101).

Two practice words were read prior to the commencement of the testing.

20 of the 30 words in this test were administered to year 1 students in November only, as it would have been too difficult in March. Year 2 and 3 students were

administered all 30 words in March and November.

Proofreading.

End of year 1 and beginning and end of year 2: Students were asked to search a piece of text, which was read out to them first, to find spelling patterns (ing and ed) in words. For example: Underline all the ed and ing spelling patterns you can find in this sentence. *Tom and Mary raced down the road, waving good-bye to their Mum as they went.*

There were 14 of these letter clusters to find.

Year 3: Students undertook the Proofreading Test of Spelling (PRETOS, Croft, Gilmore, Reid & Jackson, 1981). This is a standardised test, which is scored in two parts: A Recognition score, which shows how many incorrectly spelled words the student was able to find and a Production score which indicates how many of these words the student was able to correct. For example; a student who underlines the word gradually and writes it correctly as gradually receives one point for recognition and one point for production. A student who underlines gradually but writes it incorrectly as graduelly, receives one point for recognition but no points for production.

The PRETOS was designed to be used with students from

years 4 to 8. The author had seen this test used with year 3 and 4 composite classes and observed that many year 3 children were able to score as well as year 4 students. For this reason, this test was included in this study and was administered to whole classes. For the purposes of analysis in this study, the raw scores were used.

### Spelling

Daniels and Diack test (Peters, 1975).

This is a standardised spelling test, containing words in common use but of increasing complexity. Year 1 children were not given this test in March as it would have been too difficult, but they were given 35 words from the test in November. Year 2 children were given 35 words in March and 40 words in November. Year 3 children were given 40 words in March and again in November. The raw scores were used for analysis in this study.

Pseudoword spelling test (Adapted version of Section 3 (30 monosyllabic pseudowords) of the Decoding Skills Test (Richardson & DiBenetto, 1985).

The words from the Decoding Skills Test were used in this pseudoword spelling test. Successful spelling of pseudowords requires the speller to recode sounds in

words into appropriate letters or letter clusters. This test requires students to:

1. Spell CVC words (short vowel sounds - for example, wob, med).
2. Spell words with long vowel sounds - demonstrates knowledge of spelling patterns associated with these sounds - silent /e/ (sone), two vowels together (soan) or vowel digraph (sown)
3. Spell words containing blends (for example, blesh, grake ).
4. Spell words containing /h/ digraphs (for example, fleach, thut).
5. Spell words containing vowel digraphs (for example, zoïn, taw).

This test is scored in two ways - total words correct out of 30 and total letters correct (maximum score 129).

The pseudoword spelling test was administered to whole classes. Once again students were asked to undertake 'secret' work and used large books to hide their test papers. Prior to the commencement of the test words, the children were told that these words would be words they had never heard before, because they were not real words like the ones we normally use to talk to each other. Two practice words were orally presented. The children were asked to listen to each word and put up their hands if they could tell the class what letters

they thought would make the sounds in the word. The examiner modelled breaking the word up into sounds. For example : ez. "Who can tell me how they might spell this word? What sounds can you hear in the word ez?" The short vowel sound for /e/ was emphasised by drawing out its pronunciation and children asked "What letter do you think would make that sound?" The letter /e/ was written on the whiteboard. Similarly, the sound made by the letter /z/ was enunciated and children asked to decide what letter might make that sound. The letter /z/ was written next to /e/ to provide an example of the spelling for the word ez. The second trial word was undertaken in the same manner.

Year 1 students were only administered this test in November, as it would have been too difficult in March and only the first 20 of the 30 words were used. Year 2 and 3 children were administered all 30 words in March and November.

#### Procedure

The study was conducted over an 8 month period during 1999. Testing of all students was undertaken in March and November. Table 7 presents the nature and timing of tests undertaken and describes whether they were individual or group tests. Group tests were

administered class by class. Students were taken out of class to have the individual tests administered. The author carried out the testing.

Table 7

Nature and Timing of Tests Administered by Year Group.

		March 1999		November 1999	
		Individual (I) or Group (G)		Individual (I) or Group (G)	
Year 1	Alphabet names	I		Alphabet names	I
	Letter-to-sound	I		Letter-to-sound	I
	Sound to letter	G		Sound to letter	G
	Phonemic Awareness	G		Phonemic Awareness	G
				Pseudoword spelling (20 words)	G
				Pseudoword reading (20 words)	I
				Daniels & Diack (35 words)	G
				Proofreading	G
			6 Year Obs. Survey Including Burt Reading	I	
Year 2	Alphabet names	I		Alphabet names	I
	Letter-to-sound	I		Letter-to-sound	I
	Sound to letter	G		Sound to letter	G
	Phonemic Awareness	G		Phonemic Awareness	G
	Pseudoword spelling (30 words)	G		Pseudoword spelling (30 words)	G
	Daniels & Diack (35 words)	G		Daniels & Diack (40 words)	G
	Pseudoword reading (30 words)	I		Pseudoword reading (30 words)	I
	Burt Word Test	I		Burt Word Test	I
	Proofreading	G		Proofreading	G
Year 3	Alphabet names	I		Alphabet names	I
	Letter-to-sound	I		Letter-to-sound	I
	Pseudoword spelling (30 words)	G		Pseudoword spelling (30 words)	G
	Daniels & Diack (40 words)	G		Daniels & Diack (40 words)	G
	Pseudoword reading (30 words)	I		Pseudoword reading (30 words)	I
	Burt Word Test	I		Burt Word Test	I
	Proofreading (PRETOS)	G		Proofreading (PRETOS)	G

Language programmes in Training and  
Comparison Schools

Children in both the training and comparison schools, were taught literacy skills using a predominantly "Whole-language" approach. This approach is common in New Zealand schools and according to Tunmer and Chapman (1999) it is characterised by four key features.

1. It is a literature-based approach, which de-emphasises the use of graded reading material and recommends the use of "real" books that contain stories that can be read in a single sitting. In New Zealand, reading books are graded, but according to the difficulty level of the story rather than to the vocabulary items in the story. Children do not move on to a higher level of difficulty until they acquire 90% accuracy in word recognition for books at their current instructional level.

2. It is based on child-centred instruction. This is not exclusive to whole-language instruction but is considered to be an important feature in successful early literacy instruction.

3. Reading and writing skills are integrated. Children are introduced to writing instruction at the same time as they begin to learn to read. Attempts at spelling words are encouraged but correct spellings are not generally emphasised or even necessarily highlighted.

4. There is an emphasis on meaning construction.

Children are taught to use sentence context cues as the primary strategy for recognising words in text. Grapho-phonemic cues are used very sparingly, and then, usually to confirm a prediction. Instruction in letter-sound correspondences, is rarely taught explicitly - they are expected to be acquired incidentally as children are exposed to print.

These principles of the whole-language approach to the teaching of reading and spelling were common to the techniques used in both the training and the comparison school. The introduction of the spelling programme to the training school meant that some aspects of word-level information were taught explicitly, in conjunction with the strategies common to the whole-language approach.

#### Comparison of Literacy Programmes at Training School and Comparison School

##### Training school programme.

Children in years 1, 2 and 3 usually spent approximately 2 hours 45 minutes per day on a combination of reading, handwriting, oral language and written language activities. The trial spelling programme was included in this teaching time.

Year 1: Children at the training school generally spend one term in a new entrant classroom before moving into a year 1 class. Children are moved on as the roll increases and numbers in the new entrant class grow above approximately 20 children.

In the new entrant classroom, approximately 10 minutes per day was spent learning the names of the "Letterland" characters and making letter-sound connections.

Children were taught for example: *"This is Fireman Fred. He is also called the letter 'f' and he says 'ffff' in words. What words can you think of that might have Fireman Fred making his 'ffff' sound in them?"*

A new character was introduced every day, as well as a quick review of all the letters already learned. All the characters were represented on a large frieze in the classroom and there were books (ABC book, picture dictionary, alphabet adventures) and games (alphabet puzzles, alphabet bingo) available to support the programme, which meant that the characters names were learned by most children in their first two or three weeks at school. The 26 letters of the alphabet were learned first (each vowel had two characters to represent the short and long vowel sounds), then the characters representing the 'a' sound in the word a, and the sound made by the 'e' in they.

In the author's previous study of spelling errors made by older poor spellers the word they was consistently misspelled as thay by a number of students. There were many children who identified the 'uh' sound made by the letter 'u', as belonging to the letter 'a' because of the sound of the word a. They consistently wrote the letter 'a' whenever there was an 'uh' sound in a word. The letter 'u' was also the letter most often incorrectly represented when children were asked to make letter-sound connections in this study. This was true for children at the training school and the comparison school and it was the second most commonly wrong letter (after 'x') for children in a study by Thompson, Fletcher-Flinn and Cottrell (1999). The two exception vowel sounds in the word a and they were introduced at the beginning of children's exposure to reading and spelling, in the hope they would learn that these sounds are exceptions to the norm.

During writing time, children were taught to listen to the word they were trying to spell and to see **who** they could hear making his/her sound in that word. For example; "Who can you hear making their sounds in this word - cup? ccc - that's right Clever Cat makes that sound - How do we write Clever Cat's letter? That's right, it's a letter 'c'." The same process is used for the 'uh' sound of the letter 'u' and the 'ppp' sound of

the letter 'p'.

Handwriting practice also supported the programme, with children learning a rhyme for each character which informed them of correct letter formation. For example:

*Stroke down Robber Red's back,  
and over his arm and his hand.  
Then watch out for that robber,  
roaming through Letterland.*



In the second half of year 1, the programme introduced letter clusters: Some initial blends, the 'h' digraphs and the 'ing' and 'ed' endings. These letter clusters were taught using rhymes and stories about the "Letterland" characters in the clusters. Approximately 15 minutes of the daily language programme, four days a week was allocated to developing knowledge of these letter clusters.

Year 2: Year 2 students spent four 20 minute periods per week working on topics and activities which were designed to develop letter-sound knowledge and phonemic awareness skills. For example: Children played games such as Sound Bingo. They were asked to identify letters and letter clusters making the vowel sounds in these words: fast, fat, fame, farm, above, love, cup, cube, oot, look

and so forth. Children used bingo boards, which contained pictorial images of the "Letterland" characters that represented sounds in words. As the various words containing the 'uh' sound were called out (cup, love, above), children had to decide whether it would be the letter /u/ - Uppy Umbrella, the letter /o/- Oscar Orange's baby brother or the letter /a/ - the Parachuting Apple, that was making the sound in each word. This reinforced the idea that one sound (uh) could be made by three different letters.

Knowledge of orthographic structures in words was developed through the teaching of initial blends such as br, cr, sl, bl. Knowledge of some morphological structures of written English was introduced. For example: The effects of adding a silent 'e' to a word - hop to hope; when to double a consonant when adding 'ing' and 'ed' endings - hop to hopping; how to drop the silent 'e' when adding 'ing' and 'ed' endings - hope to hoped and hoping. The 20 minute periods spent on these activities were part of the daily language programme.

Year 3: Year 3 students spent three 30 minute periods per week working on spelling or word study topics as part of their language programme. An outline of these topics is presented in Table 8. Children's spelling progress was monitored using the Daniels and Diack spelling test

(Peters, 1975) and through an analysis of spelling in writing using the 15 minute writing analysis designed by the author (Appendix A).

Topics covered.

The topics covered in this programme were selected after studying the nature of errors made by older poor spellers in the school. There seemed to be a number of students in years 6, 7 and 8, who still struggled to match consonant and vowel sounds to the correct letters and many of these students did not always represent blends and digraphs correctly. Many of the basic rules and conventions of written English were not known, even by students who were good readers. Table 8 presents an outline of topics covered at each year level.

Table 8

Topics Covered in Spelling Programme, by Year Group.Year 1

Phonological Awareness skills - awareness of rhyme, syllables, onset and rime

Letter-sound knowledge:

consonants,

vowels (short and long)

initial blends: br, cr, dr, fr, gr, pr, tr, bl, cl, fl, gl, pl, sl

'h' digraphs

Year 2

Revision of topics covered in year 1

'S' blends: sn, sm, sp, sc, sk, st, sl, sw & tw

Some different sounds made by vowels (other than short and long sounds):

love, past, about, arm, queen, funny, cry, boot, cook

Adding endings to words:

words with short vowels (doubling the consonant before ed & ing)

words with long vowels (dropping the silent 'e' before ed & ing)

'Y' at ends of words: long 'e' sound (funny), long 'i' sound (fly)

Contractions

Plurals

Year 3

Revision of topics covered in years 1 and 2

Triple blends: squ, scr, spl, str, spr and shr, thr

End blends: mp, nd, st, sp, sk, ld, lf, lt, nt, nk, ct

Adding endings to words: en, est, er and revision of ing and ed

Adding endings to words ending in 'y' - adding ing, ed, er, est, en

Contractions

Plurals

Apostrophes denoting possession

oi / oy in words

Conventions for spelling words containing long vowel sounds:

two vowels together (train, goat)

silent 'e' words ( rope, like)

other letter patterns (show, few, eight)

'r' digraphs and letter clusters:

ar, or, ur, er, ir

are, air, ore, oar, ure, ture, ere, ear, eer, ire

Proofreading skills

Teaching methods.

The topics covered in this spelling programme were consistent across classes. Each teacher followed a term-by-term plan, to ensure all topics were covered. Teaching resources and teaching notes were developed for the year 2 and 3 programmes to ensure that children received the same instruction across classes. Practice activities were developed and made into children's booklets for year 1 and 2 students, to support the teaching and to help students apply the knowledge. (See Appendix D for a sample of teaching notes and practice activities.)

Description of Language Programme at Comparison School

Children at the comparison school, in years 1, 2 and 3 usually spend approximately 2 hours 45 minutes per day on reading, handwriting, oral language and written language activities.

Children in year 1 were taught about letter-sound correspondences as they practised written language skills. They were taught techniques such as saying A, 'ah', apple; B, 'bih', ball; C, 'kih', cat, and so forth, in order to remember the sounds made by letters. Initial blends were taught specifically during year 1, as were the common 'h' digraphs, 'sh', 'ch', 'th'.

In year 2, initial blends were revised but in contrast to the training school, there was no explicit focus on learning about different sounds made by vowels, or on learning basic rules and conventions of spelling. Instruction relating to learning about spelling was incorporated into written language programmes - as children attempted spellings, spelling patterns were highlighted.

Year 3 spelling was also part of the overall written language programme. Children had spelling lists to learn each week, which generally came from their own writing or from the essential lists in Spell Write (Croft & Mapa 1998). There was no specific plan across year 3 classes, which determined what spelling information the children were taught. Each teacher designed their own programme, which generally focussed on learning spelling words. Children's spelling progress was monitored using the Burt Spelling test.

## Chapter 5

## Results

6 Year Observational Survey Results

The "Letterland" resource was introduced to the training school in 1996. As its impact on children's learning of letter-sound correspondences became evident in the classrooms, a structured spelling programme was developed to provide children at each level with a programme that revised information taught in previous years and introduced new material that added to this prior knowledge. For example, new entrant children learned letter-sound associations for consonants and vowels. In year 1, they learned to combine some consonants to make consonant blends (sl, bl, cr, tr etc.). In year 2 children learned that vowels can make more than just short and long vowel sounds (e.g., the sounds in fat, fame, fast, above etc.) and that vowel sounds can be represented by other letters (cry) or by more than one letter (queen). In year 3, children were taught to distinguish between spelling patterns for short vowel sounds (son) and long vowel sounds (sone, soan, sown). Teachers believed that this more structured approach to what was being taught at each level and the process of how the information was being taught (the use of "Letterland") was having a positive effect on children's reading and spelling performance. Children appeared to

be making more accurate sound-to-letter associations in their spelling attempts and were using their knowledge of the sounds made by letters in their reading attempts. In order to test these beliefs, the combined 6 Year Observational Survey (Clay,1993) results for 1993, 1994 and 1995 (prior to the introduction of "Letterland") were compared with the results from 1996, 1997, 1998 and 1999 (after the introduction of "Letterland"). Table 9 presents the results, which show the differences that occurred.

Table 9

Comparison of Means and Standard Deviations of 6 Year Observational Survey Results for Training School Prior to Intervention(1993-1995)and Post Intervention (1996-1999).

Variable	Max.Score	Pre-Intervention		Post-Intervention		F	p value
		M	SD	M	SD		
Letter ID	54	51.18	5.48	52.24	3.43	4.52	0.03*
Concepts About Print	24	17.65	4.14	18.20	3.35	1.76	0.18
Word Test	15	10.38	4.44	11.08	4.23	2.11	0.14
Writing Vocabulary	83	37.44	19.84	43.31	19.30	7.12	0.008**
Dictation	37	29.33	13.69	32.04	6.65	10.25	0.0015**
Burt Word Recognition	110	20.65	13.69	24.00	12.78	5.09	0.024*
Reading Levels	22	11.36	7.07	12.81	6.17	3.82	0.051

\*  $p < .05$ \*\*  $p < .01$ 

Aspects of this assessment of reading, writing and spelling performance at age 6, showed significant changes

after "Letterland" and the spelling programme was introduced to the training school.

Table 10 demonstrates the improvements in reading levels that occurred in the training school, after the introduction of the spelling programme. Dictation, writing vocabulary and letter identification all relate specifically to spelling but the changes in the Burt word recognition score and increases in the reading levels attained, suggest that the programme also had positive influences on reading skills.

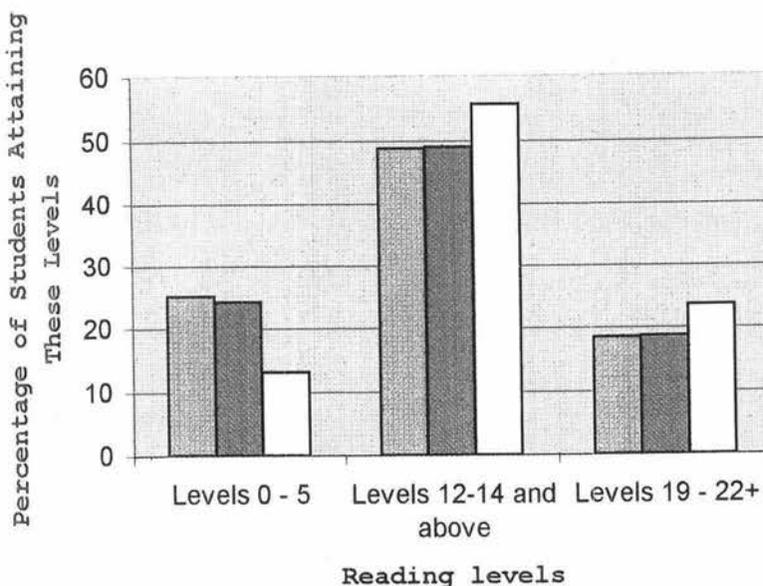
Table 10

Reading Levels Attained in the 6 Year Observational Survey, in Training School (pre and post intervention) and Comparison School, as a Measure of a Percentage of Students Assessed.

	Training School Pre-Intervention (1993-1995) <u>n</u> = 135	Training School Post-Intervention (1996-1999) <u>n</u> = 190	Comparison School (1997-1999) <u>n</u> = 177
Level 0	2.22%	1.05%	3.38%
Level 1-2	13.33%	2.10%	13.55%
Level 3-5	9.62%	10.00%	7.34%
Level 6-8	11.11%	16.84%	9.00%
Level 9-11	14.81%	14.21%	17.50%
Level 12-14	7.40%	13.68%	12.99%
Level 15-16	11.85%	10.52%	6.77%
Level 17-18	11.11%	7.89%	10.73%
Level 19-20	5.92%	8.94%	5.64%
Level 21-22+	12.59%	14.73%	12.99%

Table 10 also shows the similarities in reading levels, between the training and comparison schools prior to the introduction of the trial spelling programme. There was a considerable drop in the number of students reading in the lowest reading levels, levels 0 to 5 (25.17% down to 13.15%) and a rise in the number of students reading at or above levels 12-14 (48.87% up to 55.76%) at the training school, after the introduction of the spelling programme. There was also an increase in the number of children reading in the highest levels - level 19 and above, after intervention (18.51% up to 23.67%). Figure 1 presents these results and compares them with the reading levels of students from the comparison school.

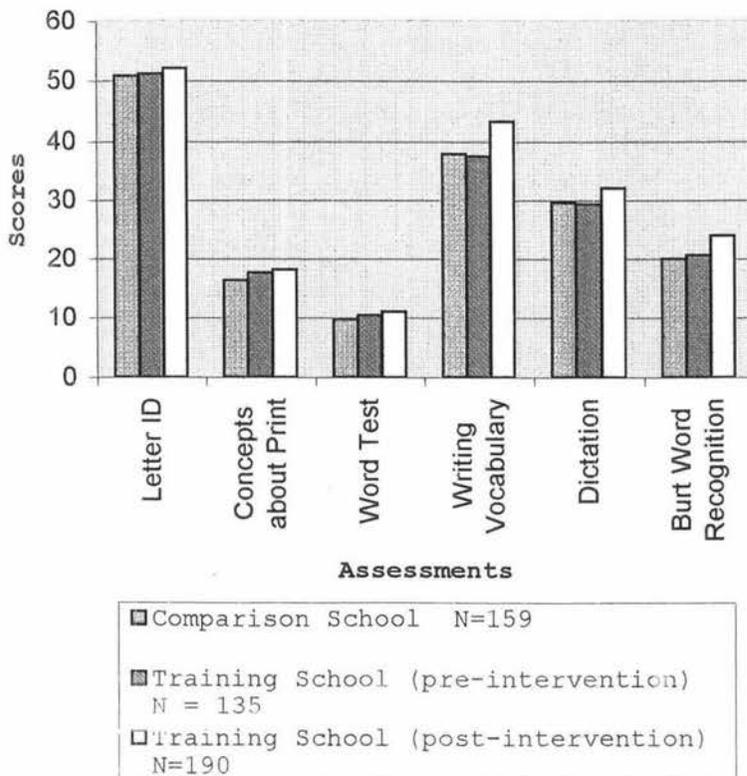
**Figure 1.** Percentage of Students Reading at Various Levels in 6 Year Observational Survey Results, Comparing Training School (pre and post intervention) and Comparison School



■ Training School (pre intervention)  
 N = 135  
 ■ Comparison School N = 177  
 □ Training School (post  
 intervention) N = 190

In order to determine whether the training and comparison schools were matched for achievement in spelling and reading skills after one year at school, the 6 Year Observational Survey results were compared over two three-year periods for both schools. The period 1993 to 1995 was chosen for the training school, because this was prior to the introduction of the "Letterland" resource and the trial spelling programme. The period 1997 to 1999 was chosen from the comparison school, because historical data were only available for this period. Figure 2 illustrates the similarity between both schools, prior to intervention at the training school, in all measures of reading and spelling in the 6 year Observational Surveys and shows the changes that occurred at the training school, after intervention.

**Figure 2.** Comparison of 6 Year Observational Survey Results Between Training School (pre and post intervention) and Comparison School



Alphabet KnowledgeKnowledge of Letter Names, Letter-sound and Sound-letter Correspondences

Table 11 presents the mean scores for knowledge of letter names, letter-sound and sound-letter correspondences for both groups.

Table 11

Mean Scores for Knowledge of Letter Names and Letter Sounds as a Comparison Between Years and Between Groups.

	Max Score	Training Group (March)			Comparison Group (March)		
		Year 1 n=15	Year 2 n=34	Year 3 n=47	Year 1 n=15	Year 2 n=35	Year 3 n=29
Letter Names	26	22.66	25.05	25.95	24.86	25.55	26
Letter-Sounds	26	24.8	23.85	23.91	18.26	19.66	19.93
Sound-Letter	31	25.66	29.05	not done	26.4	26.55	not done

None of the differences in knowledge of letter names, between year groups, were significant. However, the children in the training group showed significantly greater letter-sound knowledge at each year level, when compared with children in the comparison group ( $p < 0.001$  for each comparison). Knowledge of sound-letter correspondences increased in the training group from year 1 to year 2, but remained the same for children in the comparison group. The differences between groups became significant in year 2 ( $p < 0.001$ ).

The difference between mean scores for letter name and letter-sound knowledge in the training groups (years 1, 2 & 3) was not significant, but children in the comparison groups (years 1, 2 & 3) had much better knowledge of letter names than they did of letter sounds ( $p < 0.001$  for all year levels).

An analysis of the nature of errors made by older poor spellers (see chapter 3), revealed that a number of children aged between ten and thirteen consistently confused the vowel sounds. They particularly confused 'a' and 'u' (writing an a for the uh sound of the letter 'u'), and 'e' and 'i' (mixing these two vowels in words). Despite intervention programmes which attempted to teach the correct vowel sounds, it was very difficult for these children to 'unlearn' the sounds they had confused. In the light of this, a more in-depth analysis was undertaken of the nature of errors of alphabet letter-sound correspondences, made by children in this study. Table 12 shows a breakdown of consonant and vowel knowledge for children in years 1, 2 and 3 in the training and comparison groups.

Table 12

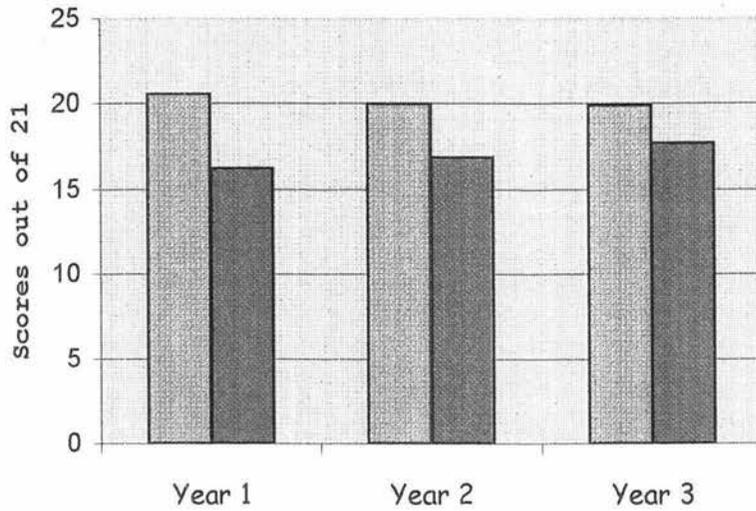
Means and Standard Deviations for Letter-Sound Knowledge of Consonants and Vowels, for Year 1, 2 and 3 Students, Comparing March Results Between Years and Between Groups.

	Max. Score	Training Group		Comparison Group		
		M	SD	M	SD	F
<u>Year One</u>						
Consonant sounds	21	20.53	0.91	16.2	4.52	13.22*
Vowel sounds	5	4.26	0.70	2.06	1.43	28.33*
<u>Year Two</u>						
Consonant sounds	21	19.96	1.25	16.83	3.57	22.90*
Vowel sounds	5	3.85	1.10	2.83	1.10	14.84*
<u>Year Three</u>						
Consonant sounds	21	19.87	1.66	17.68	2.89	22.13*
Vowel sounds	5	4.27	0.84	2.27	1.36	63.21*

$p < 0.001$

There were significant differences between the training and comparison groups, in all years, in their knowledge of consonant sounds and vowel sounds, with the training group consistently making more correct phonic responses for letter-sound correspondences. The results achieved by the year 1 children in the training group, after an average of 6 months of literacy instruction, were approaching ceiling levels on these measures. Figures 3 and 4 illustrate these results.

Figure 3. Comparison of Results for Standard Phonic Responses for Consonant Sounds in Year 1, 2 and 3 Students



Results From Each Year at Training and Comparison Schools

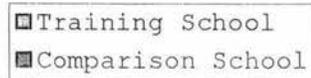
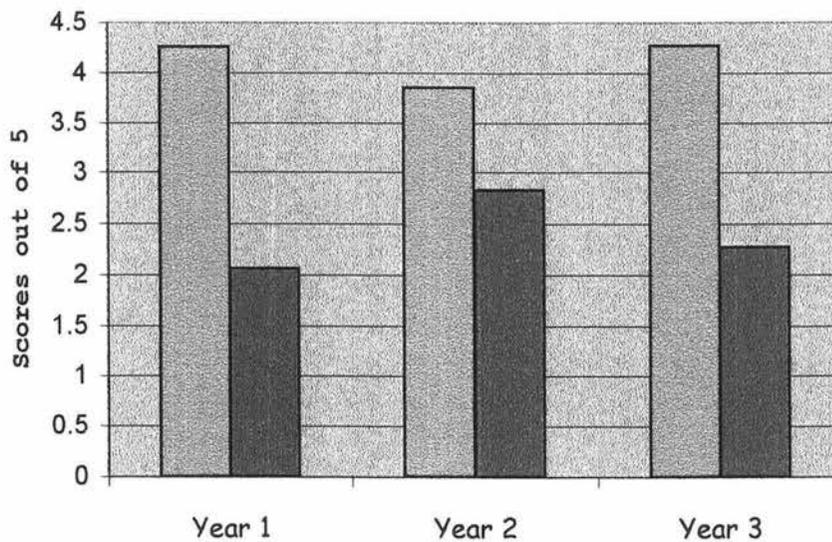
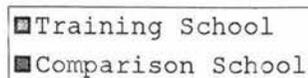


Figure 4. Comparison of Standard Phonic Responses for Vowel Sounds in Year 1, 2 and 3 Students



Results From Each Year at Comparison and Training Schools



These results raise two questions:

1. Why did the children in the training school significantly outperform the children in the comparison school in knowledge of letter-sound correspondences? The children from both schools in this study had attended school for similar periods of time, had been exposed to a similar whole-language approach to learning to read and write and came from schools matched by socio-economic background and literacy achievement at age six. The children at the training school had been exposed to a spelling programme, which encouraged learning letter-sound correspondences through picture mnemonic strategies. Was it the use of this strategy for learning letter-sound correspondences that produced significantly better results for children at the training school?

#### How Do Young Children Learn Letter-sound Correspondences?

Children in New Zealand schools are generally not taught letter-sound correspondences explicitly. Thompson et al. (1999) state:

...no New Zealand school was found that consistently and explicitly taught letter-phoneme correspondences in reading instruction. In New Zealand, literacy teaching has for many years been quite uniform across all districts. (p. 45)

It appears that children use the acrophonic principle to inform them of letters' sounds (Treiman, Weatherston & Berch, 1994, Study 3, cited in Treiman, et al., 1998; Thompson, Fletcher-Flinn, & Cottrell, 1999), a strategy that is likely to provide them with at least some incorrect information since only 9 of the 26 letters' names contain phonological properties that reflect the letter's sound (Treiman, 1994; Thompson et al., 1999).

Learning letter sounds through mnemonics.

In the current study, children learned another strategy to inform them of letter-sound correspondences. In the "Letterland" resource each letter is represented by a character, whose name provides an accurate phonemic representation of the letter's sound. Children in the training group consistently relied on the character's names rather than letter names when they were asked to give a phonemic representation of the letter. For example, the letter 'a' is known as "Annie Apple" and her name gives the short vowel sound of the letter ('a' as in apple). The letter 'x' belongs to the "Kissing cousins" Max and Maxine and makes a 'kissss' sound in words ('kissss' as in box). There was a significant difference in the mean scores for knowledge of consonant and vowel sounds between the children from the training school, most of whom (without prompting) used the

"Letterland" characters to inform them of the sounds made by letters, and children from the comparison school, who consistently used letter names to inform them of letter sounds. The errors that were made by children in both schools were however, consistent with the use of the acrophonic principle - 'sss' for the letter 'c', 'wih' for the letter 'y', 'jih' for the letter 'g' and so forth. These incorrect phonic responses are consistent with the pattern of incorrect phonic responses found in the Thompson et al. study (1999).

Table 13 presents the responses to alphabet letters, classified according to their frequency as initial graphemes and their compatibility with the acrophonic principle and compares results of children in the Thompson et al. study (1999) and children from years 1 and 2 in the current study (results from March testing).

Table 13

Percentage of Standard Phonic Responses to Alphabet Letters, as a Comparison Between Year 1 and 2 Students from the Training and Comparison Schools and Students from the Thompson et al (1999) Study.

Letters	Thompson et al n = 72 (Mean Age, 5 years 9 months) % correct	Comparison School n = 50 (Mean Age, 6 years) % correct	Training School n = 49 (Mean Age, 6 years) % correct
High compatible			
b	69	91	98
p	78	93	97
t	83	97	100
High incompatible			
c	43	59	95
f	76	84	98
h	67	91	100
m	74	83	100
s	89	86	100
Medium incompatible			
g	46	49	80
l	56	84	97
n	63	83	100
r	65	78	100
w	69	92	100
y	39	46	90
e	51	30	81
Low compatible			
v	78	99	100
z	79	89	98
o	71	81	98
Low incompatible			
x	6	31	87
a	31	36	71
i	28	71	90
u	17	27	62

There were a number of differences in the selection of students between the Thompson et al. study and the current study. Most notably, the mean age for the students in the Thompson et al. study was 5 years 9 months compared with a mean age of 6 years for students in the current study. Children who scored over 6 years 9 months in the Burt Word Test were excluded from the

Thompson et al. study, whereas they were included in the current study.

Given the similarity of results of letter-sound correspondence knowledge of students in years 1, 2, and 3 in the current study, it was interesting to consider whether there would be significant differences in the results of children in the current study, if those with Burt Word Reading scores at or below 6 years 9 months were compared with the results of those of the whole group, regardless of Burt Word reading ages. Table 14 presents these results.

Table 14

Means and Standard Deviations of Burt Word Test Scores, Comparing Children with Reading Ages Below 6 years 9 Months and All Children, Regardless of Reading Age.

	Training Group (<6;9)	Training Group (all)	Comparison Group (<6;9)	Comparison Group (all)
	<u>n= 28</u>	<u>n= 49</u>	<u>n= 36</u>	<u>n= 51</u>
Letter-sounds/26				
Mean	23.92	24.14	18.08	19.25
SD	2.01	1.93	4.58	4.42

When the mean scores for year 1 and 2 children in the present study, who had Burt reading ages at or below 6 years 9 months were compared with the mean scores from all year 1 and 2 children, regardless of their Burt

reading age, there was no significant difference. This finding is consistent with earlier results that showed children's knowledge of letter-sound correspondences did not change significantly after an average of 6 months at school, despite increased literacy instruction and reading knowledge.

The fact that the children in the Thompson et al. (1999) study differed in their Burt reading age and the length of time they had been at school, when compared with children in the current study, may not therefore, have been significant factors in the differences noted between their scores for letter-sound knowledge.

2. Is there a relationship between the nature of errors made in letter-sound correspondence knowledge by year 1 children and the nature of errors made by year 2 and 3 children? Results for letter-sound knowledge were very similar across year levels in the training school and across year levels in the comparison school. Was there a pattern of errors when comparing year levels at the training school and year levels at the comparison school? Was there a pattern of errors when comparing results from the training school with results from the comparison school?

A further analysis of errors made by children in the present study, showed that the letters year 1 children most commonly made incorrect phonic responses for, continued to be represented incorrectly by children in years 2 and 3. This was true for the children in the training group and the comparison group. There did not appear to be any consistent trend of improvement in knowledge of letter-sound correspondences between children in all years in both the training and comparison groups in this study, despite greater exposure to print for the older children.

The letters that children consistently made errors with in the present study were the same as the letters that were most often incorrect in the Thompson et al. (1999) study. These letters were: *x, u, i, a, y, c, g, e, q*. (The letter 'q' was not included in the final analysis by Thompson et al., because the font used made it a direct reversal of the letter 'p'.) These nine letters are all incompatible with the acrophonic principle but are distributed through the high, medium and low frequency ranges. However, all low frequency, incompatible letters are represented in this group of letters most commonly represented incorrectly. Table 15 shows the percentage of correct phonic responses for these nine letters achieved by children in the present study.

Table 15

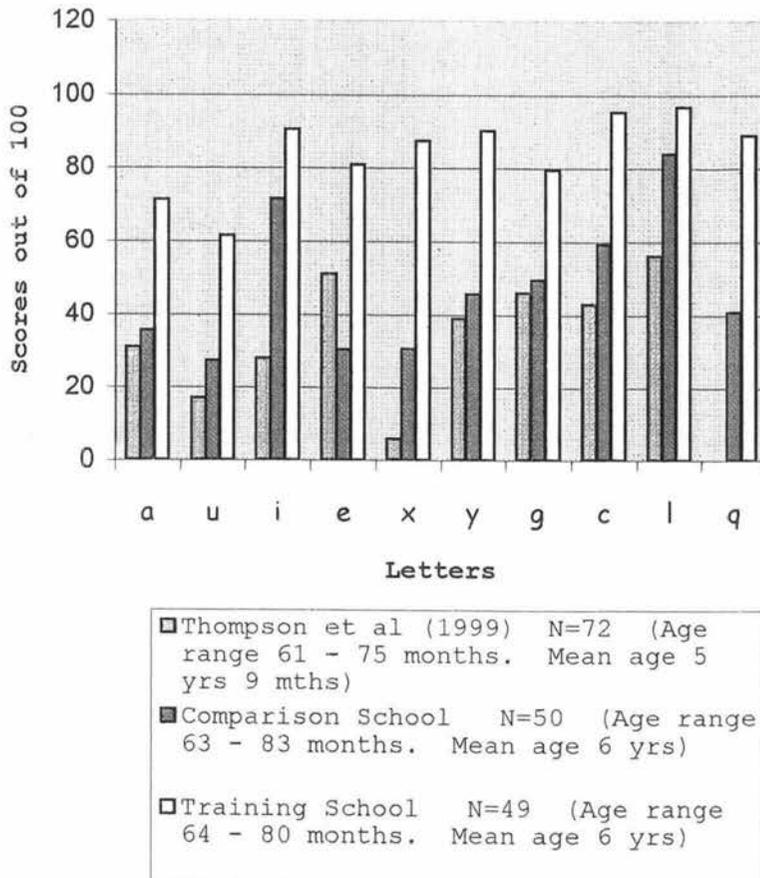
Percentage of Standard Phonic Responses for Letter Sounds in Letters Most Commonly Represented Incorrectly, as a Comparison Between Years and Between Groups (March Testing).

Letters	Training Group			Comparison Group		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
<b>a</b>	73.6	68.8	70.9	26.7	43.8	20.7
<b>c</b>	100	90.6	83.4	60.0	58.4	62.1
<b>e</b>	86.7	75.0	87.5	13.4	47.3	44.9
<b>g</b>	93.4	65.7	73.0	60.0	38.9	38.0
<b>i</b>	93.4	87.5	98.0	73.4	69.5	75.9
<b>q</b>	93.4	84.5	83.4	40.0	41.7	61.2
<b>u</b>	66.7	56.2	73.4	26.7	27.8	13.8
<b>x</b>	93.4	81.3	68.8	33.4	27.8	24.2
<b>y</b>	86.7	93.7	89.6	46.7	44.5	62.1

Of the nine most commonly incorrect letters, four (c, g, y, e) were found by Thompson et al. (1999) to have a high or medium frequency as initial letters in words that young children are commonly exposed to. This suggests that children were not using knowledge gained from ISRs (induced sublexical responses derived from children's accumulated experience of letters and corresponding phonemes that are common to several print words) to inform them of the phonemic representation of these letters. It is more likely that knowledge of letter names (and use of the acrophonic principle) was the strategy used to decide on the appropriate phonic representation for these letters.

Children in the training group had another strategy at their disposal - the names of the "Letterland" characters, which gave them a correct phonic representation for the letter. Although children in the training group also made errors with the nine letters most commonly represented incorrectly, there were more children making correct phonic responses in the training group than in the comparison group or in the Thompson et al. (1999) study. These results are demonstrated in Figure 5.

Figure 5. Percentage of Standard Phonic Responses for Letters Most Commonly Incorrect



Phonological Awareness

The TOPA (Torgesen & Bryant, 1994) was administered to year 1 and 2 students in March and November, 1999.

Table 16 presents the results.

Table 16

Means and Standard Deviations for Phonological Awareness, Comparing March and November Results, between Year Groups.

	Training Group March		Comparison Group March			Training Group November		Comparison Group November		
	M	SD	M	SD	F	M	SD	M	SD	F
Max Score 20										
Year 1	18.13	1.88	14.20	5.49	6.88*	18.73	1.94	16.42	4.78	2.96
Year 2	14.95	4.59	13.00	4.00	3.14	18.00	2.59	15.96	3.54	6.70*

\*  $p < 0.05$

The results of this testing show that year 1 students in the training group, after an average of six months involvement in the spelling programme, had significantly higher scores in the Kindergarten version of the TOPA ( $p < 0.01$ ), when compared with the comparison group. By the end of the year the ability of the children in the comparison group to accomplish this task had improved to the point that the difference between groups was no longer significant. There was still a difference in the mean scores between groups however, with the training group outperforming the comparison group in both March

(M = 18.13 v 14.20) and November (M = 18.73 v 16.42). The difference in performance between the year 2 children in the training group and comparison group in March was not significant. By the end of the year, however, the difference in performance between these two groups, had reached significance ( $p < 0.01$ ). In both March and November, the mean scores for year 2 children in the training group were higher than those for the children in the comparison group.

### Spelling

Spelling skills were measured in this study, by children's ability to spell both real words and pseudowords (their ability to use phonological recoding skills).

### Pseudoword Spelling

Table 17 presents the differences in results for pseudoword spelling, between groups of children in year 1 (November), year 2 (March and November) and year 3 (March and November).

Table 17

Means and Standard Deviations for Pseudoword  
Spelling as a Function of Group and Time of Testing.

	Training Group		Comparison Group			Training Group		Comparison Group		
	March M	SD	March M	SD	F	November M	SD	November M	SD	F
Year 1						62.53	9.92	56.66	9.94	2.61
Year 2	85.25	24.06	76.63	25.39	2.06	107.46	13.11	89.72	17.72	20.94**
Year 3	105.28	15.42	99.16	15.18	3.04	115.54	8.07	107.20	12.77	9.94*

\*  $p < .01$ \*\*  $p < .001$ 

There was no significant difference between the results of the year 1 students in the training and comparison groups. In year 2, there was no significant difference in the March results, but by November, the students in the training school had significantly outperformed the students in the comparison school ( $p < 0.001$ ). This pattern was repeated by the year 3 students, with students at the training school significantly outperforming the students at the comparison school in November ( $p < 0.01$ ).

This suggests that in year 2 and 3, the students who had been involved in the spelling programme made significant gains in their phonological recoding skills, which enabled them to spell unknown words more accurately than the students who had not been involved in the spelling programme. At the end of year 1 and the beginning of year 2, a significant difference was not apparent, but by

the end of year 2, there was a marked difference in phonological recoding skills. The difference between scores for students at the beginning of year 3 was not significant, although it was nearing significance and it had reached significance by the November testing. These results show considerable differences in the phonological recoding skills of students from the end of their second year in the programme and beyond. The mean scores for students in the training school were greater than the mean scores of students in the comparison school for all year groups.

The mean score attained by the year 2 students from the training school in November was actually marginally greater than that attained by the year 3 students from the comparison school in November (Year 2 training school: 107.46, compared with 107.20 for the year 3 students at the comparison school). In other words, the results for spelling pseudowords (phonological recoding skills) that students in the training school were able to attain after approximately two years at school, were equivalent to those attained by students in the comparison school after approximately three years at school.

Daniels and Diack Spelling

Table 18 presents the results of children's ability to spell real words from the Daniels and Diack spelling test (Peters, 1975), in November for year 1 students and in March and November for year 2 and 3 students. Students in year 1 (November) and year 2 (March) were administered 35 words. Students in year 2 (November) and year 3 (March and November) were administered 40 words.

Table 18

Means and Standard Deviations for Daniels and Diack Spelling Test, Comparing March and November results, between Year Groups.

	Training Group		Comparison Group			Training Group		Comparison Group		
	March		March			November		November		
	M	SD	M	SD	F	M	SD	M	SD	F
Year 1						15.73	5.84	17.2	8.5	0.32
Year 2	17.36	8.5	14.47	6.79	1.08	27.05	7.69	22.66	8.08	4.95*
Year 3	26.62	7.82	24.45	7.01	1.52	32.11	7.01	32.03	5.40	0.002

\*  $p < 0.05$

The results for students spelling real words were similar between groups, for both year 1 and year 3 students.

In year 2, there was not a significant difference in scores in March, but by November, the difference between groups had become significant ( $p < 0.05$ ). The mean scores for students in the training school in years 2 and

3, were greater than those achieved by year 2 and 3 students at the comparison school.

### Reading

Three tests were used to measure reading skills. The Burt Word Recognition Test measured the students ability to read real words in isolation, the pseudoword reading test measured students skills reading unknown words (phonological decoding skills) and the proofreading tasks required students to identify spelling patterns in text (years 1 and 2) and to identify spelling errors and attempt to correct them (year 3).

#### Burt Word Recognition Test

Year 1 students were tested at their sixth birthday with the Burt word recognition test. There was no significant difference between the results attained by year 1 students at the training and comparison schools, for Burt reading scores at age six. Year 2 and 3 students were tested in March and November. Table 19 demonstrates the results for students in these two year groups.

Table 19

Means and Standard Deviations for Burt Word Recognition, Comparing March and November Results Between Year 2 and 3 Students.

	Training Group		Comparison Group			Training Group		Comparison Group		
	March		March			November		November		
	M	SD	M	SD	F	M	SD	M	SD	F
Year 2	30.70	17.71	25.0	13.45	2.35	48.58	19.49	40.27	16.27	3.58
Year 3	48.53	17.13	44.83	15.82	0.92	61.71	19.28	55.48	16.24	2.07

Children's ability to read real words, in isolation, was not significantly different between year groups, although in year 2 the differences were nearing significance by the end of the year (November:  $p < 0.06$ ). Year 2 and 3 students at the training school achieved greater mean scores in both March and November tests.

#### Pseudoword Reading

Table 20 presents the differences between groups, for the ability to read pseudowords (phonological decoding skills).

Table 20

Means and Standard Deviations for Pseudoword Reading,  
Comparing March and November Results Between Year Groups.

	Training Group		Comparison Group			Training Group		Comparison Group		
	March		March			November		November		
	M	SD	M	SD	F	M	SD	M	SD	F
Year 1						47.33	11.54	46.33	10.61	0.06
Year 2	73.44	18.88	62.62	21.47	5.04*	88.20	10.51	77.42	13.60	13.22***
Year 3	87.78	9.99	81.22	12.54	6.55**	92.91	8.18	87.96	8.21	6.42**

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

Children in year 1 at the training and comparison schools achieved very similar results for pseudoword reading.

In year 2 there was a significant difference between children from the training and comparison schools in March ( $p < 0.05$ ), which increased at the November testing ( $p < 0.001$ ). Year 3 children at the training school also achieved significantly better results for pseudoword reading in March ( $p < 0.01$ ) and this difference was maintained in November ( $p < 0.01$ ). Year 2 children at the training school were able to achieve almost the same mean scores for pseudoword reading at the end of their second year as students at the comparison school were able to achieve at the end of their third year (year 2 training - 88.20, year 3 comparison school - 87.96).

Proofreading

Proofreading skills were measured in year 1 and 2 students by their ability to recognise spelling patterns in text. Year 3 students were asked to search text for words spelled incorrectly and to attempt to correct them. Table 21 presents the results of proofreading skills for year 1 and 2 students.

Table 21

Means and Standard Deviations for Proofreading, Comparing March and November Results Between Year Groups, for Years 1 and 2.

	Training Group		Comparison Group			Training Group		Comparison Group		
	March		March			November		November		
	M	SD	M	SD	F	M	SD	M	SD	F
Year 1						11.66	2.58	9.8	3.19	3.10
Year 2	9.71	3.63	8.58	3.90	1.53	12.84	1.87	11.85	2.97	2.51

There were no significant differences between schools for proofreading scores for students in years 1 and 2.

There were however, considerable differences between results achieved in proofreading for year 3 students, with students in the training group outperforming those in the comparison group. Table 22 presents these results.

Table 22

Means and Standard Deviations for Proofreading, Comparing March and November for Year 3 Students.

	Training Group		Comparison Group			Training Group		Comparison Group		
	March		March			November		November		
	M	SD	M	SD	F	M	SD	M	SD	F
Year 3 Recognition	17.04	9.56	11.8	6.95	6.50*	22.56	9.57	17.86	7.98	4.52*
Year 3 Production	14.14	9.08	7.08	5.96	11.11**	19.60	9.85	14.41	6.62	5.97*

\*  $p < 0.05$

\*\*  $p < 0.01$

Children from the training school, who had been involved in the spelling programme, achieved almost the same results at the beginning of their third year at school, as the students in the comparison school achieved at the end of their third year at school (Recognition, 17.04 (year 2, training) v 17.86 (year 3, comparison), Production, 14.14 (year 2 training) v 14.41 (year 3 comparison)).

### Comparison of Results for Students

#### Achieving the Lowest Scores

The greatest concern for teachers of young children who are beginning to learn to read and spell, is how to address the needs of those children who consistently achieve low results. In order to test the effects of this spelling programme on the results of students who achieved in the lowest ranges, each skill assessed has

been further analysed. Tables 23, 24 and 25 show the percentages of students achieving below a certain level in each skill assessed and compare the improvements in achievement between March and November, across groups.

Table 23

Percentage of Year 1 Students Scoring in the Lowest Ranges, Comparing March and November Results.

Measure	Score less than	Training Group		Comparison Group	
		March	November	March	November
TOPA	16/20	1.33%	13.33%	33.33%	26.60%
Alphabet Names	20/26	26.60%	0%	6.60%	0%
Alphabet Sounds	20/26	0%	0%	60.00%	40.00%
Sounds to letters	25/31	40.00%	0%	20.00%	13.30%
Pseudoword Spelling	60/81	not done	40.00%	not done	66.60%
Pseudoword Reading	50/67	not done	40.00%	not done	60.00%

Table 24

Percentage of Year 2 Students Scoring in the Lowest Ranges, Comparing March and November Results.

Measure	Score less than	Training Group		Comparison Group	
		March	November	March	November
TOPA	16/20	52.94%	15.62%	44.11%	40.00%
Alphabet Sounds	20/26	0%	0%	41.66%	21.97%
Sounds to letters	20/26	5.71%	0%	27.77%	3.12%
Pseudoword Reading	60/101	23.52%	0%	37.83%	6.06%
Pseudoword Spelling	80/129	31.42%	3.12%	48.48%	27.27%
Daniels & Diack	15/40	40.00%	8.92%	41.66%	23.33%
Burt Word Recognition	40/110	76.47%	38.23%	86.48%	66.66%

Table 25

Percentage of Year 3 Students Scoring in the Lowest Ranges, Comparing March and November Results.

Measure	Score less than	Training Group		Comparison Group	
		March	November	March	November
Alphabet Sounds	20/26	2.08%	0%	37.93%	27.58%
Pseudoword Reading	60/101	14.89%	6.66%	35.48%	17.24%
Pseudoword Spelling	80/129	12.00%	0%	22.58%	12.00%
Daniels & Diack	15/40	24.0%	6.82%	32.26%	3.85%
Burt Word Recognition	40/110	27.66%	8.87%	35.48%	17.24%
Proofreading Production	15/37	53.66%	34.21%	86.67%	48.28%
Proofreading Recognition	15/37	43.90%	21.05%	70.00%	37.93%

The percentage of year 1, 2 and 3 students scoring in the lowest ranges for all skills assessed was higher in the comparison school for every skill assessed in March, except year 1 students' knowledge of letters' names and their knowledge of sound-letter correspondences. By November, results from these low performing year 1 students showed that knowledge of letter names was the same between groups and students in the training school outperformed students in the comparison school in their knowledge of sound-letter correspondences. In November, all skills assessed in years 1, 2 and 3 (except year 3 students' scores for Daniels and Diack spelling, which were almost the same), showed a smaller percentage of students in the training school scoring in the lowest range of scores.

## CHAPTER 6

## DISCUSSION AND CONCLUSIONS

Discussion of Results

This study was concerned with evaluating the effects of teaching spelling skills, using the "Letterland" resource to year 1, 2 and 3 students. Initially, the results of the 6 year Observational Surveys were examined in the training school. A comparison was made between the results from three years prior to the introduction of the "Letterland" resource and from four years since "Letterland" was introduced to the school. There were statistically significant improvements in children's performances in Letter Identification, Writing Vocabulary, Dictation and Burt Reading and the changes in Reading Levels had almost reached significance, after the introduction of the spelling programme which was based around the "Letterland" resource.

In order to measure the effects of this spelling programme on students in different year groups (years 1, 2 and 3) students' performances in measures of spelling, reading and phonological awareness were compared with the performances of students in another school. The training school and the comparison school were matched according to 6 year Observational Survey results and

according to their socio-economic decile rating. There were no significant differences in measures of reading and spelling in the 6 Year Observational Survey results of both schools, prior to the introduction of the spelling programme to the training school.

The hypotheses in this study set out to test whether explicit teaching of alphabetic (letter-sound knowledge), orthographic (spelling patterns such as blends and digraphs) and morphological knowledge (rules underlying spelling conventions), using highly memorable strategies, would improve students spelling performance, and whether there would also be improvements in reading performance and phonological awareness. When comparing the results of students from the two matched schools, for performance in these measures, there were significant differences in performance, with students from the training school (who had been exposed to the spelling programme) outperforming students at the comparison school in a number of ways.

- Letter-sound knowledge. Students in the training school achieved significantly better results in their knowledge of letter-sound relationships for consonants and vowels in March and November testing, in years 1, 2 and 3.

Knowledge of letter-sound correspondences has been shown to be critical to the development of spelling and reading

skills. It is the code that underlies understanding the printed word. As Reid Lyon (1998) says, "Although spoken language is seamless, the beginning reader must detect the seams in speech, unglue the sounds from one another, and learn which sounds go with letters" (p.17).

In the absence of explicit teaching of letter-sound correspondences, young children must infer this knowledge from another source. Most children appear to use the strategy of thinking of the letter's name and inferring a phonic response from that. For seventeen of the letters of the alphabet (c, g, f, h, l, m, n, s, u, x, w, y, a, e, i, u, q), this will not be useful as their letter names are not compatible with their sounds. Greater exposure to print and literacy instruction may provide more accurate letter-sound information, but in the current study, children still struggled to identify letter-sound correspondences for the most commonly incorrect letters, when they were seen in isolation, even after two or more years of schooling.

Children who struggle with literacy tasks, often need to break words into individual phonemes in order to spell them and will often sound out words, letter by letter when reading unknown words. If their letter-sound knowledge is inaccurate, they will be unable to

accurately spell and read words through the use of these phonological recoding and phonological decoding strategies. It is possible that children in years 2 and 3 may have developed more sophisticated strategies for working out unfamiliar words. They may have developed sufficient orthographic and morphological knowledge to read and spell words using chunks or parts of words. The number of times they have to read or spell a word by breaking it into individual phonemes may be much less than for children in year 1, as they have more knowledge and strategies at their disposal and they may not therefore use individual letter-sounds as regularly as children in year 1, who have more limited orthographic and morphological knowledge. However, considerable numbers of children in the comparison group were unable to correctly identify the sounds made by the letters that were most incompatible with the acrophonic principle, in years 1, 2 or 3. While more children were able to do this in the training group, it was still the same letters that caused the problems for the children in both groups who made errors with letter-sound correspondences. It appears that when a letter sound is not known immediately, young children in years 1, 2 and 3 must use another strategy to make the letter-sound association. Letters that were least well known were those that did not give accurate letter-sound information using the

acrophonic principle. Children who did not know letter-sound correspondences immediately, appear to use the acrophonic principle as a strategy to make these links, but the information this strategy provides is frequently incorrect. Children who learned an alternate, accurate strategy for making letter-sound connections (such as the "Letterland" character's names) made significantly fewer errors after an average of 6 months of literacy instruction, and this knowledge and difference was maintained over the next two years of instruction.

Knowledge of letter sounds is considered to be necessary in order to learn to read and spell (Treiman et al., 1998). It would appear from the results of the current study, that the increased knowledge that children in the training group gained about letter-sound correspondences, might well have a positive influence on their ability to develop reading and spelling skills. This link is made by Tunmer, Chapman, Ryan and Prochnow (1999) who discuss research by Jorm, Share, Maclean & Matthews, (1984) and Juel, (1988) which shows that "... early differences in letter-sound knowledge gave rise to steadily increasing differences in future reading achievement that favoured the group that initially had higher levels of letter-sound knowledge" (Tunmer et al., 1999, p. 13,14).

Children with greater letter-sound knowledge have been shown to have escalating spelling and reading performance, particularly for exception words. (Foorman, Francis, Novy and Liberman, 1991). Foorman et al. explained this escalating performance as being due to the Matthew effect. An increased ability to read and spell words in the first grade, multiplied the "probabilities of enhanced lexical access and enhanced comprehension later on" (p.446). In other words, knowledge of the lower order, or foundation skills underlying spelling and reading led to greater accessibility to the higher order skills later on. The children from the training school, who had been taught letter-sound correspondences explicitly, through the use of highly memorable strategies, had significantly greater knowledge of these correspondences than the students at the comparison school, in all year groups. This was true for all letters, including the letter-sound correspondences that were most difficult to remember.

- There were 9 letters that caused the most difficulty for children from both schools, for producing accurate letter-sound responses. These were: a, u, i, e, c, g, y, x, q. These letters received the lowest scores for correct phonic responses at both schools.

Treiman et al. (1998) suggest that more time should be devoted to teaching the sounds of letters that are harder to learn, than to the easier letters. "An understanding of which letter sounds are difficult for children to learn, and why, should be valuable in designing curricula for young children" (p. 1537).

- The mean scores for letter-sound knowledge of consonants and vowels achieved by year 1 students after an average of six months at school, was not significantly different from the mean scores achieved by year 2 and year 3 students, despite these children having one or two more years of literacy instruction. This finding was consistent for mean scores of year 1, 2 and 3 students at the training school and for year 1, 2 and 3 students at the comparison school.

The pattern of errors in letter-sound knowledge, made by year 1 students, was maintained by year 2 and 3 students at both schools. This suggests that students may well maintain the same strategy they adopt in their first few months at school, to inform them of the sound properties of letters, particularly for those letters that have sounds that are highly incompatible with their letter name. It appears that children may well continue to use an incorrect strategy, even when the information it

provides is incorrect, if they have consistently used it initially. This highlights the importance of teaching letter-sound relationships explicitly at school entry through the use of a highly memorable strategy that provides accurate information about the phonological properties of letters.

- Phonological awareness skills. Children in year 1 at the training school demonstrated significantly better results in the Test of Phonological Awareness when they were identifying and discriminating between initial sounds, after an average of six months at school. Eight months later, the difference between these year 1 groups of children was not significant. In year 2 however, when children were asked to identify and distinguish between final sounds in words, a much more difficult task, there was not a significant difference at the beginning of the year, but by the end of the year, the difference had become significant.

It appears that the year 1 children at the training school, who had significantly greater letter-sound knowledge after an average of six months at school, were initially more successful in the Test of Phonemic Awareness. Their results after 6 months at school were nearing ceiling levels. As the year 1 children at the

comparison school were exposed to more literacy instruction, their performances improved and moved towards those of the children in the training school. At the beginning of year 2, a more difficult task was administered. In March, while the results between groups were did not reach significance, they were moving towards significance and by November, the year 2 children involved in the spelling programme were significantly more successful in this task.

Phonological awareness skills were not taught explicitly as part of this spelling programme. However, it is interesting to consider the link between the significantly greater knowledge of phonemes shown by children at the training school and their increased phonological awareness skills. The Test of Phonological Awareness may well be easier to perform for children who have clear letter-sound (phoneme) knowledge. This knowledge is not necessary for the performance of the test, but may be implicated in performance outcomes. There is a link between phonemic awareness and knowledge of phonemes, "... teaching the concept of phoneme identity was the most effective way to instil phonemic awareness" (Bryne, 1998, p. 106). It seems clear that an awareness of phonemes may have effects on the development of skills and strategies associated with the development of

phonemic awareness. Phoneme awareness was found to be a powerful predictor of spelling skill by Muter and Snowling (1997). Chapman et al. (1999) also found that letter-sound knowledge was necessary for taking advantage of sentence context as a reading strategy. They found that:

Knowledge of spelling-to-sound patterns is essential for learning to identify words, including irregularly spelled words. ...[This knowledge] is much more important than the ability to use the constraints of sentence context. (p.7)

Treiman et al. (1998) also discuss the reciprocal nature for developing knowledge of phonemes and for phonological awareness.

Our findings imply that letter-sound knowledge and phonological awareness, rather than being two separate foundations of literacy, are intimately related. ... Children who have this phonological awareness should be better at learning the sounds of most letters than children who do not. Conversely, learning the sounds of letters may foster children's phonological skills. (p.1537)

- Spelling real words (Daniels and Diack). Year 1 and year 3 groups of students showed no significant differences in their ability to spell real words.

The two groups of year 2 students were similar in March, but by November the students at the training school were significantly better at spelling real words than students at the comparison school.

- Pseudoword Spelling. There were no significant differences between groups of year 1 students in their ability to spell pseudowords. In March, for years 2 and 3 students, there were also no significant differences between groups for phonological recoding skills, but by November, years 2 and 3 students at the training school were significantly outperforming students from the comparison school, in both year groups.
- Reading real words (Burt word recognition). There were no significant differences in performance for students reading real words, when comparing years 1, 2 and 3 students at both schools.
- Pseudoword Reading. There were no significant differences between groups of year 1 students when comparing their ability to read pseudowords. Year 2 students from the training school however, significantly outperformed students from the comparison school in March and November in this area. The difference between groups increased as the year progressed. Year 3 students from the

training school also significantly outperformed students from the comparison school in March and November, in their ability to read pseudowords.

The fact that year 2 and 3 students at the training school were significantly better at spelling and reading pseudowords than students at the comparison school, but there were no significant differences in their ability to spell and read real words, needs some explanation.

Spelling and reading pseudowords requires knowledge of the cipher for successful performance. Spelling and reading real words does not necessarily require cipher knowledge for success (Hoover and Tunmer, 1992). Cipher knowledge depends on an understanding of the alphabetic principle and knowledge of letter-sound correspondences and developing phonemic awareness.

Bryne (1998) cites a summary of a variety of studies, carried out by Olson, Wise, Johnson, and Ring (1997), which concluded that:

Although gains in word identification sometimes accompany gains in nonword decoding (and phonological awareness), more often they do not. ...gains in nonword reading are not always accompanied by gains in real word identification. (Bryne, 1998, p.102)

In his study, Bryne found that there were no significant

differences in their subjects' ability to read real words found frequently in reading material, but there was a significant difference in their ability to read infrequent words with the experimental group being superior to the controls.

The question has to be asked - Why is superiority in spelling and reading pseudowords significant, if children are just as successful at spelling and reading real words?

Perhaps Bryne has an answer.

In a study motivated by questions about reading strategies in early school grades, it was found that early establishment of decoding skills is important for reading development. Children who had a reasonable stock of 'sight words' but who were poor decoders appeared to be progressing adequately in second grade but by the third grade had begun to lag in text-level reading processes. In contrast, children who were average decoders but lacked average levels of sight words made gains in reading comprehension from second to third grades. Children who had low levels of both decoding and sight word skills were compromised throughout in higher-level reading processes. (p. 138)

If, as Bryne suggests, the differences in reading ability between good and poor decoders, were not noticeable until

third grade (year 4 in New Zealand schools), the students in this study would not have reached the point where the differences in ability to spell and read real words would have been evident.

- Proofreading. Students from both schools, in years 1 and 2, did not show significant differences in their ability to identify spelling patterns in text. There was however, a significant difference in the proofreading skills of year 3 students when comparing results between schools. Students at the training school significantly outperformed students at the comparison school in their ability to identify spelling errors in set pieces of text and in their ability to correct these errors.

Crooks and Flockton (1999) highlight the difficulties that many students experienced detecting errors in the writing of others, in their report outlining the results of the National Education Monitoring Project. They found that of the twelve incorrectly spelled words in a piece of writing, only 46% of year 4 children were able to correct seven or more of them. Two proofreading and spelling correction tasks for year 8 students showed that only 64% of children in one test and 61% of children in the other were able to correct seven or more of the 12

incorrectly spelled words. The NEMP Forum Comment (1999) states, "Many students appear to be better at avoiding errors in their own writing than detecting errors in the writing of others" (Crooks & Flockton, no page numbers). Davis (1995) suggests that the skills of proofreading are not taught to students and that background knowledge of the conventions of the English language is necessary for students to make decisions about where errors exist and how to correct them. It seems possible that a lack of knowledge about orthographic and morphological structures in written English could well be implicated in the poor proofreading results of the year 4 and year 8 students in the NEMP results in 1999.

In the current study, year 3 students from the training school who had been exposed to a spelling programme that focussed on developing word-level skills, certainly appeared to be more able to recognise and correct spelling errors in text than students who had not been involved in the spelling programme, even though their ability to read and spell real words was similar.

- Performance of lowest scoring students. In March, the training school had fewer students scoring in the lowest ranges than the comparison school, for all skills measured in all year groups, except for

year 1 students' knowledge of letter names and knowledge of sound-letter correspondences. In November, with the exception of year 3 students scores for spelling real words (Daniels and Diack), which were almost the same, every skill assessed, in all year groups, showed a smaller percentage of students from the training school, scoring in the lowest ranges when compared with students from the comparison school.

The debate about how literacy skills should be taught really revolves around how to increase success for students who do not "pick up" literacy skills easily. The results from this study suggest that the lowest achieving students from the training school achieved better results than the lowest achieving students at the comparison school.

In the areas where the mean scores for skills measured across year groups were greater for students from the training school, the differences were not just a reflection of the most able students achieving better results and increasing the mean. Students with low scores also appeared to achieve better results for spelling, reading and phonological awareness skills after being involved in the spelling programme, than students with low scores in the same measures, from the comparison school.

Educational implications

The results of this study suggest a number of areas that have implications for the teaching of literacy skills.

1. Identify the skills that are critical to spelling and reading success.

The National Reading Panel has just completed a two year analysis and assessment of over 100,000 studies related to reading research ([www.aft.org/reports/readpanel.html](http://www.aft.org/reports/readpanel.html)).

Two of the skills identified by this panel as being necessary for children to become good readers were **phonemic awareness** skills - the ability to manipulate the sounds that make up spoken language, and **phonics skills** - the understanding that there are relationships between letters and sounds. Ehri and Wilce (1987) point to the skills that underlie spelling and show how these inform reading:

Spelling might be expected to contribute to reading skill because, in learning to spell, children are taught some of the elements of decoding skill. They learn to divide pronunciations of words into their constituent sounds. They learn to represent sounds and words visually by converting sounds into letters (Morris & Perney, 1984). Both of these elements, phonemic awareness and letter-sound knowledge, are thought to be important components in

reading words (Ehri & Wilce, 1985, in press; Gough & Hillinger, 1980). If so, then the learning of these skills as part of spelling instruction should transfer and facilitate reading. (p. 48)

Adams (1994) also discusses the skills that are necessary for developing readers and spellers and points to the need to include them in instructional programmes:

Given the indication that so many children lack basic phonemic awareness on one hand and that phonemic awareness is truly so critical for learning to read and write an alphabetic script on the other, it is clearly a domain that begs instructional support. ... a number of investigators have demonstrated that programs of games and activities designed to develop phonemic awareness result in significant acceleration of the children's subsequent reading and writing achievement... .

(p.16)

In other words, letter-sound knowledge, phonological awareness, phonemic awareness skills and knowledge of spelling to sound correspondences (phonics skills) are all vital to the development of efficient recoding and decoding skills.

2. Teach these skills explicitly.

It seems logical to teach skills explicitly to young children if they need to use them in order to spell and read well. As Bryne (1998) says:

... if we want children to understand the alphabetic principle underpinning English orthography, we should tell them about it. We should not rely on them fathoming the system for themselves. (p.138)

The argument that explicit teaching of such skills will not fit with the way reading and spelling are taught, does not hold. The results of this study suggest otherwise, as do the results of a research study by Butyniec-Thomas & Woloshyn (1997). They state:

... Explicit-strategy instruction in spelling can be effectively integrated with whole-language instruction for young students. In fact, explicit-strategy instruction in a whole-language environment resulted in better spelling performance than did either whole-language or explicit-strategy instruction alone. (p. 300)

Despite the different approaches that they may be exposed to in learning to read and spell, children will use the same processes in order to become efficient readers and writers. There is an enormous amount of research-based evidence which suggests that efficient readers and spellers have a good grasp of word-level information,

which provides them with a framework for understanding the printed word. They may well have developed this knowledge through different instructional approaches, but the fact remains that they have it. Children who struggle with reading and spelling skills are limited in this area of word-level information. Rather than becoming embroiled in a discussion of the "correct" instructional approach to the teaching of reading and spelling, it seems more logical to be guided by a theoretical framework of literacy acquisition, which will allow the teacher to understand the nature of a child's difficulties and to manipulate the teaching approach accordingly.

Word-level information is critical to the development of spelling skills, and therefore a spelling programme should teach these skills explicitly. Becoming an efficient speller will positively impact on written language performance and therefore will influence performance in other curriculum areas. Spelling skills have been shown to improve reading skills, which will also impact on other curriculum areas. Success with reading and writing will enhance children's academic self-concept and will therefore affect their academic success. Academic success plays a significant part in personal feelings of self worth. Stephanie Burns, a

learning specialist, demonstrates the link between something as seemingly insignificant as poor spelling skills and general self-concept. "... if you didn't stumble on a good strategy for spelling, you were labelled stupid, and you better know that it has had long-term effects on how you learn in general and what you believe about yourself today" (Burns, 1993, p.21).

#### Limitations of This Study

A limitation of this study, related to the process of matching children from the two schools. Children in year 1, who were initially tested in March, needed to be turning 6 before November, so that the results of their 6 year Observational Surveys could be evaluated. This limited the number of eligible children in each school, and all eligible children did not return permission slips to allow them to be involved in the study. This also meant that children in year 1 had started school on average, 6 months earlier, by the time they were first tested in March. Children from the training school had therefore been involved in the spelling programme for an average of 6 months before they were first tested in March. In retrospect, it may have been better to test children at school entry and match year 1 children according to their skills at that time. This may have also produced a small sample however, since the number of

children starting school in February and early March may not have been great. The lack of information about students' knowledge base at school entry was also a factor in matching groups of year 2 and 3 students. Children could not be matched according to the knowledge they had before formal instruction began. For this reason, the schools were matched according to the mean scores for spelling and reading of students at age 6, over a three-year period and according to the socio-economic decile rating of the schools (they were both decile 9 schools) rather than the groups of students in the study being matched by their individual results.

#### Suggestions for Future Research

It would be interesting to continue to measure the spelling and reading progress of the children involved in this study over a further two or three years, to see if the differences between groups were maintained over time. Another study could be designed to further evaluate the reasons for the success of this spelling programme. The two significant features of the spelling programme evaluated in the current study, were the explicit teaching of word-level information and the use of a resource ("Letterland") that used picture mnemonics and story to make material to be learned memorable. Groups of children could be matched at school entry on

measures of letter sound knowledge, letter name knowledge and phonological awareness skills and then divided into three groups. One group could be taught spelling and reading skills through traditional whole-language programmes such as those used in most New Zealand classrooms. One group could be taught the word-level information described in the spelling programme used in the current study, without the use of the "Letterland" resource. The third group could be taught the word-level information described in the spelling programme used in the current study through the use of the "Letterland" resource.

Achievement in measures of spelling, reading and phonological awareness could be evaluated to determine the success of the various programmes in an attempt to answer the following question.

Is it sufficient to teach word-level information explicitly for spelling success, or does the process of how the information is taught influence achievement outcomes? Results from the current study suggest that what was taught (word-level information) and how this information was taught (through strategies that made learning memorable) were both critical to the successful outcomes achieved.

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Appendix A  
Spelling Analysis Sheet

# 15 MINUTE WRITING SAMPLE - SPELLING ANALYSIS

Name

Date

Word Count

Number of Spelling Errors

Number of Spelling Errors

Number of Core Vocab. Errors

Number of Non-Core Vocab. Errors

Nature of Errors (Summary)

Targets for Spelling Programme

Targets for Proofreading

Student's spelling	Intended Word	Sound Analysis: Consonant, vowel or blend errors	Lack of Knowledge of spelling patterns	Lack of knowledge of spelling rules	Proofreading errors	Other (specify)	Errors from core vocab.	Errors out of core vocab.
5								
10								
15								
20								
25								

Appendix B

Letter-Sound Knowledge Test Sheet

## LETTER-SOUND KNOWLEDGE

Name: ..... Date: ..... Room: .....

name	sound	name	sound	name	sound			
a	<input type="checkbox"/>	<input type="checkbox"/>	f	<input type="checkbox"/>	<input type="checkbox"/>	t	<input type="checkbox"/>	<input type="checkbox"/>
c	<input type="checkbox"/>	<input type="checkbox"/>	g	<input type="checkbox"/>	<input type="checkbox"/>	v	<input type="checkbox"/>	<input type="checkbox"/>
d	<input type="checkbox"/>	<input type="checkbox"/>	i	<input type="checkbox"/>	<input type="checkbox"/>	u	<input type="checkbox"/>	<input type="checkbox"/>
h	<input type="checkbox"/>	<input type="checkbox"/>	o	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>
b	<input type="checkbox"/>	<input type="checkbox"/>	k	<input type="checkbox"/>	<input type="checkbox"/>	z	<input type="checkbox"/>	<input type="checkbox"/>
e	<input type="checkbox"/>	<input type="checkbox"/>	l	<input type="checkbox"/>	<input type="checkbox"/>	w	<input type="checkbox"/>	<input type="checkbox"/>
j	<input type="checkbox"/>	<input type="checkbox"/>	m	<input type="checkbox"/>	<input type="checkbox"/>	q	<input type="checkbox"/>	<input type="checkbox"/>
n	<input type="checkbox"/>	<input type="checkbox"/>	p	<input type="checkbox"/>	<input type="checkbox"/>	s	<input type="checkbox"/>	<input type="checkbox"/>
r	<input type="checkbox"/>	<input type="checkbox"/>	y	<input type="checkbox"/>	<input type="checkbox"/>			

Letter names

/ 26

Letter sounds

/ 26

Children say the name of the letter and the sound it makes in words. They must give the short vowel sounds for vowels (as in apple, egg, ink, otter, under). If they give a long vowel sound (the name of the letter), ask if they know any other sound that letter makes in a word. If they say 'sih' for the letter 'c', or 'jih' for the letter 'g', ask them if they know another sound that letter makes in a word. They must be able to say 'kih' as in cat for 'c' and 'gih' as in go for 'g'. The correct sound for 'x' is 'ksss'.

Appendix C

Sound-Letter Knowledge Test Sheet

<b>SOUND-LETTER KNOWLEDGE</b>
-------------------------------

Children write down the letter that makes the sound highlighted in these words. Make sure you do not voice sounds that do not belong to the letter. For example: The letter 's' says 'sssss' not 'sih', the letter 'f' says 'ffffff' not 'fih'.

- |                                |                            |
|--------------------------------|----------------------------|
| 1. The 's' sound in soft       | 17. The 'n' sound in nose  |
| 2. The 'w' sound in wet        | 18. The 'b' sound in bed   |
| 3. The 't' sound in toe        | 19. The 'f' sound in fish  |
| 4. The 'x' (kiss) sound in box | 20. The 'h' sound in house |
| 5. The 'z' sound in zip        | 21. The 'j' sound in job   |
| 6. The 'l' sound in leg        | 22. The 'r' sound in run   |
| 7. The 'q' sound in quick      | 23. The 'm' sound in mouse |
| 8. The 'k' sound in kite       | 24. The 'p' sound in pig   |
| 9. The 'd' sound in dig        | 25. The 'v' sound in vase  |
| 10. The 'c' sound in catch     | 26. The 'g' sound in gold  |
| 11. The 'y' sound in yellow    | 27. The 'a' sound in apple |
| 12. The 'e' sound in egg       | 28. The 'i' sound in ink   |
| 13. The 'o' sound in orange    | 29. The 'u' sound in under |
| 14. The 'a' sound in apron     | 30. The 'e' sound in eagle |
| 15. The 'i' sound in iron      | 31. The 'o' sound in over  |
| 16. The 'u' sound in useful    |                            |

Total            /31

For numbers 8 and 10, 'c' and 'k' are acceptable for either. This test is not about correct spelling for the whole word, but is about writing an acceptable letter for a sound. Although 'c' can sometimes make a 'sss' sound and 'g' can sometimes say 'jih', these sounds only occur in certain situations and are therefore not acceptable answers for those letters in numbers 1 and 21.

Appendix D

Sample Sheets from Year 2 Spelling Programme

Week 2

Contractions

Day 1.

Read exploding letters explanation on pages 88,89 of Big Strides.

Demonstrate how contractions work, on the board. Box the letters that have exploded (it is always a vowel and sometimes a vowel and one or two consonants).

e.g. I have - I've - I h a ve

It is - It's - It i s

He is - He's - He i s

Do not - Don't - Do n o t

Did not - Didn't - Did n o t

Days 2,3,4

Do worksheets making contractions.

If anyone finishes the four worksheets before the time is up, have them write sentences using some of the contractions they have made.

Week 3Day 1.

Practice turning contractions back into whole words.

Write these up on the whiteboard and have children come up and write the whole words beside them.

I've	It's	wouldn't
He's	They've	she's
Isn't	There's	don't
couldn't	You're	hasn't
you've	wasn't	I'd

When the whole words have been written up, have the children come up and put a box around the letters that have "exploded" and disappeared.

e.g. I've                      I have                      I h a ve

Day 2

Children do worksheet filling in the contraction column and then drawing a box around the letters that have exploded in the third column.

Day 3 & 4.

Children do worksheet rewriting sentences by making contractions or by expanding them.

	Write the contraction	Put a box around the missing letters
I am	I'm	I <input type="text" value="a"/> m
I have		I have
It is		It is
Do not		do not
Will not		will not
that is		that is
did not		did not
could not		could not
he is		he is
she is		she is
here is		here is

Rewrite these sentences with the underlined words as contractions.

I have not had any lunch today.

---

I will not give you my toy.

---

She is my best friend.

---

I have got three new kittens.

---

Today it is very hot.

---

We will have a swim in the pool.

---

We would like to swim with you.

---

Rewrite these sentences making the words that are contractions into two words again.

It'll soon be Christmas time.

---

You're very lucky to win that prize.

---

I didn't like that drink.

---

We won't be coming to see you today.

---

She's my new friend.

---

He'll play soccer on Saturday.

---

Where's my new ball?

---

MAKE CONTRACTIONS FROM THESE WORDS

I      am  
      have  
      will  
      would

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

you    are  
       have  
       will  
       would

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

she    is  
       has  
       will  
       would

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

he     is  
       has  
       will  
       would

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

they   are  
       have  
       will  
       would

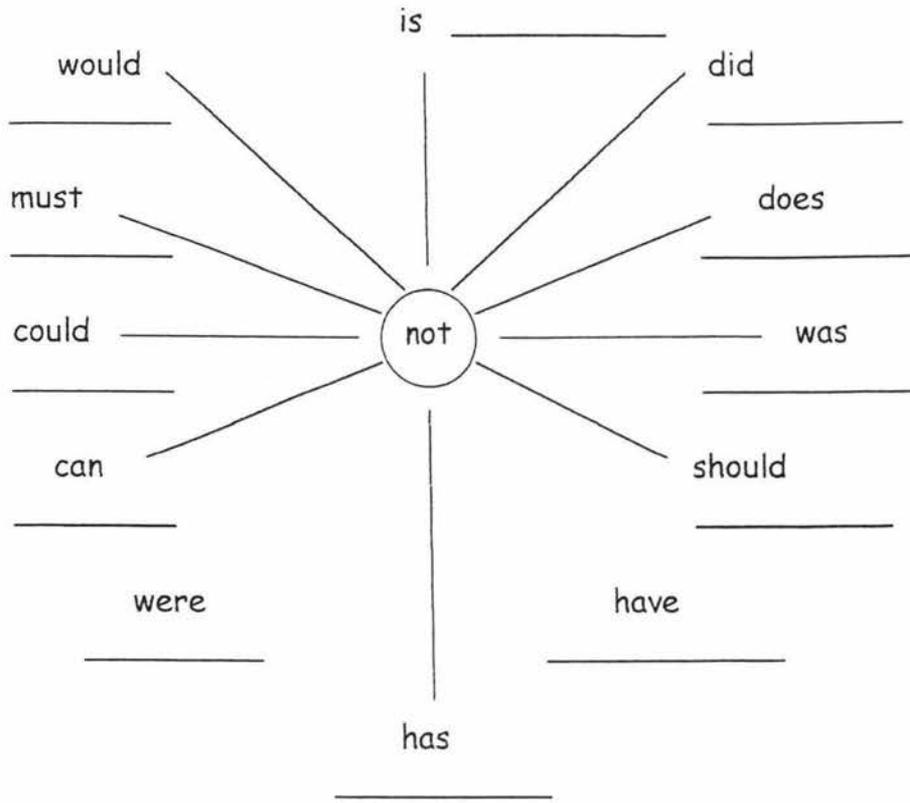
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

MAKE CONTRACTIONS FROM WORDS CONTAINING NOT



MAKE CONTRACTIONS FROM WORDS CONTAINING IS

