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The influence of teachers' knowledge and teaching  
practice on outcomes for beginning readers

A thesis presented in partial fulfilment of the requirements for the degree of

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## ABSTRACT

New Zealand has a problem with reading achievement, in spite of ongoing efforts to address the issue. The current study selected to investigate the influence of teachers' knowledge and teaching practice in teaching beginning reading. The study was a two-phase, mixed methods, explanatory sequential design, involving 30 teachers from 12 urban, state schools located in New Zealand's lower North Island. Teachers participated in professional learning and development (PLD) workshops focused on teacher knowledge and explicit teaching practice for beginning readers. The study used data from 109 New Entrant children from the PLD classrooms and from a non-PLD comparison group of 61 new entrant children. The first phase of the study involved obtaining and analysing data about teachers' linguistic knowledge, self-confidence for teaching literacy, teaching practice, and reading prompts. The data were analysed using descriptive statistics and *t*-tests. The findings showed that teachers' knowledge of linguistic constructs and self-confidence in teaching the code component of reading increased significantly. Observations showed a significant change in teaching practice, from implicit teaching to explicit teaching. Teachers' prompts changed significantly to using code-cue prompts. For some teachers, teaching practice remained implicit and prompts remained context-based, regardless of an increase in their teacher

knowledge. The second phase of the study involved interviews with four teachers to identify barriers for teachers in changing to explicit teaching. Student reading skills were measured and data analysed using a series of MANOVAs and ANOVAs to identify any differences between the implementation and comparison groups. The student data showed significantly better outcomes for the implementation students, with a notable positive difference for students from schools located in lower socio-economic neighbourhoods. Findings suggest that when teachers are equipped with knowledge and practice to teach the code component explicitly to beginning readers, improvement in reading outcomes is possible.

Recommendations from the study include that changes are required at a policy level, in teacher training, and for teaching resources, with a particular need for increased cognisance of studies from the science of reading.

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## **DEDICATION**

This thesis is dedicated to an extraordinary educator and good friend

Jocelyn Goodwin (1962-2014)

I wish you had been here; I hope you would be pleased.





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## CHAPTER ONE: INTRODUCTION

The current study arises from concerns about the ongoing disparity in reading outcomes in New Zealand. Many attempts have been made to improve reading outcomes but without success for significant numbers of children. The impact on groups who continue to experience least success in learning to read is too important to ignore. In 2011, the incoming Minister of Education was informed by Ministry officials that “the greatest challenge facing the schooling sector is providing equitable outcomes for students” (Ministry of Education, 2011, p. 23). While there are a number of reasons that outcomes might be low, this study examines the within-school influences that can be changed to improve reading outcomes. In particular, teachers’ knowledge and teaching practice are examined as significant influences on achievement outcomes for beginning readers.

The ability to read is a vital skill for everyday life and has an impact on all aspects of an individual’s achievement. Difficulties in learning to read are linked to a range of negative academic and social consequences, such as problems with self-efficacy, behaviour, and overall school achievement (Chapman, Greaney, & Prochnow, 2015; Libbey, 2004; Zimmerman, Rodriguez, Rewey, & Heidemann, 2008). Broad societal effects of reading difficulties are evident in reduced job opportunities (Chapman & Tunmer, 2014; Lane, 2011), in the cycle of poverty

(Gerber, 2011), and in the low language and literacy rates in prison populations (Prison Reform Trust, 2006; P. Snow & Powell, 2011). Illiteracy has direct costs on the global economy and more importantly has indirect costs on the lives of individuals (World Literacy Foundation, 2015). Mastery in the skill of reading has both individual and societal impacts, so success in learning to read needs to be of the highest priority in schooling.

Learning to read is complex. The human brain is biologically and socially adapted for learning language in the form of speech, but processing the printed word is a relatively new modality of language that requires dramatic changes in the brain (Dehaene, 2013; Pinker, 2007; Seidenberg, 2017). A reader must associate the printed symbols of an orthography to the sounds in spoken words of the language. A key task for the beginning reader is to match their knowledge of oral language to new learning about the printed form of words or orthography (Gough & Hillinger, 1980). A key task for the teacher is to make the task of learning to map speech to print manageable for learners.

The teaching of reading is also complex and there are differing views about how reading should be taught. One view of learning to read is that it is a natural event that children will learn as part of being immersed in print and books (Goodman, 1970, 1986; F. Smith, 1971, 1985, 2004; J. Smith & Elley, 1997). An opposing view is that learning to read requires explicit teaching of the elements of the written code, which cannot be absorbed from exposure (Adams, 1990; Nicholson, 2000; C. Snow & Juel, 2005; Stahl, 1997; Stanovich, 1980). The opposing views have led to disagreement about the best way to teach reading.

The complexity involved in both learning to read and the teaching of reading is reflected in reading outcomes data. Reading outcomes in New Zealand show a significant and continuing gap between those who succeed in learning to read and those who struggle to reach a level that might be expected in terms of age and development (Nicholson, 2000; Tunmer, Chapman, Greaney, Prochnow, & Arrow, 2013; Tunmer, Chapman, & Prochnow, 2004; Tunmer, Prochnow, Greaney, & Chapman, 2007; Wilkinson, Freebody, & Elkins, 2000). Data from the Progress in International Reading Literacy Study (PIRLS), accumulated since 2001, indicate that in New Zealand, 20% of children continue to experience difficulty in learning to read proficiently (Mullis, Martin, Foy, & Drucker, 2012; Mullis, Martin, Foy, & Hooper, 2017; Mullis, Martin, Gonzales, & Kennedy, 2003; Mullis, Martin, Kennedy, & Foy, 2007). Similarly, the New Zealand National Standards data, gathered from a variety of in-classroom reading measures, reveal that 20% of children are not achieving mastery in reading (Ministry of Education, 2016).

Analyses of both national and international data sets show that children from low socio-economic backgrounds or from ethnic minority groups are disproportionately represented in the low achievement statistics (Ministry of Education, 2016; Mullis et al., 2012; Piasta, Connor, Fishman, & Morrison, 2009). Of particular concern to the current study, the 2016 National Standards data showed 30% of children from low socio-economic homes or Māori<sup>1</sup> and Pacific<sup>2</sup>

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<sup>1</sup> Māori are the indigenous people of New Zealand, with whom the government has a Treaty partnership.

<sup>2</sup> Pacific is a collective term referring to people who identify themselves as having family or cultural connections to a Pacific country (e.g., Samoa, Tonga, Cook Islands, Fiji).

backgrounds did not achieve mastery, which is evidence of the inequitable outcomes.

The relatively wide spread of reading scores in New Zealand is consistent with the Matthew Effect, which Stanovich (1986) described as occurring when an initial learning advantage accumulates into further advantage, and initial disadvantage accumulates into further disadvantage in learning progress. Initial advantage for learning to read occurs for children who have a foundation in literacy-related knowledge and abilities, such as strong oral language, experience with stories, and ability to create rhymes and hear sounds in words (Boudreau & Hedberg, 1999). Initial disadvantage is more evident for children from low-income families where children have access to fewer resources that assist with language development (McGinty & Justice, 2010) and for children who have difficulty with phonological awareness (Gillon et al., 2019).

For a number of reasons, some children at school entry do not have an optimum foundation for success in learning to read. Due to the stress that financial difficulty places on resources and family interactions, children from low-income households often have less exposure to language and books (McGinty & Justice, 2010; Petterson & Albers, 2001; Prochnow, Tunmer, & Arrow, 2015). Less exposure to language results in lower vocabulary levels, which influences the development of other skills for literacy. The difference in skills at school entry can develop into negative Matthew Effects if teaching methods fail to respond adequately to children's specific needs (Justice, Mashburn, Pence, & Wiggins, 2008; Tunmer, Chapman, & Prochnow, 2003). Small differences at school entry can result in large differences in rate of progress in learning to read (Prochnow, Tunmer, &

Arrow, 2015). Slower progress eventually results in less practice in reading, more likelihood of material being too difficult, and ultimately avoidance and withdrawal from engagement in reading (Tunmer et al., 2013).

The reasons for failing to make progress in reading are varied, but researchers have found reading failure is often blamed on non-instructional factors, such as race, ethnicity, environment, socio-economic factors, student motivation, or parent involvement (Joshi et al., 2009; C. Snow, Burns, & Griffin, 1998; Vellutino, Scanlon, & Jaccard, 2003). As an example of attributing blame to influences outside of school, one literacy educator recently stated “it must be understood that parents’ education, socio-economics status, and cultural orientations to reading have a significant impact on the likelihood of children’s success in learning to read” (Ewing, 2018, p. 5). Similarly, some New Zealand reports have suggested inequitable outcomes need to be viewed in light of societal changes and home language gap, rather than instructional methods (Dix, Cawkwell, & Locke, 2011; Elley, 2004; Limbrick, 2000). Dix et al. (2011) suggested that the fact there has been little change in the reading outcomes data over the years might be viewed as an achievement, given rapid change in the ethnicity of the population and the accelerating income gap. Such views attribute the problem to a societal and family level, rather than to a school level.

While, home background undoubtedly influences learning outcomes, an alternative response to finding solutions for low reading outcomes is to consider how teaching methods make a difference to outcomes. Some New Zealand researchers have suggested the ongoing achievement gaps are due to particular classroom practice and education policy (Nicholson, 2000; Tunmer et al., 2013).

Analyses of PIRLS data from 2001, 2006, and 2011 reveal that differences in children's school entry capability have resulted in larger differences in future reading achievement in New Zealand than in most other countries (Tunmer et al., 2013).

The predominant pedagogy in teaching reading in New Zealand over three decades reflects a constructivist view (Wilkinson et al., 2000). Constructivist pedagogy is built on the assumption that learning involves constructing understanding, therefore, effective teaching largely involves providing opportunities for learners to construct their own understanding. For teaching reading, pedagogical constructivism places responsibility on students to develop the necessary knowledge about the printed code, in an implicit and incidental way, within the process of reading texts. Teaching reading based on pedagogical constructivism places little emphasis on explicit teaching of the skills needed for learning the code. The view is prevalent in a number of past and current resources available for New Zealand teachers (Department of Education, 1972, 1985; Hood, 2000; Ministry of Education, 1996a, 1996b, 2003, 2015; J. Smith & Elley, 1997).

Tunmer and colleagues (2013) hypothesized that the gaps in literacy achievement are largely triggered by the main orientation to teaching reading in New Zealand that fails to respond adequately to differences in essential reading related skills and knowledge at school entry. In contrast, a systematic and intensive approach to teaching the code component of reading has been shown to mitigate early disadvantage (Snow & Juel, 2005). Without such input, the disadvantage maintains or widens over time (Stanovich, 1986), which is evident in

the New Zealand data. Tunmer and Chapman (2015) argue that system-wide change is needed to address the problems of inequitable learning outcomes.

Many attempts have been made to address the ongoing inequity in reading outcomes. One significant attempt in New Zealand was the National Literacy Strategy, implemented in 1999 in an attempt to close the gap in reading achievement (Ministry of Education, 1999). The Minister of Education appointed a Literacy Taskforce to consider the implementation of the strategy from the perspective of principals, teachers, and advisers. In addition, a Literacy Experts group was established to provide theoretical and research input for the Taskforce (Douglas, 2002). The Experts group recommended greater attention to the development of word-level skill in beginning reading instruction, but the Taskforce rejected the recommendation in favour of a focus on continuing with a meaning-based approach (Tunmer et al., 2013). The Taskforce also rejected the need for a system-wide change in literacy instruction, claiming that existing literacy strategies were already effective for most students (Dix et al., 2011).

In contrast to New Zealand's National Literacy Strategy response, the findings from the Rose (2006) report in England lead to the recommendation for a programme of phonics within a language-rich curriculum. In addition, the report suggested a focus on improving teacher knowledge about language as appropriate to teaching children to read and write. Many researchers suggest recognising the importance of teachers' knowledge is an essential step to ensuring teachers acquire knowledge that is necessary to teach explicitly and systematically (Cunningham, Zibulsky, Stanovich, & Stanovich, 2009; McCutchen, Green, Abbott, &



Sanders, 2009; Moats, 1995, 2014; Piasta et al., 2009). However, the New Zealand Literacy Taskforce did not recommend a focus on improving teacher knowledge.

One of the difficulties in learning to read in English is that the orthography is governed by a combination of phonology, spelling patterns, and morphology (Devonshire, Morris, & Fluck, 2012) and, therefore, is relatively opaque. Mastering reading skills in English is more challenging than in a transparent orthography where the letter to sound match is exact (e.g., Finnish, Italian, or Spanish). In a more transparent orthography, children fluent in the spoken language can reach basic proficiency in reading within one year of formal teaching. In contrast, basic proficiency in reading in English requires between two and three years (Seymour, Aro, & Erskine, 2003). The challenge of the orthography must be considered for teacher knowledge and teaching practice.

An accumulating number of studies has identified gaps in teachers' knowledge of the linguistic constructs that are necessary for effective teaching of reading (Carroll, 2006; Carroll, Gillon, & McNeill, 2012; Cunningham, Perry, Stanovich, & Stanovich, 2004; Fielding-Barnsley, 2010; Joshi et al., 2009; Moats, 2009). These studies show that most teachers lack the explicit knowledge necessary for teaching early reading. Teachers cannot teach what they do not know, a concept referred to as the Peter Effect, which proposes that a person cannot give what they do not have (Applegate & Applegate, 2004). Teacher preparation and development, therefore, are important as part of the solution for improving reading outcomes (Foorman & Moats, 2004; McCutchen, Abbott, et al., 2002; Spear-Swerling & Brucker, 2003). The combination of improved teacher

knowledge about learning to read and explicit teaching practice is necessary for improved outcomes.

## **Overview of the thesis**

The current study includes a focus on teacher knowledge and explicit teaching practice, as these are highly influential in determining reading outcomes for beginning readers (Hattie, 2009; Hempenstall, 2016; Lyon & Weiser, 2009; Marzano, Pickering, & Pollock, 2001; Rosenshine, 2012; Sanders & Rivers, 1996). The study includes a focus on teaching mastery of the printed code, while also acknowledging the importance of a language-rich curriculum.

The thesis is structured around six chapters. The introduction chapter has outlined the importance of learning to read and current problems with inequitable reading achievement. The study seeks to examine possible classroom-based solutions for the ongoing problems indicated by reading outcomes data.

Chapter Two reviews the literature related to how children learn to read and the way reading is taught. Two contrasting views about teaching reading are explained in order to identify problems and solutions for improving reading outcomes. In particular, the code component of reading is examined in detail based on the premise that without mastering the code, children cannot succeed as readers. Studies about teacher knowledge provide background about what teachers need to know to teach effectively. Literature on teacher change is reviewed because changes in teaching practice are necessary for making a difference to students who have been underachieving. The chapter concludes with the research aim and the questions for the study.

Chapter Three outlines the two-phase mixed-methods, explanatory sequential research design of the study. The first phase obtained and used quantitative data about teacher knowledge and teaching practice for a group of New Zealand New Entrant teachers. The second phase used qualitative data from semi-structured interviews to add explanation to the quantitative results. Student outcome data were obtained for two groups of children in their first year at school, a group whose teachers participated in the professional learning and development (PLD) implementation and a comparison group. The chapter describes the study's methods and the measures used to obtain data on teacher knowledge and teaching practice, prior to and after the PLD intervention. In addition, the measures used to obtain student data for the implementation and comparison groups are described.

The results of both phases are presented in Chapter Four. Pre- and post-PLD data on teachers' knowledge and teaching practice data are analysed, with a focus on the code component of teaching reading. Descriptive and inferential statistics are presented to show the significance of change. Interview data from four teachers are used to identify themes relating to barriers or enablers to teachers making change suggested by the PLD. Student data are used to identify any effect on reading outcomes from the PLD. In Chapter Five, the research findings are discussed and compared to the existing literature. Chapter Six presents the conclusion of the study, including the contribution to, and implications for, the teaching of beginning reading.

The aim of the study is to examine the teaching of reading in children's first year at school and to identify any difference to student outcomes from changes to teachers' knowledge and teaching practice. The year-long study with intervention

and comparison groups provides a unique opportunity to identify the influence of teachers' knowledge and teaching practice on beginning reading outcomes, prior to and after provision of the PLD. The study is important for making recommendations about teacher preparation that can equip teachers with knowledge and practice to provide improved outcomes for all students.



## **CHAPTER TWO: LITERATURE REVIEW**

### **Introduction**

The introduction chapter suggested the complexity of learning to read and the associated complexity of teaching reading. In addition, the chapter highlighted that the ongoing inequity in reading outcomes, with its negative consequences for certain groups, has been associated with particular approaches to teaching reading. Given the evidence that some children do not learn to read successfully and that teaching approaches are an important influence on student outcomes, the current study aims to examine the influence of teaching variables on reading outcomes.

In the literature review, studies on how children learn to read are examined, including studies of reading acquisition from two contrasting perspectives. The review includes an outline of the cognitive processes involved in successful reading of print. The key teaching approaches associated with the contrasting theories of reading are discussed, along with an examination of the approaches that might improve outcomes. Accordingly, the chapter examines the teacher knowledge and pedagogical approaches necessary for effective teaching of beginning reading. Change in knowledge and practice may be necessary for

optimum outcomes, and studies on influences involved in teacher change are reviewed. Gaps identified in the literature form the basis of the Research Questions, which are stated at the end of the chapter.

## **Learning to read**

There is broad agreement among researchers that the main goal of reading is to gain meaning from the text (Adams, 1990; Clay, 1991; Goodman, 1986; Gough, 1972, 1985; F. Smith, 2004; J. Smith & Elley, 1997; Tunmer & Hoover, 2019). However, researchers differ in defining how learners gain the necessary skills to ensure gaining meaning. A key difference between the differing views is whether the act of reading is natural to humans in the same manner as learning to speak or is a complex process that requires specific teaching about the printed word (Castles, Rastle, & Nation, 2018; Gough & Hillinger, 1980; Tunmer & Nicholson, 2011).

In addition to the contrasting views of reading as natural or unnatural to the human brain, Snow and Juel (2005) reported that the complexity of English as an orthography promotes two views of how children should be taught about the code. One view is that English is too complex to teach and, therefore, the learner must be allowed to deduce connections. A contrasting view is that English is too complex to learn implicitly and so must be explicitly taught. These two contrasting views help explain some of the controversy about the teaching of reading.

One group of researchers has emphasised the importance of learners mastering the code to gain access to the meaning (Adams, 1990; Ehri, 2005; Goswami & Bryant, 1990; Gough, 1996; Gough & Tunmer, 1986; Juel & Minden-

Cupp, 2000; Moats, 1999; Share, 1995; Stahl, 1997; Stanovich, 1980, 2000). These researchers promote the teaching of core foundation skills, such as alphabet knowledge and decoding skills. Researchers who promote explicit teaching of the code suggest that as an alphabetic script, mastery of English orthography dictates the need for complete or near-complete processing of the orthographic detail (Castles et al., 2018; Share, 1995; Stahl, 1997). This view has been labelled 'bottom-up' processing because lower order elements, such as knowledge of the alphabetic code, are emphasised as essential to secure the higher-level processes of comprehending text.

In an opposing view, other researchers emphasise that a learner constructs their own knowledge of the print through engagement with meaningful texts (Clay, 1991; Goodman, 1976; Goodman & Goodman, 1979; Routman, 1999; F. Smith, 1971; J. Smith & Elley, 1997; Weaver, 1994). These researchers promote the use of meaningful texts as a first step to teaching reading. The view is labelled 'top-down' because the reader's higher cognitive processes are believed to precede and control the lower order skills of using alphabet knowledge and decoding (J. Smith & Elley, 1997).

Proponents of reading as a process constructed from higher order processes describe learning to read as being as natural as learning to speak (Goodman, 1970; F. Smith, 2004). Both F. Smith (2004) and Goodman (1970) proposed that learning to read words and retaining them in memory occurs by exposure to print and immersion in a print-rich environment, rather than through explicit teaching of how to decode the print. These researchers purport that reading progresses from an understanding of larger units of meaning and that



readers process words from context rather than focus on specific letters (F. Smith, 2004). F. Smith (2004) argued that it is not necessary to decode print into speech at all. Goodman (1976) argued that explicit teaching about words during reading is unnecessary because children discover the alphabetic principle as they attempt to write words. According to this view, learning to read words occurs as part of the wider reading process; any focus on the detail of a word unnecessarily disrupts that process.

In contrast to reading as a process that proceeds from higher order processes first, a focus on reading as a bottom-up process describes the task of a reader as mastering foundational skills to succeed in reading the printed code. Researchers who promote the fundamental importance of these foundation skills have examined the cognitive skills and processes that occur during reading (Adams, 1990; Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001; Gough & Tunmer, 1986; Perfetti, 1985; Rumelhart, 1994; Seidenberg & McClelland, 1989; Stanovich, 1980). In particular, the researchers have examined how a reader learns to translate printed words into recognisable meaning units. The studies have produced abundant evidence that learning how graphemes (a letter or group of letters) match to phonemes (the individual sounds in a spoken word) is essential for learning to read words. While reading comprehension requires more than identifying individual words, comprehension cannot happen without word identification (Perfetti, Landi, & Oakhill, 2005).

The rationale for asserting that meaning is the main driver of the reading process was based on an early study by Goodman (1965). Goodman found a 60% to 80% improvement in reading accuracy when children read words in the context

of a story rather than in a list format. Goodman argued on the basis of these findings that meaning assisted the reader with word identification and any focus on print detail was unnecessary and unhelpful.

Critics of Goodman's original study have identified errors in its design and its assumptions. Nicholson (1991) identified that the design of the study lacked a counterbalance to preclude the practice effects that occurred because children had seen the words in the list prior to encountering the words in the text to be read. In addition, Nicholson argued that the study did not determine whether good or poor readers (or both categories) derived benefit from context. Subsequent to Goodman's study, other researchers have repeated the experiment and included clearly defined groups of good and poor readers, finding that poor readers over-relied on context cues in reading attempts (Adams, 1990; Nicholson, 1991; Nicholson, Lillas, & Rzoska, 1988). Adams (1990) reported that good readers tend to decode words automatically and other studies showed that good readers do not rely heavily on context for word identification (Allington, 1978; Gough, 1995; Nicholson, 1991, 1993; Stanovich, 1980). Nicholson (1991) argued that poor readers attempt to use context because they lack the decoding skills of the good readers.

### ***Learning to read words***

Studies that have examined how words are learned and retained in memory confirm the primary role of recognising and interpreting the symbols of print (Devonshire et al., 2012; Ehri, 1999, 2014; Juel & Minden-Cupp, 2000; Rumelhart & McClelland, 1986; Seidenberg & McClelland, 1989; Share, 1995; Treiman, 1998). The ability to translate printed words independently into their spoken equivalents

is central to reading acquisition, not just for beginning readers but through the entire reading ability range (Share, 1995). Once the word can be decoded or pronounced, the reader can access the word's meaning (Seidenberg & McClelland, 1989). Two models of word reading provide understanding about how efficient reading occurs. The dual-route cascaded model (Coltheart & Rastle, 1994) and the connectionist model (Adams, 1990; Seidenberg & McClelland, 1989).

The dual route and the connectionist models describe efficient reading as the ability to automatically and rapidly bind together speech and print units. The graphemes of a word are recognised and associated with phonemes in order to produce a phonological recoding of the print to read the word (Jorm & Share, 1983; Share, 1995, 2008). The act of phonological recoding involves the reader in using known associations between the letters (orthography) and the sounds (phonology) to successfully pronounce the print.

The dual route model describes two pathways necessary for learning and storing words: the phonic knowledge route and the direct route. The phonic knowledge route involves the reader applying known spelling-sound patterns (sub-lexical units) to decode unknown words. The direct route by-passes the use of the sub-lexical units as the reader recognises orthographic patterns retained as whole words. This route suggests the long-term memory's role in recognising words such as 'come', 'here', 'eight', and 'eye' where the irregularities of the words do not allow readers to rely on dependable sub-lexical connections (Thompson & Fletcher-Flinn, 1993).

The connectionist model similarly describes the connections between orthography and phonology as vital to success in reading. The model differs from

the dual-route in its emphasis on the use of orthographic-phonological connections in reading all words. The cognitive process involves using knowledge of letter clusters that have become familiar from many exposures to recognise whole words. Studies show that skilful readers have a sensitivity to groups of letters in regular order (Juel & Solso, 1981; Massaro, Venezky, & Taylor, 1979). The sensitivity appears to result in the subliminal recognition of likely and unlikely sub-lexical units. For example, skilled readers quickly recognise units such as 'er' and 'ou' and process these differently than a unit such as 'dn', which cannot occur in a one syllable word, but can occur in a two-syllable word such as 'midnight'. The findings of these studies are confirmed by studies of eye-movement tracking, which show that readers routinely process every letter in a word by parallel processing of letter groups that work together as units (Snow & Juel, 2005). The eye registers one, two or three letters at a time as appropriate to the word itself.

Both the connectionist and the dual route models show the phonological recoding that occurs during reading (Share, 1995). Share (1995) stated that trying to read without phonological recoding becomes an exercise of reading logographs, equivalent to memorizing lists of telephone numbers. Memorising is untenable for the demands of reading many thousands of words and complex text. In addition, memorising words does not utilise the phonological-orthographic affordances of an alphabetic language.

### ***Phases of word learning***

Some code-based researchers consider mastery of word learning as a gradual process that can be described in phases of word learning (Ehri, 1992; Gentry, 1982; Read, 1971, 1986; Share, 1995). Phases of word learning outline that

learners first respond to words as logographs, associating a symbol with its meaning (EXIT and STOP signs, the golden arches for McDonald's, car model symbols, a child's own name). At this point, children do not necessarily have or use any alphabet knowledge to recognise the words or symbols. Ehri (1992) showed that pre-readers (pre-alphabetic phase) lacked any sensitivity to strings of letters and could not identify likely patterns from unlikely. Once children begin to match letters with the sound (phonology) associated with them, they use partial word cues to approximate a word in reading or spelling (partial alphabetic phase). The skills a child develops in matching phonology to orthography are vital for further progress as a reader.

Success in reading requires that learners gain a more complete control of the alphabetic principle. In the full alphabetic phase, the child must engage in analytic processing and be aware of the interrelatedness of the patterns in words (Tunmer & Nicholson, 2011). Learners use more of the sub-lexical units in a word and set these connections in the memory (Ehri, 1992). In this phase, the consolidation of alphabetic coding skill marks success in reading and spelling a large number of words.

An understanding of phases of word learning can be used for considering a suitable progression for teaching word recognition skills. The types of words a child can process in early word learning are those with simple phoneme to grapheme correspondences. In support of the gradual development of these correspondences, Share (1995) found that young skilled readers made fewer errors and read faster when words were regular consonant-vowel-consonant (c-v-c) words with a consistent short vowel pattern. Readers made more errors reading

words with vowel teams that result in a long or variable sound of the vowel. Share hypothesised that the first act in reading was the ability to segment a c-v-c word into its components and then blend the components to read the words. As children mastered early skills, they were able to read words with vowel digraphs that were dependable such as 'ee' or 'oa' more easily and readily than the context sensitive combinations such as 'ea' (read/read) and 'ow' (cow, mow). Recognition of larger chunks in a word showed a learner's progress, for instance, in being able to process words by onset-rime (c-vc such as b-at or c-vvc such as b-oat). Using an onset-rime approach is a more sophisticated skill and can be difficult for early learners (Ehri, 2014).

Share (1995) proposed that each successful decoding encounter with an unfamiliar word provides an opportunity to acquire the word's specific orthographic information, which has a role in self-teaching. The foundation in word learning is vital to further success in reading as it provides a kick-start for further learning to occur (Arrow & Tunmer, 2012; Byrne, 2005; Dehaene, 2013; Ehri, 2014; Juel & Minden-Cupp, 2000; Share, 1995). Teaching early reading requires a focus on the alphabetic principle, where children learn to associate the phonemes in spoken words with the graphemes of print.

In contrast to theories that propose that learning to read is natural, studies have revealed that learners do not automatically induce the rules about print by being immersed in it. In transfer task studies, researchers taught children to read pairs of words (e.g., *fat*, *bat*) and then asked if a written word was *fun* or *bun* (Byrne & Fielding-Barnsley, 1990). The studies showed no evidence of children inducing the alphabetic principle from knowing one pattern to using that

information for a new pattern. Children need knowledge of the alphabetic principle to generate more knowledge about the code. Code-based teaching approaches, where teachers direct learners to look closely at the letters and spelling patterns within words, provide learners with the foundation that subsequently engages the self-teaching mechanism (Juel & Minden-Cupp, 2000; Share, 1995, 2008).

### ***Summary of theories***

The above section outlined that efficient reading involves the translating of orthographic symbols of print into spoken words. Ensuring children understand the link between orthography and phonology is vital for teaching children to read. Recent neuroimaging studies (Dehaene, 2013) have confirmed the understanding of these earlier models. The view is consistent with the research for connectionist and dual route models of reading and positions learning to read as involving mastering the connections between the orthography of print and the phonology of spoken language. The models of efficient word reading are important for considering how children learn to read and the best teaching approaches.

The reviewed literature highlighted two contrasting theories about learning to read. The views of reading as 'top-down' or 'bottom-up' processing come from opposing theoretical positions that explain reading in different ways. An analysis of the studies showed that top-down processing or a meaning-based approach can place poor readers at risk of underachieving in learning the code of reading. The reviewed studies and the two opposing views suggest that teachers need a clear model of reading to use for effective teaching of reading for all students.

## **A model of reading as code and meaning components**

The current study considers a model of reading, the Simple View of Reading (SVR), that combines meaning and code components. In the SVR, Gough and Tunmer (1986) proposed that, while learning to read is not simple, the simplest way to define reading comprehension is the interaction of two main components: decoding (D) and language comprehension (LC). The language comprehension component involves skills for deriving meaning from spoken language, such as understanding sentence structure and vocabulary. The decoding component involves the code-based skills needed for matching written symbols to spoken words for success in reading words. Decoding enables a reader to read the word and language comprehension enables the reader to understand what they read. The components combine to ensure meaning is gained from print, which is the ultimate goal of reading.

The SVR model proposes that both components are vital for success as a reader. The factorial equation of Reading Comprehension ( $RC = D \times LC$ ) indicates that as one of the components reaches perfection, reading comprehension will be determined by the level of skill in the other component (Hoover & Tunmer, 2018). As an example, a beginning reader would generally have stronger language comprehension relative to decoding ability because they have had experience in speech but not in reading print. Hoover and Tunmer (2018) explain that the relatively weaker decoding skills in younger children constrain the relations between LC and RC. Once decoding is mastered, a child can read anything they can comprehend in speech, so their reading is only constrained by the ability to apply language comprehension and their background knowledge to the words read.



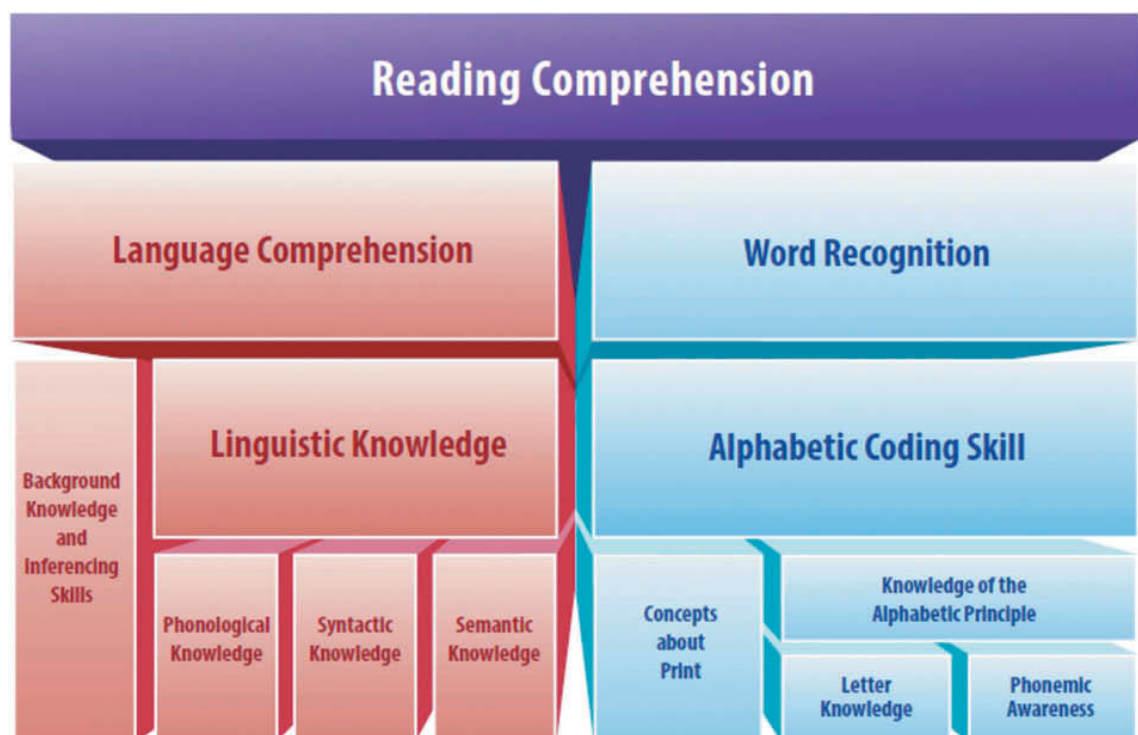
The SVR provides a robust explanation of reading at the broadest level of analysis (Hoover & Tunmer, 2018). However, the SVR does not explain the underlying sub-components involved, nor the processes that need to occur for a reader. The Cognitive Foundations Framework (CFF) (Tunmer & Hoover, 2019) expands the two key components of the SVR to clearly show the skills that underpin each component and that are foundational to the development of skilled reading.

In the CFF, the role of language comprehension is described as requiring competence in linguistic knowledge and background knowledge. Background knowledge is vital for understanding the context of a spoken or written text. Linguistic knowledge refers to knowledge of the language being read or heard and is dependent on sub-skills of knowledge for hearing the sounds in words (phonology), sentence structure (syntax), and vocabulary (semantics). The role of the language comprehension component highlights the importance of exposure to rich language environments. Beginning readers are likely to have more knowledge of the language comprehension component than the word recognition component.

Word recognition is the ability to read words accurately and automatically. Success in word recognition is dependent on the skills of alphabetic coding, where a reader can map letter patterns onto phonological forms of the word (Shankweiler & Fowler, 2004). A reader must make connections between the phonemes (speech sounds) and graphemes (the letter or letter combinations) to identify unfamiliar written words and acquire word-specific knowledge (Ehri, 1998, 2005, 2014; Snow & Juel, 2005; Tunmer & Nicholson, 2011). Importantly,

each successful identification of a word strengthens the word-specific sub-lexical connections needed for securing the letter sequence in lexical memory.

In contrast to the top-down view, the CFF describes how the interaction of the two components with their sub-components creates success in reading. Tunmer and Hoover (2019) explain that the CFF has a hierarchical structure, with foundation skills essential to developing higher-order skills. In addition to the hierarchical structure, each element develops concurrently with the element above and the one below in a reciprocally facilitating way. Higher order skills are better developed when the lower order skills form a strong foundation. Figure 1 shows the components of the Cognitive Foundations Framework.



*Figure 1. Cognitive foundations of learning to read (Tunmer & Hoover, 2019)*

The Simple View of Reading and the CFF provide an important background to the current study. The models identify that both word recognition and language

comprehension are necessary for success in reading. The Cognitive Foundations Framework clearly shows the skills needed for readers and provides direction for teaching practice.

## **Teaching practice**

The two contrasting theories about reading give rise to two main approaches to teaching reading. A top-down view of reading gives rise to teaching approaches that emphasise the higher-level processes of comprehension over direct teaching of word-level skills. The teaching is a 'whole-to-part' approach, where it is assumed children learn about the parts of words by starting from the whole word. A 'bottom-up' view emphasises teaching that ensures that foundational skills for learning to read print are mastered for fast and accurate decoding (Perfetti, Liu, & Tan, 2005; Snow & Juel, 2005; Vellutino & Fletcher, 2005). The teaching is 'part-to-whole' as it is based on the premise that word knowledge is built from letters to words. The different theories of reading and the practices associated with them are discussed below.

An approach based on a bottom-up view prioritises a code-based approach with explicit and systematic teaching of the alphabetic principle as the access point to effective reading. Successful teaching involves ensuring children secure phoneme to grapheme correspondences as the foundation to success in reading. Hoover and Tunmer (2018) explained the importance of approaches that ensure an early mastery of the skill of decoding to release cognitive resources for the reader to obtain meaning from text.

A code-based approach promotes explicit teaching with a carefully planned sequence of steps, where the teacher explains and models new learning (Hempenstall, 2016). Explicit teaching of the code component would involve a systematic progression that guides the teaching of code-based skills that are applied to the independent reading of a text. In explicit instruction, teachers provide instructional scaffolding by carefully sequencing content, considering working memory capacity, using clear descriptions and demonstrations, and gradual release from high levels of teacher support to more child controls as success is evident (Brophy & Good, 1986; Rosenshine, 2012).

In contrast, top-down teaching uses context as the driver of the reading process. Aitken, Villers, and Gaffney (2018) proposed that children develop knowledge about words as a by-product of immersion in literacy activities, rather than needing any direct or explicit teaching. Learning to read in a context-based approach is promoted as more effective when learning happens incidentally and implicitly, with a teacher as guide or facilitator (F. Smith, 1971, 1992; Weaver, 1988) while they read a text at their instructional level (Clay, 2005; J. Smith & Elley, 1997). The incidental approach means there is no structured or systematic system to follow but just as occurs in a child's writing or reading.

A context-based view of reading relies on and uses a multiple-cues approach where a reader integrates a variety of cue sources (semantic, syntactic and orthographic information) to successfully read the words in a text (Clay, 2005; Ministry of Education, 2003; Pearson, 1978; J. Smith & Elley, 1997). In particular, information from meaning and sentence structure sources is positioned as driving

the child's success in reading; using the detail of the word itself is seen as a last resort (Clay, 1998; Goodman, 1976; F. Smith, 2004).

Examples in the teaching handbook *Effective Literacy Practice in Years 1 to 4* (Ministry of Education, 2003) show the promotion of a multiple cues approach. One example in the book states that in the sentence "*The wolf woke up*", the child is attempting the word 'woke'. The reader "recognised that the sentence structure required a verb and the word began with a 'w' so she tried walked" (p. 30). The attempt is considered successful after using sentence structure cues in the first instance and only the first letter of the word to select a word that makes sense. The example continues with a description of the child's self-correction: "The next word was familiar and the child realised that 'walked up' would not make sense in this context so she self-corrected to woke up" (p. 30). The handbook does not mention the print detail, even though the word 'woke' should be decodable for a child reading at this level, and a decoding strategy would have been more efficient.

The example confirms the belief that readers only need to use as much print detail as necessary (Clay, 2005; Ministry of Education, 2003) and that readers should be taught to use information simultaneously. The handbook examples show that teachers have been directed to use teaching approaches that promote context or multiple cues rather than mastery of the code. The multiple-cues view suggests that readers selectively use a range of information to make predictions for upcoming words in the text. Clay (2005) stated that because most written language occurs as continuous text, the focal task is to use a problem-solving approach to obtain the message of the text. Clay proposed that successful reading involves extensive problem-solving rather than use of "word-solving tricks" (p. 101), such

as alphabetic decoding. Problem-solving is described as finding and relating information from different sources to construct a decision for reading an unfamiliar word.

Critiques of multiple cues, sometimes called the three-cueing model (Adams, 1998) or the searchlights model (Rose, 2006), suggest that the guidance promotes inefficient reading strategies (Adams, 1998; Hempenstall, 2003; National Reading Panel, 2000; Rose, 2006; Rowe, 2005). Hempenstall (2003) stated that the ready acceptance of the three-cues model should not be treated lightly because of its continued influence on the teaching of reading and the impact this has on reading outcomes. Weaker readers who are instructed to direct their attention away from print detail and to use context cues will form unproductive reading habits that are difficult to change. Adams (1998) argued that the multiple cues system is discrepant with what is known from the scientific studies of learning to read.

The suggestion that a reader can use context to read words relies on the concept that not all information in written text needs full attention because written language has redundancies and, therefore, a reader can use prediction. However, evaluations of scripts have shown an overall predictability rate of only 29.5% (Finn, 1977). Low predictability occurs because context words carry the most meaning in a sentence but are only 10% predictable (Gough, 1985). Information loaded words are relatively unpredictable in prose resulting in contextual guessing being least helpful where it is needed most (Schatz & Baldwin, 1986; Share, 1995). Gough (1996) suggested that given that most content words are not predictable, context might be a false friend.

While some children learn to read successfully through an implicit and multiple-cues approach to reading, explicit and code-based instruction is essential for the reading success of beginning readers, struggling readers, and children from disadvantaged backgrounds (Connor, Morrison, & Katch, 2004; Connor et al., 2011; National Reading Panel, 2000; Snow et al., 1998). A number of studies have reported that explicit instruction is superior to discovery learning for equitable outcomes (Hattie, 2009; Kirschner, Sweller, & Clarke, 2006; Marchand-Martella, Martella, Modderman, Petersen, & Pan, 2013; Snow et al., 1998). Discovery learning approaches have reported weak effect sizes below the 0.4 benchmark, which was set as showing real word impact (Hattie, 2009). In contrast, explicit instruction has been shown to have an effect on reducing disparities in score distributions (Foorman & Torgesen, 2001; Gillon et al., 2019).

### ***Teaching materials***

The different teaching approaches require appropriate support materials. The type of instructional texts used is highly influential on how a teacher can teach using the text and if the texts provide learners with an opportunity to apply their developing reading skills in context. Three main types of texts can be considered as useful in children's mastery of reading. Decodable texts emphasise the use of words that are phonetically regular and include sequenced progressions of letter-sound combinations. These texts are designed to keep decoding challenge within controlled orthographic patterns and allow learners to master the sub-lexical units gradually. Predictable texts use repeated sentence structures, which gives an opportunity to acquire sight word maps of high frequency words. Natural language texts and general children's literature books provide children with opportunities

to apply their reading skills broadly, once the early foundations are laid (Solity & Vousden, 2009).

An implicit teaching approach uses resources that have sentence structure and vocabulary as close as possible to general spoken language and are not limited to using words that are easily decodable. These texts are designed to support learners to utilise a multiple cue approach to read texts, and to learn about decoding incidentally within the context of reading a text. Texts may be natural language or use a repeated and predictable sentence structure on each page.

In contrast, explicit teaching of the code in a systematic and sequenced way requires texts that are controlled for orthographic patterns. These decodable texts provide opportunities for beginning readers to apply their developing decoding skills in the context of connected text (Adams, 1990; Cheatham & Allor, 2012; Ehri & McCormick, 1998). These texts, with a high percentage of easily decoded words, help children build a foundation of grapheme phoneme correspondences (GPCs) and high frequency words as sight words. As children master the foundation skills and succeed with reading decodable texts, they can access authentic children's literature as the material for improving a wider range of reading skills (Snow et al., 1998; Solity & Vousden, 2009).

Careful selection of texts is important for effective teaching of beginning readers, with teachers needing to consider the lesson-to-text match (Mesmer, 2001). The match is measured by the degree to which the text matches the skills taught in the lesson. Criteria for a lesson-to-text match include the text's predictability, the introduction of high frequency words, or the overall decodability to support learning readers (Mesmer, 2010). Decodable texts allow learners to



apply new knowledge, practice skills, and to experience success as a reader.

Hatcher, Hulme, and Ellis (1994) found that phonics teaching was more effective when children had immediate opportunities to apply what they have learned to their reading. However, Castles et al. (2018) warn that beyond the early stages of reading, the benefits of decodable texts are likely outweighed by the limitations of language and sentence structures. More research is required to establish the optimum use of different types of texts.

In addition to appropriate instructional texts, teachers require a well-structured and supportive curriculum that considers the complexities involved in teaching reading and the varying student needs in any classroom (Fuchs et al., 2001). Foorman and Moats (2004) reported that teachers welcomed pacing guides, lesson plans, and lesson scripts and did not find these limiting to their teaching. These studies found that using directed and scripted resources resulted in a consistency in teaching, which has been linked to improvement in student outcomes (Foorman et al., 2003; Fuchs et al., 2001).

### ***Summary of teaching approaches***

Different views of reading give rise to different teaching approaches. A top-down view of learning to read prioritises context-based reading opportunities, with a multiple cues approach to teaching reading favoured as key to success in reading. In contrast, a bottom-up view prioritises the teaching of how the printed code works. The reviewed studies show that explicit teaching and an emphasis on the code component of reading are important for beginning readers as print mastery is new to children beginning school. In particular, to efficiently learn the code of English orthography, most learners require assistance to learn and master

the complexity of print. Teachers need to understand how children learn to read and need knowledge of how the code of written English works for optimum teaching for each learner.

## **Teacher knowledge**

Explicit teaching of the code requires explicit teacher knowledge about orthography. As an alphabetic script, mastery of English orthography dictates the need for complete or near-complete processing of the orthographic detail (Share, 1995; Stahl, 1997). For this teaching to occur, teachers need a specific knowledge of the English code and how to teach it. Many researchers have suggested that the knowledge teachers need to teach beginning reading is extensive and should not be under-estimated (Brady & Moats, 1997; Lyon & Weiser, 2009; McCutchen et al., 2009; Moats, 2009; Podhajski, Mather, Nathan, & Sammons, 2009; Spear-Swerling, Brucker, & Alfano, 2005; Washburn, Joshi, & Binks-Cantrell, 2011). Moats (2009) reported that teachers' content knowledge must include a deep knowledge of basic language constructs (phonology, phonemic awareness, alphabetic principle, phonics, and morphological awareness). Knowledge in these constructs is needed for teachers to understand decoding problems, which underlie most of the difficulty experienced by students at primary grade level (Snow & Juel, 2005).

Studies evaluating teachers' knowledge about orthography have revealed lower than optimum levels of knowledge for effective teaching of beginning reading. The levels are an indication that content knowledge is, as Shulman (1986) has suggested, the missing paradigm for teachers. Low linguistic knowledge in *phonemic, phonologic, phonic, and morphologic* constructs was found in an early

study by Moats (1995). This result has been replicated in more recent studies, both in New Zealand (Carroll et al., 2012; Chapman, Greaney, Arrow, & Tunmer, 2018; McNeill & Kirk, 2013; Nicholson, 2007) and internationally (Bos, Mather, Dickinson, Podhajski, & Chard, 2001; Cunningham et al., 2004; Cunningham et al., 2009; Foorman & Moats, 2004; Moats, 1995; Piasta et al., 2009; Spear-Swerling & Brucker, 2003; Washburn et al., 2011). The studies generally reported low knowledge in constructs identified as important for teaching early reading.

Generally, the studies have reported mean scores in a moderate range for teachers' knowledge in the construct of *phonemic* knowledge (Bos et al., 2001; Carroll et al., 2012; Cunningham et al., 2004; Stainthorp, 2004; Washburn et al., 2011). The studies reported that teachers were generally able to count phonemes in words that have a transparent phoneme-grapheme match. Common errors occurred where words had a less transparent phoneme-grapheme match (e.g., *through*, *box*). Across the studies it was generally found that teachers' *phonological* knowledge was of a high level (Binks-Cantrell, Washburn, Joshi, & Hougen, 2012; Bos et al., 2001; Stainthorp, 2004; Washburn et al., 2011). High levels of *phonological* knowledge may come from ability in spoken language, for example in the ability to count syllables in a word. The possibility that the knowledge is more generally accessible is supported by a study that found a group of pre-trained teachers had the same skill in counting syllables as trained teachers, whereas pre-trained teachers had lower scores for phoneme counting (Stainthorp, 2004).

The studies reported lower levels of knowledge in explicit knowledge of the term *phonological awareness*. For example, Bos et al. (2001) reported that most teachers incorrectly selected that the term *phonological awareness* referred to a

method of teaching reading, rather than understanding how spoken language is broken down. Across the studies, many teachers appeared to assume that the terms *phonological* and *phonemic* were synonymous with *phonics*, rather than as emerging prior to phonics as an important foundation for the alphabetic principle. The error shows a common misunderstanding of key terms that are fundamental to teaching beginning reading and common to many teaching textbooks (Cunningham & O'Donnell, 2015).

Low or moderate mean scores in *phonic* knowledge were common to a number of studies (Bos et al., 2001; Moats, 2009; Washburn et al., 2011) with many teachers unable to identify particular spelling pattern or distinguish between terms such as consonant blends and digraphs (Carroll et al., 2012). *Morphological* knowledge was the lowest mean score across studies, with most teachers unable to define a morpheme or count morphemes in words (Moats, 1995; Piasta et al., 2009; Washburn et al., 2011).

Content knowledge and knowledge of students combine in effective teaching. Knowing how students make progress through the phases of word learning (e.g., Ehri, 1992, 1995) can provide a map for teaching the code component of reading. The phases help teachers to identify the learning and instructional needs, to keep teaching and learning goals in mind during teaching, to monitor if instruction is contributing to progress, and to consider modifications that improve the lesson's effectiveness (Moats, 2009; Serry & Oberklaid, 2015). This is particularly important for teaching children who experience difficulty with learning to read. For example, poor readers need larger amounts of specific teaching to advance from the partial to full alphabetic phase of word learning

(Tunmer & Nicholson, 2011). An understanding of phases of development may act as an enabler to effective teaching and improved student outcomes.

Teacher knowledge and understanding the child's learning are essential for effective teaching. Clay (2005) proposed that teachers needed to "be alert to detect the difference between what analysis of sounds will move the child forward and what might confuse the child" (p. 76). As an example of using knowledge to select appropriate examples, a teacher with knowledge of final consonant blends, such as the -nk in *bunk*, would be able to correctly select the sub-lexical units of *b-u-nk* rather than incorrectly selecting *b-un-k* (McCutchen et al., 2009). A teacher who knows that the grapheme 'x' involves the phonemes /k/ and /s/ is positioned to assist a learner who spelled the word *exit* as 'eksit' (Cunningham & O'Donnell, 2015). Similarly, linguistic knowledge in morphemes helps a teacher assist a child who is writing the word 'dogs' with a letter 'z' in the position for the plural -s. These examples illustrate that improved linguistic knowledge is necessary for effective teaching for beginning readers.

### ***Summary of teacher knowledge***

The review of studies shows that teachers require a high level of explicit knowledge in linguistic constructs to effectively teach beginning reading. Many studies also show that in general, teachers have gaps in their knowledge of the linguistic constructs, which would limit the explicit teaching of the code component. Student outcomes are improved when teachers' knowledge is explicit (Connor et al., 2004; Moats, 2014) and, therefore, examining the knowledge of participating teachers will form an important part of the current study. An

important part of the study will be examining the change that is possible in teacher knowledge after specific PLD.

### **Relationship between teacher knowledge and teaching practice**

The connection between teacher knowledge and teaching practice is not necessarily direct or causal and a change in one variable does not necessarily correlate with a change in the other (Cirino, Pollard-Durodola, Foorman, Carlson, & Francis, 2007; McCutchen, Harry, et al., 2002; McCutchen et al., 2009). Cirino et al. (2007) found that teacher quality (instructional strategies, classroom management and organisation, presentation of subject matter, and learning environment), rather than teacher knowledge was positively related to student engagement and the optimal use of instructional time. However, Connor et al. (2014) warned that greater levels of instructional time were only useful when teacher knowledge was high. Piasta et al. (2009) found that showing teachers how to change practice meant teachers may be able to implement some suggested practices, but these were less effective than when knowledge also increased (Piasta et al., 2009). A combination of teacher knowledge and ability to implement the knowledge in practice is vital.

The purpose of promoting an increase in teacher knowledge and a change to explicit teaching practice is to improve outcomes for students (Connor et al., 2014). Increased teacher knowledge about the reading process and about the English code enables teachers to teach explicitly. McCutchen, Abbott, et al. (2002) reported that students make a faster start in reading and writing when teachers offer explicit instruction in key components of literacy.

## Teacher change

Any solution for improving reading outcomes involves considering the current situation for teachers' knowledge and teaching practice to compare with what the research says about optimum knowledge and practice. The comparison may reveal the need for change, but change is associated with many challenges. It is apparent that some teachers make successful change to practice during PLD and others don't, but the reasons for the difference is not well understood (Connor et al., 2011).

Initiatives designed to create change in instructional practices may encounter many different barriers and will need to consider the required support. A number of supports and challenges can be identified from a review of previous studies.

Teaching occurs within a social environment and this can be both an enabler for change and a barrier. Teachers are likely to teach in ways promoted by the school they teach in and the colleagues they teach alongside (Fives & Buehl, 2012) and change in isolation of colleagues can be more difficult than change in a community. Communities of practice (Wenger, 1998) can provide teachers with a structure to learn, trial, and discuss proposed changes to practice. However, teachers need to feel that the environment is safe for change, otherwise they will continue with previous teaching approaches (Goleman, Boyatzis, & McKee, 2001). A particular barrier can occur when an influential teacher does not agree with the proposed change (Robbins, 2000). Robbins (2000) found that power relationships

in a school can make change difficult especially if change is perceived as a threat to an expert status or a change in resource allocations.

Further barriers arise when standardised curricula and assessments dictate what is taught (Swan & Swain, 2010) and when resources support the existing practices rather than the changes to practice (Mesmer, 2010). An example of the effect of curricula, assessments, and resources is the systematic review of the teaching of reading that occurred through the Rose report (2006) in the United Kingdom. The Rose report recommended the replacement of the commonly used searchlights (three-cueing) approach to teaching reading in favour of using the Simple View of Reading. The use of synthetic phonics was advocated and a phonics screening check introduced to assess whether students have mastered grapheme-phoneme correspondences in their first year at school (Castles et al., 2018). These curriculum level changes act as enablers for teaching reading in a systematic and structured way.

Teachers' beliefs are an important consideration in implementing a change. A belief can be described as something an individual regards to be true (Ajzen & Fishbein, 1980). The belief may be about their ability as a teacher (Tschannen-Moran & Johnson, 2011), which has an effect on how they teach and what they prefer to spend time teaching. Teachers also hold beliefs about the nature of learning and teaching and how this occurs for a specific subject (Behrmann & Souvignier, 2012; Pajares, 1992; Peterson, Fennema, Carpenter, & Loef, 1989). Peterson et al. (1989) defined beliefs about instruction specific to the topic as pedagogical content beliefs. Teachers' beliefs that affect approaches to teaching



can be classified as being on a continuum from a constructivist orientation to a direct-transmissive orientation (Staub & Stern, 2002).

Pedagogical content beliefs about reading and about the best methods of teaching shape instructional decisions. Some studies have found a teacher's constructivist beliefs to be associated with beneficial student achievement (Staub & Stern, 2002). However, most importantly, when low achieving students were included in a study, Behrmann and Souvignier (2012) found that teacher belief associated with a direct-transmissive approach was positively related with student achievement.

The goal of making a difference to student outcomes can be used to create a sense of urgency and develop a vision (Connor et al., 2004; Robbins, 2000) and as an impetus for change. In support of this view, Guskey (1986) reported that a change in beliefs can be a consequence of a change in teaching that had a positive effect on student outcomes. Marzano, Waters, and McNulty (2005) described using student achievement data in a way that supports teachers to be accountable without threat. While it can be tempting to find blame for low achievement in factors outside of the school, such as the home or the child, if data are used to provide a teaching goal that will make a difference for students, this can be an impetus for change (Marzano et al., 2005). The inclusion of student assessment keeps the reflection focused on improving literacy for low achieving priority learners (Vescio, Ross, & Adams, 2008), providing a feedback loop for the changes made to practice (Knight, 2009).

Beliefs act as a filter through which new learning is interpreted, indicating beliefs may be stronger than knowledge as a predictor of action (Nespor, 1987).

According to Cobb, Wood, and Yackel (1990), the link from beliefs to behaviour is not necessarily directly causal in either direction, but rather involves a continuous interplay between beliefs and practice. Change may require reconsidering long-held beliefs and practices. If particular beliefs have been held for a length of time, teachers may view being asked to change as a challenge to how they identify themselves (Heifetz & Linsky, 2002).

Change may be supported by professional learning and development opportunities for teachers. A number of models provide guidelines for promoting change and development (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Fullan, 1982; Guskey, 1986; Richardson, 1996; Timperley, 2008). Most of the models include an interaction among key dimensions, such as an initial input event, teacher knowledge and beliefs, teaching practice, and student outcomes (Clarke & Hollingsworth, 2002; Desimone, 2009; Fullan, 1982; Guskey, 1986; McMeniman, Cumming, Wilson, Stevenson, & Sim, 2000; Speck & Knipe, 2005; Timperley, 2008). The initial input event may promote a change to teachers' knowledge, which can be applied to a change in practice (Fullan, 1982). A change to practice may positively affect student outcomes, which can influence a change in teacher beliefs (Guskey, 1986).

Teachers' specialised knowledge is necessary and has a positive influence on student outcomes, but it is likely that teachers require support and guidance to apply new knowledge to classroom practice (Arrow, Braid, & Chapman, 2019; Connor et al., 2014; Vernon-Feagans, Kainz, Hedrick, Ginsberg, & Amendum, 2013). Arrow et al. (2019) found that teacher knowledge alone was not sufficient for teachers to implement a systematic approach to teaching reading. While teachers

benefitted from increased teacher knowledge, the curriculum context they worked within made it difficult for them to make the suggested change to a systematic approach. The study by Arrow et al. (2019) suggests the importance of a supportive curriculum for teachers to make the required changes. Vernon et al. (2013) suggest the addition of coaching to PLD to improve instruction. Together the findings of these studies indicate that teachers need a range of supports to make the necessary change to practice.

### ***Summary of teacher change***

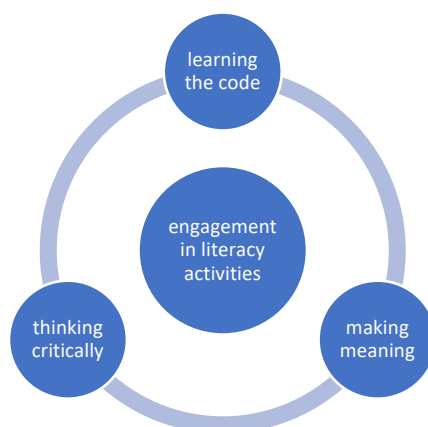
The reviewed literature shows that change is complex and multifaceted. A number of influences require consideration in asking teachers to make changes to practice. The studies show that the school context, colleagues, student achievement, and teachers' self-belief need to be considered. In addition, long-held beliefs related to knowledge and pedagogy and the curriculum context will affect teachers' ability to make change. A range of factors must be considered to successfully enact change.

### **New Zealand teachers' knowledge, practice, and beliefs**

As outlined in the previous chapter, data show that New Zealand has a problem with equity in reading outcomes. National Standards and PIRLS data show that New Zealand has high levels of variability in outcomes between good and poor readers. Rates of achievement for students of Māori and Pacific backgrounds and students from low socio-economic neighbourhoods have remained stable over decades (Prochnow, Tunmer, & Greaney, 2015), with 30% of students continuing to be at risk of underachievement. The data show there have

been no significant overall increases in achievement, nor any decreases in the gap between the achievement of good and poor readers in the last three PIRLS cycles. This gap in achievement is somewhat surprising because schools are well resourced, a large amount of government money is spent on education, and the education system is relatively uniform across the country (Prochnow, Tunmer, & Greaney, 2015). Given the anomaly between achievement results and the highly resourced system, the current study examines how the approach to teaching reading contributes to student outcomes.

Teaching of reading in New Zealand has been dominated by a pedagogy of constructivism. The view is exemplified in the framework for literacy acquisition (Ministry of Education, 2003). The framework describes three aspects for literacy learning: learning the code, making meaning, and thinking critically. The three aspects are positioned as developing together. The cycle diagram in Figure 2 does not suggest a particular entry point or emphasis at any particular part of learning.



*Figure 2. A framework for literacy acquisition in the handbook Effective Literacy Practice in Years 1 to 4*

In New Zealand, teaching of reading is predominantly context-based and implicit rather than code-based and explicit teaching. The top-down and constructivist views are exemplified in the dominance of a multiple-cues approach in New Zealand practice. A multiple cues influence is evident in the *Effective Literacy Practice in Years 1 to 4* handbook (Ministry of Education, 2003) which stated that “fluent readers and writers use all available sources of information simultaneously and unconsciously. Beginning readers and writers need to be taught to draw on these sources and to use them efficiently” (p. 30). The suggestion that a reader uses all sources of information simultaneously highlights the difference between practices promoted in New Zealand and the studies that have shown that explicit teaching of the code component is essential.

### ***Reading resource materials***

Teaching approaches that follow a top-down, constructivist view as key to learning to read require instructional texts based on story and natural language. In New Zealand, the original *Ready to Read* book series was developed in reaction against teaching methods considered archaic with books that put “phonics ahead of common sense and literary value” (Price, 2000, p. 29). The series prioritised a recognised story structure, a gradual introduction of reading vocabulary, and a close match of picture to text to ensure high levels of support for a child’s reading attempts (Randell, 2000). Changes to the series through the 1980s resulted in a move away from controlled introduction of words and highly predictable sentences to an emphasis on using the storyline and sentence structure to read a text (Connelly, Johnston, & Thompson, 2001). The updated books require a teaching approach that uses a clear and robust introduction to the text (Ministry of

Education, 2014) so learners can use semantic, syntactic, and orthographic cues in combination to engage in reading a text. They are not intended for teaching in a structured way about grapheme to phoneme matching.

Further examples of the predominant view are found in the materials that support the *Ready to Read* levelled book series (e.g., Ministry of Education, 2015). The teacher support notes include more than 90% of suggestions for utilising and advancing the story meaning and less than 10% for any teaching or specific use of the code. In addition, the indicators in the *Literacy Learning Progressions* (Ministry of Education, 2010) are broad and lack a systematic sequence to follow. The Reading Recovery<sup>3</sup> teachers' handbook, *Literacy Lessons Designed for Individuals* (Clay, 2005, 2016), states that without a linguist's knowledge, teachers might have difficulty selecting appropriate examples to use for teaching. However, the handbook does not provide teachers with in-depth knowledge of phonologic and orthographic connections meaning that teachers trained as literacy specialists are underprepared to teach the code component of reading.

Teachers teach the way they have been trained to and they cannot teach beyond what they know (Applegate & Applegate, 2004). The current study will examine practice of a group of teachers to identify the approaches most commonly used in light of what is shown has dominated in New Zealand and what research has revealed is optimum for teaching reading.

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<sup>3</sup> Reading Recovery is a one-to-one tuition designed in New Zealand by Marie Clay. It provides opportunities for acceleration to children who do not make expected reading progress after one year of school.

### ***Summary of the New Zealand approach***

For many years, New Zealand has had a top-down approach to teaching reading. Unfortunately, a top-down approach has been shown in studies to be ineffective for many learners (Nicholson, 2000). The predominant approach, taken together with evidence of inequity in reading outcomes over two decades, suggests a need for change in the teaching of reading. Change for New Zealand teachers will be affected by the expectations of curriculum and assessments as well as by the resources available for teaching reading. Effective change will involve teachers having knowledge about reading and the English language, including the training available at both pre-service and in-service level. The current study's research questions are designed to examine teachers' knowledge and teaching practice and any change that occurs during an implementation of PLD.

### **Chapter summary and Research Questions**

The literature review has presented theories of how children learn to read and studies on the effective teaching of reading. The models of the Simple View of Reading and the Cognitive Foundations Framework showed the importance of both a code and language component to success as a reader. The nature of teaching of reading in New Zealand has been largely implicit, with an emphasis on meaning rather than any explicit or systematic teaching of the code. The long-term domination of top-down theories and context-based implicit teaching approaches is supported by the provision of instructional texts that require a multiple-cues approach. In contrast, research has suggested that equitable reading outcomes

occur when teaching is explicit and there is a systematic approach to teaching children the code component of reading.

The literature review showed that teachers' code related knowledge along with relevant instructional practices are essential for optimum student outcomes. Teachers need an understanding of the orthography of English and its implications for the teaching of reading. Studies have shown that there are gaps in teachers' knowledge of English orthography and the current study will examine in a New Zealand context whether this is the situation for a group of New Entrant teachers. While many studies have examined teacher knowledge, there is little research on how PLD affects change to teacher knowledge for teaching beginning reading. For this reason, the study will examine teachers' knowledge prior to and after evidence-based PLD, with a focus on building orthographic knowledge (RQ 1).

Studies reviewed in this chapter showed that implicit teaching has a negative effect for many beginning readers. The current direction promoted in New Zealand and the resources available to teachers make it difficult to implement teaching the code component of reading in an explicit and systematic way. Therefore, the study is designed to examine current teaching practice for the code component and any change that occurs after the PLD that promoted explicit and systematic teaching (RQ 2).

The dominance of a particular way of teaching reading may be a barrier to teachers changing their practice to a more explicit and code-based approach. The literature review identified that other influences may be barriers to change, such as the available resource, expected practices, influential colleagues, and teacher beliefs. Change is also supported by particular influences, such as colleague and



resource support and a change to student outcomes. As it is unclear why some teachers change and others do not, the current study will examine barriers and enablers to a change to explicit teaching (RQ 3).

Improvement in student achievement is the ultimate aim for changes to teaching. The current reading outcomes data for New Zealand students reveal the ongoing inequity in achievement between groups. The reviewed literature suggested that a change to teacher knowledge and practice is important for a change to outcomes for students. However, there is a lack of studies on the effect of a change to knowledge and practice on beginning reading outcomes. The use of an implementation and comparison group in the current study provides an opportunity to show any differences between groups as a result of PLD in explicit teaching of the code (RQ 4).

Based on the gaps identified in the literature, the following research questions are used for the current study.

- 1. What knowledge and confidence do teachers have for explicit teaching in the code component of beginning reading prior to and after professional learning and development?*
- 2. What is the predominant teaching practice for teaching the code component during small group reading instruction, prior to and after the PLD?*
- 3. What do teachers find to be the barriers and enablers in teaching the code component of beginning reading?*
- 4. Do children whose teachers participated in professional learning and development in the code component of reading achieve better reading outcomes than children in a comparison group?*

The current study examines the influence of changes in teacher knowledge and teaching practice on reading outcomes, particularly for learners who have not experienced success. It uses and builds on recent studies of PLD in reading (Carlisle & Berebitsky, 2011; Cunningham & O'Donnell, 2015; Foorman & Moats, 2004; Piasta et al., 2009; Porche, Pallante, & Snow, 2012). The study uses the Cognitive Foundations Framework within a professional learning and development approach to examine the effect of providing teachers with knowledge, resources, and practices that have been shown to improve literacy outcomes. In addition, the study examines the enablers and barriers to change when teachers have long-held beliefs and practices in the area of teaching reading.

The current study examines teachers' knowledge and teaching practice, prior to and after the PLD. The PLD provided teachers with the opportunity to develop their knowledge of the English written code and promoted a change from implicit to explicit teaching practice in small group lessons. As a longitudinal study with a comparison data set for student outcomes, the study aims to evaluate the effect of any teacher change on student outcomes. The following chapter outlines the methods for carrying out the study to examine these connections.



## **CHAPTER THREE: METHODS**

### **Introduction**

The aim of the current study was to identify the teacher influences that enable successful reading outcomes for all beginning readers. The research questions outlined in Chapter Two arose from the literature review of studies in the teaching of beginning reading. The review showed the need for studies about teachers' knowledge of and practice in teaching the code component to beginning readers. The current chapter describes the methods used for the study, the participants, and the setting for the research. The design and methods are described, including each of the tools used to obtain data. Specific tools created for the study are explained. The data from each tool suggest a particular method of analysis.

### **The research context**

The current study was part of The Early Literacy Research Project (ELRP) funded by the New Zealand Ministry of Education (MoE) and undertaken in Massey University's Institute of Education (IoE) from 2015 to 2017. The main goal of the project was to examine the effect of a teacher PLD programme designed to

improve literacy learning outcomes of children in their first year at school. The particular focus of the project was on improving literacy learning outcomes for students who have disproportionately low levels of literacy achievement, such as those from low socio-economic, Māori, and Pacific backgrounds. The Project was designed for general classroom use and is expected to benefit all students, including students who are learning English as an additional language.

At the time of this study, a decile system was used in New Zealand to categorise schools according to the predominant socio-economic levels of the families in the school zone, with 10% of schools classified at each decile grouping from 1-10. The decile categories were used to distribute funds to schools that might need more assistance due to lower income of the families. The bands are useful in the current study because children from schools with lower decile rankings are over-represented in under-achievement data. In addition, decile groupings generally act as a proxy for ethnicity, as Māori and Pacific students are over-represented in lower decile bands.

The project was a longitudinal randomized control trial that occurred across the lower North Island of Aotearoa, New Zealand. Schools were randomly selected from a Ministry of Education list of schools that were likely to enrol eight or more new entrant children at the beginning of the year. The school selection process involved a stratified element to maximise the inclusion of lower decile schools as these are the students who have experienced long-term lower reading outcomes. The selection procedure involved an over-sampling of 38% in the lower decile range and an under-sampling of 28% in the highest decile range. The remaining sample was compiled of schools in the mid-decile band. The sampling

ensured that the study was not biased in favour of children who normally have higher reading outcomes and ensured a useful sample of lower decile schools in case of participant attrition.

The trial involved two cohorts, one in 2015 and the other in 2016. Once the schools had been selected and had accepted the offer of participation, they were randomly assigned to an implementation or comparison group. The implementation group of teachers received PLD on teaching reading and the comparison group of teachers did not participate in the PLD.

## **Participants**

In 2016, the comparison group from the previous year (cohort 1) was offered the opportunity to be involved as the implementation group of a second cohort; this is the group of teachers involved in the current study. A new comparison group was enlisted, composed of 2015 comparison schools that did not want to become part of the implementation, or schools that were specifically invited to participate as a comparison group.

The current study involved 26 teachers (24 females; 2 males) from the 12 schools involved as the implementation group in the second of two cohorts of the ELRP. Implementation group teachers attended five PLD workshops that focused on enhancing teacher knowledge of early literacy development and providing teaching strategies to supplement their regular classroom teaching. Comparison group teachers continued with their normal classroom literacy programme. Student data were obtained from the children (n=109) in the implementation classrooms and from a comparison group (n=61).

The implementation group reflected a typical range of teachers in New Zealand. Five teachers had a diploma level qualification and 21 had degree qualifications. In terms of years of teaching, four teachers had taught for fewer than 10 years, 16 teachers had taught for between 10 and 20 years, and five had taught for more than 20 years. The children were New Entrants who had started school between December 2015 and March 2016, on or close to their fifth birthday. A group of 61 children, in the same age bracket as children in the implementation group and whose teachers did not participate in the PLD intervention, formed the comparison group. The comparison group data are important to be able to suggest the effect of changes to teacher knowledge and practice on outcomes for students.

In the pilot year (2015) of the Early Literacy Research Project, teacher knowledge tests were administered online for both implementation and comparison group teachers, but the approach did not yield enough completed tests for data analysis. In 2016, the teacher knowledge tests were administered during the first and final PLD workshops to ensure improved collection rates. However, this approach resulted in no available teacher knowledge data for the comparison group teachers. Therefore, the use of comparison data from students whose teachers did not participate in the PLD relies on an assumption that the teachers of these students reflect typical range of teachers in terms of both teacher knowledge and teaching practice. An associated assumption is that the comparison teachers continued with business as usual.

The student participants are described according to gender, ethnicity and decile-band category. For the purposes of this study, decile rankings were grouped into three bands: low = decile 1 to 3; medium = decile 4-7; high = decile 8-10. The

implementation group had slightly higher numbers in the lower decile band due to the fact that the comparison group had no decile 1 schools and fewer decile 2 schools participating. The high decile band comparison group had more decile nine schools than the implementation group. Table 1 shows the percentage of students from each decile band along with percentages for gender and ethnicity.

*Table 1. Percentage of student participants by group, decile band, gender, and ethnicity*

		Implementation	Comparison
Decile	1-3	36	26
	4-7	36	34
	8-10	28	40
Gender	Male	55	59
	Female	45	41
Ethnicity	NZ European	61	53
	Māori	27	27
	Pacific Peoples	5	8
	Other	7	11

## **Research design**

The current study used a mixed-methods, explanatory sequential design (Creswell & Plano Clark, 2011). The explanatory sequential design involves two distinct phases, a quantitative phase followed by a qualitative phase. The quantitative data were obtained at two points, before and after an intervention that involved five PLD workshops for the participant teachers. The qualitative data



were obtained through interviews post-PLD and are used to explain trends and relationships revealed in the quantitative results (Creswell, Plano Clark, Gutmann, & Hanson, 2003).

Phase one, the quantitative phase, involved obtaining and using teacher knowledge data from a test of linguistic constructs and a survey of self-confidence for teaching literacy to answer research question one. Teaching practice data from observation of lessons and survey of prompts were used to answer research question two. The pre- and post-PLD data were analysed for evidence of change in knowledge and self-confidence (RQ 1), and for evidence of change in teaching practice and reading error prompts (RQ 2). In addition, the results were used for selecting interview teachers to ensure a representation of teachers with different amounts of change in the knowledge and practice data sets. Phase two consisted of semi-structured interviews for selected teachers with the aim of identifying barriers and enablers for making change to teaching practice (research question three).

Additional data on measures of student reading outcomes were obtained to answer research question four. The data from the students whose teachers participated in PLD workshops were used along with data from a comparison group of students whose teachers were not part of the PLD group. An analysis of the data from the two groups is used to identify any differences for children whose teachers participated in the PLD. Figure 3 shows the design.

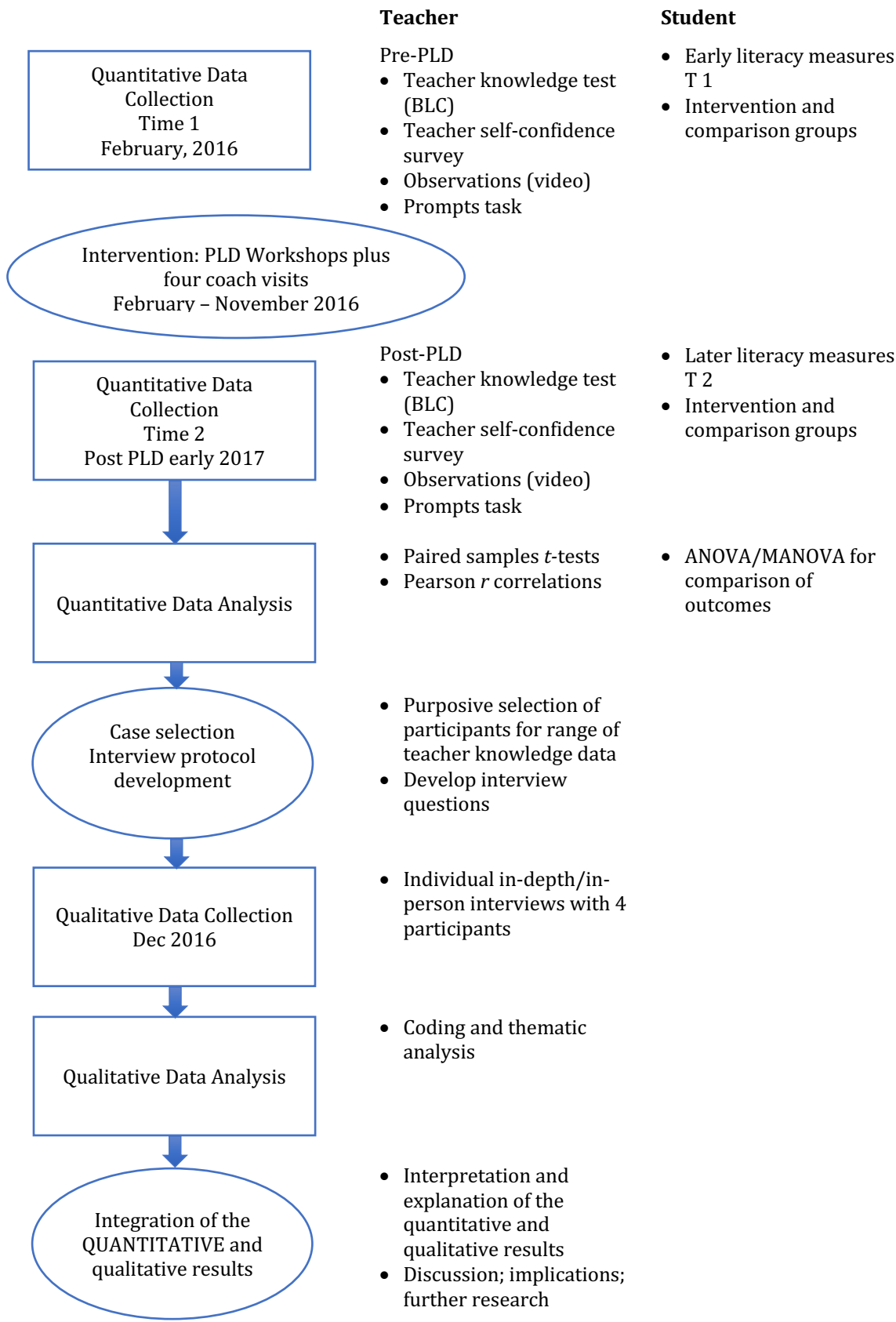


Figure 3. Research design

*The Intervention.* The PLD consisted of five workshops that were evenly spaced across the school year, from March to December, 2016. The workshops were facilitated by the ELRP principal co-investigator, who has academic and research capability, and the researcher on the current study, who is an experienced PLD facilitator. The five workshops provided teachers with current research about effective teaching of reading for children in their first year at school (see Table 2). The content of the PLD was based largely on the theoretical framework of the Simple View of Reading (Gough & Tunmer, 1986) and its expansion as the Cognitive Foundations Framework (Tunmer & Hoover, 2019). The workshops were designed to assist teachers to improve their knowledge of literacy teaching and learning and to implement explicit teaching practice in the code component of reading.

The workshops focused on research-informed practice by ensuring teachers received the necessary guidelines and models to implement new understandings of how children learn to read. The teachers were provided with a *scope and sequence* that followed phases of word learning (Ehri, 1995) and gave particular guidelines about the knowledge and strategies to teach at each phase (see Appendix 1). In addition, teachers were provided with direction in explicit teaching approaches in the form of model lesson plans and provided with supporting resources for learners in the form of decodable texts, and magnetic letters.

*Table 2. Description of the workshop modules*

Module	Content
Module 1: Introduction and the importance of language	<p>Outline and examination of the Cognitive Foundations of learning to read</p> <p>Effective instruction: the role of direct teaching and implicit teaching</p> <p>Phases of reading development (Ehri, 1995): a scope and sequence for teaching</p> <p>Assessment for screening, diagnostic, and monitoring</p>
Module 2: Learning how to read words	<p>The role of vocabulary in decoding and language comprehension</p> <p>The nature of phonological awareness</p> <p>Letter-sound knowledge: phonological awareness and its role in development of the alphabetic coding skills</p> <p>How the spoken word is written</p>
Module 3: Developing word knowledge for fluency	<p>Strategies for decoding different word patterns</p> <p>Using sounding and blending, letter teams, morphemes, and syllable types to decode words</p> <p>Self-teaching hypothesis: laying a strong foundation so children can add to their code knowledge through reading written text</p> <p>Developing children's independence for decoding unfamiliar words</p>
Module 4: Reading comprehension	<p>Comprehension strategy instruction and using text structure</p> <p>Explicit knowledge of sentence construction</p>
Module 5: Differentiated instruction	<p>Using the scope and sequence and the teacher knowledge from modules 1-4 to re-conceptualise reading instruction at whole class and small group levels</p>

The workshops provided teachers with the opportunity to increase their knowledge about teaching reading and to discuss the challenges and successes experienced in changing teaching practice in the classroom setting. Teachers were provided with a *scope and sequence*, explicit lesson plans, magnetic letters, and decodable texts. All teachers received decodable texts (Pocket phonics)<sup>4</sup> and decile 1-3 schools received a classroom set of a series of decodable readers (Little Learners Love Literacy)<sup>5</sup>.

Teachers were invited to use the workshop direction as suited their context. Teachers were not expected to follow scripts and there was no mandate about how much time was spent in teaching literacy. The approach ensured the intervention was something teachers could implement within their context, giving the intervention social validity. Workshops and observation videos gave the researcher the opportunity to identify what teachers had implemented. Further research using a similar approach would help to ascertain any generalisability of the results.

As part of the Early Literacy Research Project, each teacher was offered four coaching visits. The coach was an independent literacy expert and the visits consisted of lesson demonstration or observation and follow-up discussion. The coach was able to provide further support for teachers to enhance the content of the workshops. All but one of the teachers in the current study accepted coaching visits but data on the number of visits each teacher received were not used for the

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<sup>4</sup> Pocket Phonics series by Smart Kids

<sup>5</sup> Little Learners Love Literacy series by Maureen Pollard

current study. The reports filed by the coach for the Project provided information about the fidelity of teaching practice in addition to that obtained from video observations and in-workshop discussions.

### **Data measures**

Teacher data were obtained from five measures, four for the quantitative phase and one for the qualitative phase. Each measure was designed or selected for purpose as outlined in Table 3 and is further described below the table.

*Table 3. The five teacher data measures used in the study*

	Measure	Appendix
Teacher knowledge	A Basic Linguistic Constructs (BLC) test (Binks-Cantrell et al., 2012)	Appendix 2
	Survey of self-confidence for teaching literacy	Appendix 3
Teacher practice	An observation rubric designed for the study	Appendix 4
	A prompts task (Greaney, 2001) adapted for the study	Appendix 5
Teacher interviews	Semi-structured interviews designed from knowledge and practice results	Appendix 6

## Quantitative data

### *Teacher knowledge*

#### *The Basic Linguistic Constructs test*

The teacher knowledge test used in the current study was designed to examine linguistic constructs of English language. The Basic Linguistic Constructs test (Binks-Cantrell et al., 2012) was based on previous studies using a similar tool (Bos et al., 2001; Cunningham et al., 2004; Joshi et al., 2009; Moats, 1995). The test measures teachers' knowledge of four linguistic constructs: *phonological*<sup>6</sup>, *phonemic*<sup>7</sup>, *phonic*<sup>8</sup>, and *morphological*<sup>9</sup>. Knowledge in these constructs are part of the content knowledge established as necessary to effectively teach children to read. Binks-Cantrell and colleagues (2012) reported that the BLC test was evaluated for construct validity to ensure each item checked what it purported to check. A Cronbach alpha of 0.90 showed that the reliability of the test was high.

The BLC test involved 17 multiple choice questions and two non-multiple-choice questions on topics identified by research as the teacher knowledge vital for teaching early literacy (Binks-Cantrell et al., 2012; Piasta et al., 2009; Foorman & Moats, 2004; Moats, 2009, National Reading Panel, 2000). The test included questions about phonological awareness, phonemic awareness, the alphabetic principle or phonic knowledge, and morphology. Across the survey, 12 questions

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<sup>6</sup> Phonological teacher knowledge is knowledge of speech sounds in a word e.g., syllable, onset-rime.

<sup>7</sup> Phonemic teacher knowledge is knowledge of the smallest unit of sound in a word, the phoneme.

<sup>8</sup> Phonic teacher knowledge is knowledge of how letters are used for sounds they represent.

<sup>9</sup> Morphological teacher knowledge is knowledge of the meaning units in words, the morpheme.

measured a teacher’s explicit knowledge, and 26 measured a teacher’s implicit knowledge. Teachers completed the test during the first and final workshops of the PLD. The data were used to identify levels of teacher knowledge and any change that occurred following the PLD. Table 4 shows the test items for each construct.

*Table 4. The test items in the Basic Linguistic Constructs test*

		Implicit	Explicit	
Construct		(26)		(12)
Phonological	Count syllables	7	Definition	1
Phonemic	Count phonemes	7	Definitions	3
	Manipulate phonemes	3		
Phonic	Identify spelling pattern	2	Define terms or locate examples	7
Morphological	Count morphemes	7	Define morpheme	1

*Self-confidence in literacy teaching*

Teachers in the study were asked to evaluate their knowledge as *minimal*, *moderate*, *very good*, or *expert* in eight elements important in a literacy programme. The eight elements cover reading process (phonemic awareness, phonics, fluency, vocabulary, comprehension) and classroom practice (children’s literature, teaching English Language Learners (ELL), and using reading assessment) (see Figure 4).



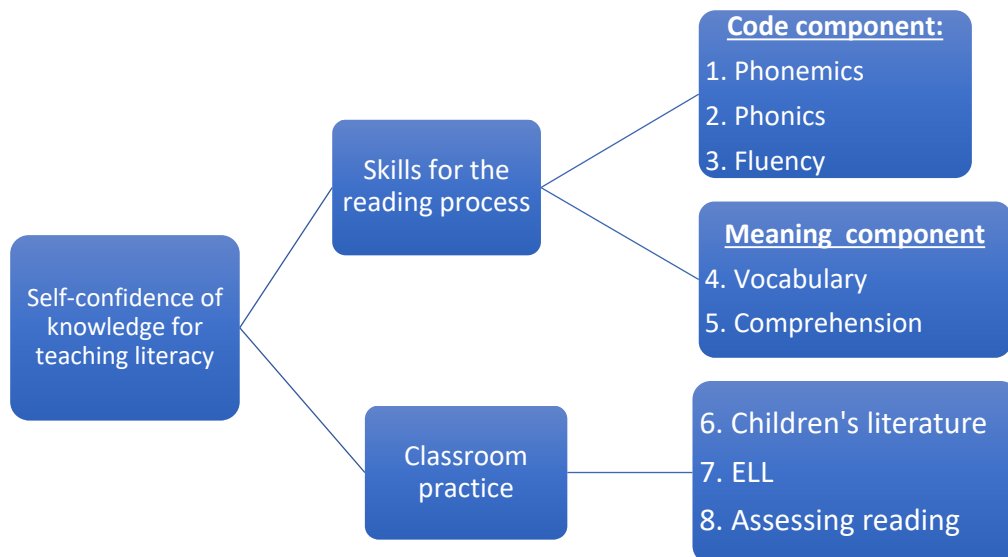


Figure 4. Items of the self-confidence survey

### **Teacher practice**

#### *Observation rubric*

Observations were used to examine teaching in small group instruction, prior to and after the PLD. Small group instruction was selected for the observations because it is a common teaching practice in New Zealand classrooms. Teachers were asked to conduct a small group reading lesson for a research assistant to video record. Two lessons from each teacher, one prior to and one towards the end of the PLD workshop series, were used to examine any change in teacher practice.

In order to analyse the large amount of video lessons available, the researcher created a structured observation framework in the form of a rubric. Structured observation involves creating categories that are systematic and discrete. The categories were created in advance of and alongside observations. The categories allowed a large amount of teaching to be analysed and categorised

relatively quickly (Cohen, Manion, & Morrison, 2011) by using a rating scale for each category.

The first step in developing the observation measure involved examining other studies that had developed observation scales (Chen, Hu, Fan, & Li, 2014; Connor, 2013; Doabler & Nelson-Walker, 2009; Nelson-Walker, Kennedy, Cohen, & Crone, 2011; Reddy, & Dudek, 2014; Reddy, Fabiano, & Peters, 2015; Walpole & McKenna, 2013). The studies were examined for both the content they included and the method of evaluating teaching.

The content of the rubric needed to reflect current practice in the teaching of beginning reading and optimum teaching practice as suggested by research. The researcher viewed many hours of videoed lessons, used outlines of current expected practice (e.g., *Effective Literacy Practice in Years 1 to 4*, Ministry of Education, 2003), and studies on research-informed teaching of beginning reading. A large number of indicators were developed for the first trial (see versions 1 and 2 in Appendix 4).

Two main possibilities were considered for rating scales. One type of scale considered for the measure was designing indicators of practice that could be rated on a 1 to 5 scale from not very effective to highly effective. However, initial trials with a rubric using the rating scale revealed the issue of central tendency, where a rater is likely to avoid high and low rates in favour of a central one (Cohen et al., 2011). Reliable results were difficult to achieve between raters.

An alternative to rating scales was the development of specific indicators that describe practice at different levels of a scale. Doabler and Nelson-Walker

(2009) used indicators as anchors for rating teaching with clear descriptors for 11 elements of classroom practice, across four categories rated from not present, somewhat present, present, and highly present. Descriptions act as an anchor to use as a guide in rating (Popp, Ryan, & Thompson, 2009).

For the current study, clear descriptions were developed over a number of iterations for each lesson element and for each rating. The researcher developed an extensive list of indicators to reflect the difference between current and desired teaching practice. In the trials, the number of indicators proved too large and the rating scale was difficult to use with consistency between raters. A number of revisions were made to indicators to reduce overlapping categories and to ensure the rubric could be used to evaluate the practice seen in the videos. The revised version of the rubric included indicator statements to guide raters in determining a category for the observed teaching practice.

The revised rubric for the current study was trialled with the available teacher videos and adapted using an iterative process of viewing, rating, adapting the indicators, and re-viewing and rating with the adapted indicators. The process led to a decision to categorise teaching on a continuum of implicit to explicit teaching, rather than rating as poor to excellent. The implicit-explicit continuum approach was selected to acknowledge that an implicit approach has been promoted (Ministry of Education, 2003, 2015) and provides an evaluation of the change towards explicit practice, as promoted by the PLD. The categories were not deemed as judgments of effective or ineffective teaching but would be used to identify the explicit teaching practice promoted in the PLD workshops.

The observation rubric has six lesson elements and four ratings. The lesson elements are *lesson focus*, *instructional strategies*, *code knowledge*, *text selection*, *reading strategies*, and *resource materials*. The four categories or ratings across these six lesson elements form a continuum or scale from implicit (discovery; incidental) towards most explicit teaching (intentional; systematic). Indicators for each lesson element in the finalised version described teaching practice as would be seen in implicit teaching (Clay, 2005; J. Smith & Elley, 1997; Ministry of Education, 2003) through to practice common to explicit teaching (Connor et al., 2004; Hempenstall, 2016; National Reading Panel, 2000). The lesson elements are described below. The final version of the observation rubric with all indicators is shown in Appendix 4.

The element of *lesson focus* describes the main purpose of the lesson. Implicit lessons involve reading the levelled book with a focus on meaning and fluency. Explicit lessons focus on the teaching of the knowledge and strategies needed for success as a reader. The element of *teaching strategies* measures how teachers phrase their teaching support. The indicators for teaching strategies range from a pre-dominance of questions (implicit) to inclusion of teacher explanations and modelling (explicit). The change from questions to explanations indicates more explicit teaching.

In the element of *code knowledge*, lessons are evaluated for explicit or implicit teaching of the alphabetic code. The indicators are on a continuum from arising in the text (implicit) through to systematic teaching of selected code knowledge and strategies taught prior to the reading of a text (explicit). *Text selection* is a vital element because the type of text used dictates the type of

teaching that can occur. The indicators for the implicit category of text selection involve books that use natural language and a strong storyline, with many words outside of a child's reading vocabulary. Indicators for explicit categories include selecting decodable texts to support a *scope and sequence* for teaching the alphabetic code.

In the lesson element of *reading strategies* an implicit approach involves guiding students to use the meaning of the sentence for unfamiliar words. An explicit approach involves teaching the decoding strategies readers need for the words in the text. The lesson element of *resource materials* refers to resources used to support teaching and learning. An implicit lesson has the focus on the book itself, with few other teaching materials. An explicit lesson involves the students in using magnetic letters or writing words on whiteboards as the teacher guides them in new learning.

The observation rubric provided a structure to analyse the lessons and generated quantitative data on teacher change. The six elements were rated across the categories so each of the elements received one point for discovery, two points for incidental, three points for intentional, and four points for systematic. The total score divided by the six elements gave an overall score between one and four. The PLD workshops promoted teaching at the explicit end of the scale, therefore, a score closer to four indicated the desired change in practice. The data from the observation tool were used to reveal any changes in teaching towards more explicit teaching after the PLD.

Reliability checks were conducted in terms of inter-rater agreement in allocating teaching events to the relevant elements on the rubric. Two experienced

literacy educators helped identify issues of rating inconsistency in the elements of the rubric. The feedback from the inter-raters revealed that some of the indicators did not progress systematically, or that in some cases there was little difference across categories. After the inter-rater feedback, the indicators were refined to improve the discreteness of the categories and remove any overlap.

Along with the two original inter-raters, a third inter-rater checked the reliability of scoring in the final version of the measure. Three inter-raters rated the six elements of each lesson making 18 possible agreements for each observation. Where there was a lack of agreement, the researcher and inter-raters discussed the differences. The discussion resulted in a change to the rating (agreement) or a note of the difference. Inter-rater reliability is calculated on number of agreements divided by number of possible agreements. The inter-rater reliability coefficient of 0.91 showed the tool had a high level of reliability. Table 5 shows the summary for each lesson (1 to 5).

*Table 5. Inter-rater reliability check of the observations*

	1	2	3	4	5	Total	Reliability
Observation	17/18	16/18	16/18	16/18	17/18	82/90	0.91

#### *Prompts task*

The prompts task was used to obtain data on what teachers suggested when a child made a word reading error during text reading. The suggested prompts revealed the type of teaching and reading strategies a teacher preferred

and whether the code or meaning component were considered. The prompts task generated data for a comparison of teacher suggested prompts pre- and post-PLD.

The prompts task for this study was adapted from a previous study (Greaney, 2001). The original measure was adapted to include text excerpts and error types that reflected those of a child's first year at school. The types of error used for the prompts task included error of omission (scenario 1), substitution (scenario 2), medial vowel error (scenario 3), incomplete attempt (scenario 4), and over-generalised past tense (scenario 5). The errors and suggested prompts were based on examples from the *Teacher Support Materials* (Ministry of Education, 2014) for the *Ready to Read* texts to ensure the examples reflected common classroom practice. The miscue errors used for the prompts task are shown in Appendix 5.

Part of developing the prompts task for this study included identifying an appropriate way to analyse the data that the task generated. The prompt should have an initial focus on letter-sound mappings, followed by confirming that hypothesis by using sentence context (Tunmer & Chapman, 2012b). Letter-sound knowledge is favoured as the initial prompt for two reasons. Firstly, context predictions are only successful one attempt in four (Stahl, 1997) and require a sophisticated approach to searching for possible words. Secondly, when context-based predictions are used as the initial action, this can mask inadequate letter-sound knowledge and strategy (Stahl, Duffy-Hester, & Stahl, 2006). Using context over print detail is a strategy that learners with weak code knowledge use (Nicholson, 1991). Skipping over the code detail means the child loses an

opportunity to imprint the orthography of the word in question (Harm, McCandliss, & Seidenberg, 2003).

Inter-rater reliability checks for the prompts measure involved the researcher and an experienced literacy teacher. The reliability check used all the prompts data for each teacher (n=21) across all five scenarios. Inter-rater reliability was high for both criteria, 0.90 for criteria of using the code-cue first and 0.96 for decoding strategies. Disagreements involved a slight difference in interpretation of the criteria. In the code-cue first criteria, one rater accepted “I want you to look back and check” as a code-cue first prompt, while the other rated that as a general prompt. The small number of disagreements in the decoding strategy criteria occurred as a result of one inter-rater accepting “Sound it out” as specific decoding strategy, while the other thought this was not specific enough. Table 6 shows the agreement rates for the inter-rater reliability.

*Table 6. Inter-rater reliability agreement rates for the prompts measure*

	1	2	3	4	5	Total	Reliability
Word cue first	19/21	18/21	19/21	20/21	19/21	95/105	0.90
Decoding strategies	20/21	20/21	21/21	20/21	20/21	101/105	0.96

The measures outlined above provided data on the key factors of teacher knowledge, teacher self-confidence, teaching practice in small group reading lessons, and teacher prompts at a child’s reading error. These measures were used during the first phase of the explanatory sequential design to provide data for



research questions one and two. Pre-PLD data showed the current situation for knowledge and practice and post-PLD data were used to identify any change that occurred.

### ***Quantitative data analysis***

The teacher data were scored prior to and after the PLD and compared using *t*-tests for paired samples. The *t*-tests results were used to analyse the change for statistical significance. Pearson-*r* correlations were used to identify any significant correlations among teacher variables. Correlations were evaluated between teaching practice and teacher knowledge as overall measures. Correlations were also evaluated among the different elements, that is, the four elements of the teacher knowledge test, the eight aspects of the self-evaluation survey, the two parts of the prompts and the six lesson elements of the observation rubric. Parametric tests of paired samples, independent samples, and Pearson *r* correlations were used because the data sets had similar standard deviations, the sample size was above 20, and because of the similarity of results when non-parametric tests were trialled.

### **Qualitative data**

#### ***Teacher interviews***

Interviews enable participants to discuss their interpretations of the world and to express how they regard situations from their own point of view (Cohen et al., 2011). Kerlinger (1986) listed benefits of the interview as including the ability to follow up on unexpected results, to validate other methods, or to identify

reasons for results. In the current study the interview was designed to allow teachers to express their opinions and experience of implementing changes to their practice, which might identify influences that the quantitative measures could not identify. The current study used a semi-structured interview (Bogdan & Biklen, 2007) to identify enablers and barriers for change to explicit teaching of the code component. The interviews used open-ended questions in order to establish rapport, get more information, and make way for unanticipated answers (Cohen et al., 2011).

Prior to the interviews, a set of possible questions was developed from examining the results of each teacher's knowledge test, self-confidence survey, and the prompts task (see Appendix 6). In addition, the researcher considered each teacher's videoed lessons for possible interview questions related to changes in teaching practice. These data were used to develop an appropriate interview for each participant. For instance, one interview question asked teachers for their view on the influence of their improved teacher knowledge, another question asked about the change in their suggested prompts from pre- to post-PLD, and another asked teachers to consider any changes made to their teaching in small group lessons. Teachers had the opportunity to speak about their practice, which helped to identify what enabled change and what might be a barrier.

A section of video from each teacher's lesson was available for discussion during the interview. A small section of the group lesson was selected for discussion. Video stimulated recall (VSR) (Lyle, 2003; Powell, 2005; Reitano & Sim, 2010) allows teachers to reflect on their practice *in-the-moment*. The process provides opportunity for dialogue with a colleague or coach revealing teachers'

knowledge-in-action (McMeniman et al., 2000). The VSR can help to investigate teacher decision making at the time of the behaviour and in the exact context in which it occurred (Reitano & Sim, 2010). Teachers can relive the episode as they verbalise their thought processes (Calderhead, 1981).

### ***Qualitative data analysis***

Interviews were transcribed by an independent transcriber. The transcriptions allowed the interviews to be read and coded. Coding of the transcriptions was a way of reducing the large amount of data gathered. *NVivo (11)* was used to assist in analysis of the scripts by coding according to categories. The reviewed literature and the data from the quantitative phase of the current study revealed that categories of teacher knowledge and teacher understanding were important influences in teacher practice. The discussion during workshops revealed teachers' difficulty with resources to support their new learning and the systems that existed at school and national level that inhibited changes in their practice. These four categories were used as a basis for analysis of the scripts and guided a first reading and coding. These codes were descriptive rather than numeric, with the description relating to a theme.

During the first analysis, memos were taken alongside each section of the transcript. The memos acted as researcher notes to identify as much as was possible from the teacher's responses. Fifty different memos arose from reading the script. The memos were sorted for themes, beginning with the four categories previously identified: teacher knowledge, teacher understanding of reading, available resources, existing systems. The remaining memos were grouped into broader categories to form the codes and reduce the data to usable quantities. In

the final analysis, the categories were sorted into enablers and barriers, with some categories featuring as both an enabler and a barrier. Appendix 7 shows the themes as enablers and barriers.

### ***Validity and reliability***

The researcher's role as interviewer and in PLD provision must be considered in the validity and reliability of the collection and analysis of the interview data. The role involves the researcher's own assumptions and experiences, which can be a strength and limitation to the reliability and validity of the data (Clarke & Braun, 2013). The role also involves a collegial relationship with the interviewees from participation in the intervention workshops. The PLD role involved a position of expertise; the interviewing role involved a change from providing advice to asking for a teacher's views.

The dual roles of PLD facilitator and interviewer could have a particular influence on the recording and interpretation of data, which will be considered before, during, and after the interviews. The interviewer as PLD provider might engage in providing solutions rather than in letting the teachers talk. In addition, teacher statements may be inhibited by the PLD expert role. However, teachers may have been more open to explain their experiences because they knew the interviewer in a collegial role. In the analysis of the interview data, the researcher's experience may influence the interpretations of teachers' responses, but the experience could also provide a depth in analysis.

The change in role from facilitator to interviewer requires reflexivity, where the researcher engages in critical reflection about the influence involved

(Clarke & Braun, 2013). The change in role was considered in preparation for the interviews, by considering the available data for each teacher and constructing possible interview questions. The researcher's experience as a literacy teacher and PLD facilitator is likely to affect the analysis to some degree and a reflexive stance helps to mitigate undue bias. The involvement of other researchers in the team provided the opportunity for the analysis to be checked.

## **Student assessments**

A number of student literacy achievement measures were used for data on students in both the implementation and comparison groups. Data were obtained from children whose teachers participated in the PLD, together with data from a comparison group of children whose teachers did not participate in the PLD programme.

Time 1 assessments were carried out in February, prior to the start of the PLD programme and in the first six weeks of the child's schooling. Time 2 assessments were carried out in December, when the PLD programme had finished and the children had received a year of reading instruction. The data were used to identify any differences in outcomes between the implementation and comparison groups. The measures used enabled data to be gathered on the two key components of reading identified in the Cognitive Foundations Framework, word recognition and comprehension. Table 7 shows an overview of the skills and the measures used. Each measure is further described below.

*Table 7. The student data measures and when used in the study*

	Skills	Measure used	Timing <sup>10</sup>
Word recognition	Phonological awareness	Comprehensive Test of Phonological Processing (CTOPP)	February December
		Alphabetic coding	Alphabet letter and sound
		Blends and digraphs	December
		Pseudoword test	December
	Reading words	Clay word test	February
		Burt word test	December
	Spelling words	Invented spelling	Wide Range Achievement Test (WRAT-4)
Language comprehension	Receptive vocabulary	British Picture Vocabulary Scale (BPVS)	February
	Language processing	Mispronunciation task Non-word repetition	December December

### ***Phonological awareness***

The Comprehensive Test of Phonological Processing (CTOPP) is a standardised, norm-referenced test used to assess reading-related phonological processing skills (Wagner, Torgesen, Rashotte, & Pearson, 2013). The CTOPP subtests used were matching, blending, and elision. In the matching task, children were asked to identify a word that starts or ends with a target sound. The blending

<sup>10</sup> February testing is pre-PLD and December testing is post-PLD

tasks progress in order of difficulty from blending syllables, then onset-rime, and lastly phonemes to produce a word. In the elision task, children were asked to delete a sound from a given word, progressing from deleting a syllable from a two-syllable word to the more difficult task of deleting phonemes from various positions in words. The mean scores were used to analyse any differences in phonological awareness skills that are essential as foundations in learning to read.

### ***Alphabetic coding skills***

Prior to the PLD programme, children's coding knowledge was assessed with tests of letter name and letter sound. Children's word knowledge was assessed with word tests for reading and spelling. After the PLD programme, advanced coding skills of 20 consonant blends and five digraphs were measured. A further measure of coding skills assessed children's ability to apply phonic knowledge in spelling attempts. After the PLD, children's decoding skills were checked using a pseudo-word test. The pseudo-word test is a test of 20 non-words that shows what children know about phoneme to grapheme correspondences. The test shows what children know about the English code without being able to use context cues.

### ***Reading and spelling words***

In February, children had recently started school and so spelling and reading words was assumed would be low. The commonly used Clay word reading test and an invented spelling test were administered to gather baseline data and for comparing implementation and comparison entry scores.

In December, the children had been at school for a full year and so standardised tests could be used. The Wide Range Achievement Test (WRAT-4) spelling test was administered to gather data on how well children apply code knowledge in spelling real words. The test is a list of words increasing in difficulty to a maximum of 45 words. Children were asked to spell the words after they heard them alone and then in a sentence until 10 consecutive errors were made. The ability to recognise and read words was assessed with a standardised measure of word reading without context, the Burt word reading test (Gilmore, Croft, & Reid, 1981). A pseudo-word reading test was used to measure the student's ability to apply grapheme to phoneme knowledge without using prior knowledge of a known word.

### ***Receptive vocabulary***

The British Picture Vocabulary Scale (Dunn et al., 2009) was used to assess receptive vocabulary. The scale comprises a carefully graded range of pictures. Four pictures were presented to the child, who selected the best match to a spoken word. The measure produces standardised scores to facilitate comparisons of individual children with their same-age peers. The test was administered prior to the PLD programme to identify any differences between the two groups that might affect literacy learning outcomes.

### ***Language processing***

Language processing skill was measured using a mispronunciation task (Tunmer & Chapman, 2012a) and a non-word repetition task. The mispronunciation task required children to use semantic knowledge to correct a mispronounced word provided in a sentence context. Results from this task



reveals if children can utilise a set for variability (Tunmer & Chapman, 2012b; Venezky, 1999), which involves altering an initial decoding attempt by using the context cues. Each item is a mispronunciation of the vowel part of the word and so mimics a child's inaccurate but full decoding attempts. The non-word repetition task is part of the CTOPP tests. The child is asked to listen to a recording of a non-word and asked to repeat it. The task reveals the child's phonological working memory, or retention and recall of information from the beginning to the end of a word.

### ***Analysis of the student data***

Data were gathered by research assistants and checked by an independent researcher employed by the Early Literacy Project. The data gathering and checking process ensured data were reliably scored and recorded. Data that could not be verified as reliable were discarded for purposes of analysis.

The student data were analysed at Time 1 using a multivariate analysis of variance (MANOVA). MANOVA were used on the student measures of phonological awareness (elision, matching, blending), alphabetic coding (letter name, letter sound), language processing (receptive vocabulary) and reading and spelling outcomes (Clay word test, invented spelling).

The results were used to indicate any differences between the implementation and comparison groups prior to the implementation teachers receiving the PLD. At Time 2, the MANOVA were used on measures of phonological awareness (elision, matching, blending), alphabetic coding (digraphs, blends, spelling phonemes), language processing (mispronunciation, non-word repetition)

and reading and spelling outcomes (Burt word test, pseudoword reading, and WRAT spelling).

Each of the MANOVA resulted in a main effect for Group (implementation or comparison) to identify any significant effect of the PLD on the outcomes. Main effects for Decile identified results in terms of school decile ranking band. The interaction effects of group by decile band were examined to reveal any differences for the implementation group relative to the comparison group across the three decile bands.

## **Ethics**

Ethics approval for the Early Literacy Research Project covered all student and teacher data for publication of research papers and this thesis (MUHEC, Southern 14/10). The current study received MUHEC approval (Southern B 16/19) for specific use of each interview teacher's data, including their video, within a semi-structured interview situation with the researcher. Appendix 8 includes the ethics approval, the teacher information sheets, and the teacher consent forms for the teacher interviews in the current study. The approval considered informed and voluntary consent, anonymity and confidentiality, minimisation of harm and opportunity for beneficence, and the right to withdraw. All teachers were provided with information sheets, were respectfully approached to participate, and participation was not required.

## Chapter summary

The methods used in the design of this study enabled the researcher to obtain the data necessary for answering the research questions. The PLD was implemented in workshops for teachers. Data were analysed for significant change after the PLD. The mixed-methods explanatory sequential study included a quantitative phase followed by an explanatory qualitative phase. The quantitative phase obtained data on teacher knowledge and teacher self-confidence to teach reading. In addition to teacher knowledge, the quantitative phase included measures of teaching practice, using a specifically designed rubric to evaluate teaching practice as implicit or explicit. A prompts task was adapted to obtain and analyse data on how teachers supported children at a reading error. Semi-structured interviews were used to explain why some teachers might have had difficulty changing to explicit teaching of the code component of reading. Implementation and comparison group data pre- and post-PLD provided the opportunity to measure the effect of teacher PLD on student outcomes. Chapter Four presents the data for analysis.

## CHAPTER FOUR: RESULTS

### Introduction

The results chapter presents the data for the mixed methods study that examined the teacher influences that enable success in reading outcomes for beginning readers. Quantitative data from pre-and post-PLD measures of teacher knowledge and instructional practice are presented to identify any change that occurred. Qualitative data from teacher interviews are presented to identify the barriers and enablers teachers reported when making changes to teaching practice. Student reading outcome data are presented for an implementation and comparison group to identify whether changes in teachers' knowledge and teaching practice for the implementation group were associated with improved outcomes in students' reading achievement.

### Teacher data

#### *Teacher knowledge*

The analyses of the results from the teacher knowledge measures are presented in this section to answer RQ 1. Teachers' linguistic knowledge from the Basic Linguistic Constructs test is examined, followed by the data from a survey on

teachers' confidence in teaching beginning reading. Over the year of the study, the data available from the teacher participants varied. Six teachers missed the first or final workshop, resulting in a lack of either pre- or post-PLD data on the teacher knowledge test, self-confidence survey, and the prompts task for those participants. One teacher who missed the final workshop completed the prompts task as part of the teacher interviews. Data were available for 20 knowledge tests, 20 self-confidence surveys, and 21 prompts tasks. For teaching practice, video observations for pre- and post-PLD were available for 23 teachers. Some of the teachers who had pre- and post-data available for observations did not have pre- and post-data available for other tests. Only 16 teachers had all data sets available pre- and post-PLD. A decision was made to use as much data as possible, rather than restrict the available data to the teachers with all data sets.

#### *Teacher linguistic knowledge*

The Basic Linguistic Constructs test was used to obtain data about teachers' knowledge of *phonemic*, *phonological*, *phonic*, and *morphological* constructs. The mean scores in the BLC increased across all test items. Paired samples *t*-tests showed statistically significant increases in teacher knowledge for all constructs. Effect sizes ranged from moderate (0.50) to high (1.11). Table 8 shows the mean raw scores, standard deviations, *t* values, and effect sizes.

Table 8. Results for teacher knowledge in the BLC pre- and post-PLD

n=20	Pre-PLD			Post-PLD		<i>t</i>	<i>d</i>
	Max. score	M	SD	M	SD		
Total knowledge	38	23.19	5.79	28.57	4.82	5.35**	1.00
Explicit knowledge	12	5.33	2.61	8.05	2.29	5.11**	1.11
Implicit knowledge	26	17.95	3.70	20.48	3.50	3.67**	0.70
Phonemic	13	9.33	2.52	10.33	2.00	3.02**	0.50
Phonological	8	7.14	0.57	7.55	0.75	2.26	0.61
Phonic	9	4.24	1.84	6.13	1.67	4.52**	1.07
Morphological	8	2.55	2.68	4.81	2.41	3.12**	0.89

\*\*  $p < .01$

Significant increases occurred in mean scores for total knowledge (38 items; Pre: 61% correct; Post: 75% correct), explicit knowledge (12 items; Pre: 44% correct; Post: 67% correct) and implicit knowledge (26 items; Pre: 69% correct; Post: 78% correct). Teachers' explicit knowledge was lower than implicit at both time points, but explicit knowledge showed a proportionally higher increase.

Items in the *phonemic* construct measured teachers' knowledge of phonemes, the smallest units of sound that can be isolated in a spoken word. Mean percent correct was relatively high on both testing occasions (13 items; Pre: 71% correct; Post: 79% correct). As shown in Table 8, the increase was statistically significant and the effect size moderate.

An examination of the test items showed the majority of teachers were able to successfully answer most items testing implicit knowledge. Post PLD results showed an increase in correct counting of phonemes with between 85% and 100% of teachers counting correctly across all items. Lower scores occurred for words with a less transparent phoneme-grapheme match (e.g., 'through', 'box'). An analysis of the items that tested teachers' explicit phonemic knowledge showed that teachers were highly successful in selecting the correct definition for a phoneme. However, fewer than a third of teachers could select the correct definition for phonemic awareness at both time points. The incorrect selections showed teachers associating phonemic awareness with phonics, rather than the hearing of spoken sounds in a word independent of code knowledge.

Items in the *phonological* construct measured knowledge of a unit larger than the phoneme, such as onset-rime and syllable. Teachers' implicit knowledge was shown in ability with syllable counting (7 items; Pre: 98% correct; Post: 96% correct). The change from pre- to post-PLD was non-significant because the result was high at both time points. In contrast, few teachers had explicit knowledge of the phonological construct prior to the PLD with only 20% of teachers able to correctly select a definition for phonological awareness. Post-PLD, 65% of teachers selected the correct definition, a significant increase, although some teachers continued to associate phonological awareness with print, rather than as the sound structure of words.

Items in the *phonic* construct measured knowledge of orthography or how graphemes are used to represent the phonemes in words. Teachers' mean percent score for knowledge in the phonic construct was lower than knowledge in

phonemic and phonological constructs at both time points (9 items; Pre: 41% correct; Post: 68% correct). A paired samples *t*-test showing change between the pre- and post-PLD results was statistically significant and the effect size was large. The mean scores revealed that fewer than half of the teachers showed knowledge in the phonic construct prior to the PLD, with an increase to two-thirds of teachers post-PLD. The results showed that teacher overall knowledge of orthography improved.

Items in the *morphological* construct measured teachers' knowledge of the structure of words and the units that affect parts of speech or meaning. Explicit knowledge was tested with a question on the definition of a morpheme. To assess implicit knowledge, teachers were required to count morphemes in words. The mean percent correct for the eight items increased by almost a third but remained lowest of all the constructs (Pre: 32% correct; Post: 60% correct). A paired samples *t*-test between pre- and post-PLD revealed a statistically significant increase, with a large effect size. The results showed that many teachers had little understanding of a morpheme prior to the PLD, with some non-attempts of the question.

For the item on explicit knowledge in the morphological construct, teachers were required to select the correct definition of a morpheme, '*a single unit of meaning*'. Prior to the PLD, 40% of teachers selected the correct definition, while one third of the participants selected that they had no idea of a definition. After the PLD, 80% of teachers selected the correct definition and no teachers selected the *no idea* option. The results showed a marked increase in teachers' understanding of the morphological construct. Most teachers could define a morpheme, but many



continued to have difficulty with applying this knowledge to counting morphemes in words.

### ***Teacher self-confidence***

In addition to the data on linguistic knowledge, teachers completed a survey on their level of confidence in eight different items about teaching literacy. The results from the eight teaching items are presented in two categories as outlined in the methods chapter. The two categories are reading process (phonemics, phonics, fluency, vocabulary, comprehension) and classroom practice (children's literature, reading assessments, English Language Learners). The reading process category is further analysed as items for the code component and items for the meaning component, in accordance with the focus of the current study.

Teachers were asked to rate their knowledge for each of the eight items as *minimal* (1), *moderate* (2), *very good* (3), or *expert* (4). The pre-PLD results showed that on average teachers rated their knowledge as *moderate* for each of the items, except for knowledge for reading assessments, which they rated as *very good*. After the PLD, teachers generally rated their knowledge in each of the items as *very good*, apart from knowledge for teaching English Language Learners, which retained a *moderate* rating. Teachers rarely selected a rating of *minimal* or *expert* showing a tendency to rate centrally in self-evaluation.

Paired samples *t*-tests between pre- and post-PLD showed statistically significant increases in self-confidence in three of the five reading process items (phonemic, phonic, vocabulary) and two of the three classroom practice items

(assessments, English Language Learners). Effect sizes were largest for changes in self-confidence of teaching phonemics and phonics. Table 9 shows the mean scores, standard deviations, *t*-values, and effect sizes for the eight items at both time points.

Table 9. Teachers' self-confidence ratings for each item of the survey

n=20	Pre-PLD		Post-PLD		<i>t</i>	<i>d</i>
	M	SD	M	SD		
Reading process						
Phonemic	2.16	0.69	2.68	0.48	3.29**	0.87
Phonics	2.37	0.60	2.79	0.54	3.62**	0.81
Fluency	2.37	0.68	2.63	0.50	1.76	0.58
Vocabulary	2.42	0.61	2.79	0.54	3.24**	0.67
Comprehension	2.58	0.61	2.63	0.50	0.38	0.17
Classroom practice						
Children's literature	2.53	0.51	2.58	0.51	0.57	0.10
ELL	2.00	0.76	2.37	0.60	2.69*	0.59
Reading assessment	2.53	0.70	2.84	0.50	2.36*	0.58

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

#### Reading process

The five items in the reading process category shown in Table 9 are reported in two sections: code (*phonemics*, *phonics*, and *fluency*) and language (*vocabulary* and *comprehension*). The components were analysed according to code and language to discern any difference in teachers' self-evaluation between

the two components of the Cognitive Foundations Framework and to identify teachers' confidence in the code component of reading.

Code component (phonemics, phonics, fluency): Paired samples *t*-tests between pre- and post-PLD data showed statistically significant changes in self-evaluation for phonemics and phonics, with both items having the largest effect sizes in the survey. The percentage of teachers who rated their knowledge for teaching phonemic awareness as *very good* or *expert* increased from 30% to 70%. The percentage of teachers who rated their knowledge as *very good* or *expert* for teaching phonics increased from 40% to 75%. The paired samples *t*-test for fluency was not statistically significant and the effect size was moderate. The percentage of teachers who rated their knowledge as *very good* or *expert* for teaching fluency changed from 38% to 60%.

Language component (vocabulary, comprehension): Paired samples *t*-tests between pre- and post-PLD data showed statistically significant changes for self-evaluation in vocabulary, with a large effect size. The percentage of teachers who rated their knowledge for teaching vocabulary as *very good* or *expert* increased from 40% to 75%. The results for a change in rating for comprehension were not statistically significant, and the effect size was low. The percentage of teachers who rated their knowledge for teaching comprehension as *very good* or *expert* increased from 55% to 65% after the PLD.

#### *Classroom teaching*

Reading assessment, children's literature, teaching ELL: Paired samples *t*-tests between pre- and post-PLD data showed statistically significant changes for teaching ELL and reading assessment, but not for children's literature. The effect

sizes for ELL and reading assessment were moderate, but low for teaching children's literature. The percentage of teachers who rated their knowledge as *very good* or *expert* for reading assessments increased from 55% to 80%. The rating for teaching children's literature showed the smallest of all increases from 50% to 55%. The percentage of teachers who selected a rating of *very good* or *expert* for teaching ELL increased significantly from 25% to 45%. Teachers felt least confident in teaching ELL compared to the other items in the self-confidence check.

### ***Summary of teacher knowledge and self-confidence***

The results from the BLC test showed that teacher knowledge in constructs of *phonemics, phonology, phonics, and morphology* increased after PLD that focused on developing teacher knowledge of the code component of reading. Teachers' knowledge in the phonemic and phonological constructs was higher than that in the phonics and morphological constructs prior to and after the PLD. The mean percent scores in all the constructs were 60% or above after the PLD, increasing from scores below 50% prior to the PLD. Overall, the results showed teachers' knowledge was significantly improved after the PLD, with moderate to high scores in all constructs.

Prior to the PLD, teachers' self-confidence in their knowledge for teaching the code component of reading was lower than the evaluation of confidence in the meaning component. The lower self-confidence matches the lower scores of teacher knowledge in linguistic constructs. After the PLD, more teachers rated their knowledge for the code component as *very good* than they did for the meaning component, which is matched by an increase in score on the linguistic construct test.

### ***Teaching practice***

This section presents data on two aspects of teaching practice: small group reading instruction (video observations) and teaching prompts suggested for a range of reading errors. The results from the teaching practice measures provide data on teachers' practice before and after the PLD (RQ 2).

### ***Observations***

For the observations, each of the six lesson elements was rated in one of four categories using the indicators from the rubric. The four rubric categories were *discovery* (1), *incidental* (2), *intentional* (3) or *systematic* (4). A score of one or two indicates implicit teaching, while a score above two indicates a change towards explicit teaching. The results were analysed for each lesson element and for the lesson overall. Appendix 9 shows the results graphed by percentage of lessons in each rubric category.

Observation data are presented from the 23 teachers with pre- and post-PLD video of practice during small group reading instruction. The pre- and post-PLD data from the observations were analysed using mean scores for each lesson element of the rubric. Prior to the PLD, the mean score was 1.73 out of a possible score of 4; all 23 lessons were categorised as implicit prior to PLD. The post-PLD mean score of 2.67 shows a shift in practice toward overall explicit practice. The results in Table 10 reveal statistically significant changes, with medium to large effect sizes for each of the six lesson elements and for the lesson total. A change in the score from a category of 1 towards a category of 4 represents a move from implicit practice of the discovery or incidental categories towards explicit practice of the intentional and systematic categories. All lesson components showed an

increase between 0.7 and 1.1, which reflected a change in teaching, on average, of one rubric category towards more explicit teaching.

Table 10. Mean scores for lesson observations pre- and post-PLD

	Pre-PLD		Post-PLD		<i>t</i>	<i>d</i>
	M	SD	M	SD		
n=23						
Lesson focus	1.79	0.72	2.86	0.95	5.09**	1.27
Teaching strategies	1.75	0.87	2.45	1.03	3.99**	0.73
Code teaching	1.79	0.64	2.60	1.08	3.37**	0.91
Text selection	1.43	0.51	2.48	1.16	4.30**	1.17
Reading strategies	1.76	0.89	2.64	1.09	3.69**	0.88
Resource materials	1.90	0.94	3.00	1.23	3.75**	1.00
Overall	1.73	0.57	2.67	0.92	5.59**	1.23

\*\*  $p < .01$

In the lesson element of *lesson focus* most lessons were categorised as implicit, prior to the PLD. It was common to see the levelled book introduced at the beginning of the lesson. The introduction focused on the content of the text with some opportunities for children to hear words or sentence structures that would occur in the instructional text. Very few lessons included any explicit teaching before reading of the text. After the PLD, there was a significant change to the number of lessons categorised as explicit. Lessons categorised as explicit began with focused teaching about the code, selected for the group's learning needs.

Prior to the PLD, in the lesson element of *teaching strategies*, the most commonly used strategies were questioning or prompting learners to consider what they know for reading the text. After the PLD, just over half of the observed

lessons were categorised as explicit, where the teacher explained and modelled new knowledge and strategies. However, questioning remained a dominant strategy for many teachers.

For the lesson element of *code knowledge*, almost all lessons prior to PLD were categorised in the implicit categories. Teachers approached the teaching of code knowledge when a difficulty arose within the reading of the levelled book. The result of this incidental teaching was that the flow of reading was halted, with some observations showing up to 40% of the words in a sentence needed teacher support during the text reading. After the PLD, over half of the observed lessons were categorised as explicit, as they included a distinct section of code teaching before reading the text.

Prior to the PLD, for the lesson element of *text selection*, all lessons were categorised as implicit. Texts selected had natural language (e.g., *Ready to Read*) or had a controlled introduction of high frequency words (e.g., Price Milburn). After the PLD, *text selection* showed a change to texts that facilitated a more explicit approach. The selected texts in these lessons were decodable, either specifically purchased or teacher-made to better support the code teaching purpose. However, after the PLD, two core book series (*Ready to Read* and PM) were still predominant, with half of the lessons using these.

For the lesson element of *reading strategies*, a large majority (80%) of lessons prior to the PLD were categorised as implicit. In these lessons, teachers promoted the use of context cues for any unknown words, with minimal direction towards the code information. Any support teachers provided for using code cues commonly included the teacher sub-vocalising the initial part of the word to assist

a child to start an attempt. After the PLD, more than half of lessons were categorised as explicit for *reading strategies*. In these lessons, teachers directed children to use all the print information in a word, with sentence meaning used to support and confirm the decoding attempt.

Prior to the PLD, most observed lessons were categorised as implicit for the element of *resource materials*. The main teaching material used was the instructional book, with some inclusion of word cards for a review of sight words. After the PLD, two thirds of lessons were categorised as explicit for *resource materials*. These lessons included the use of magnetic letters and whiteboards for teaching about the printed code, with almost half of all lessons categorised as systematic where the teacher and the students used the materials. The results showed that the lesson element of *resource materials* had the most lessons categorised as systematic of all the lesson elements.

#### *Prompts task*

The prompts task was used to obtain data on the type of support teachers suggested when a child made an incorrect attempt reading a word in text. Data were available for 21 teachers who completed the task, pre- and post-PLD. The suggested prompts were analysed for use of a code-cue first and explicit direction to use a decoding strategy. Paired samples *t*-tests were used to compare prompts from pre- to post-PLD. The results were statistically significant and effect sizes were large. Table 11 shows mean scores, standard deviations, significance, and effect sizes for the two criteria across all scenarios at pre- and post-PLD.

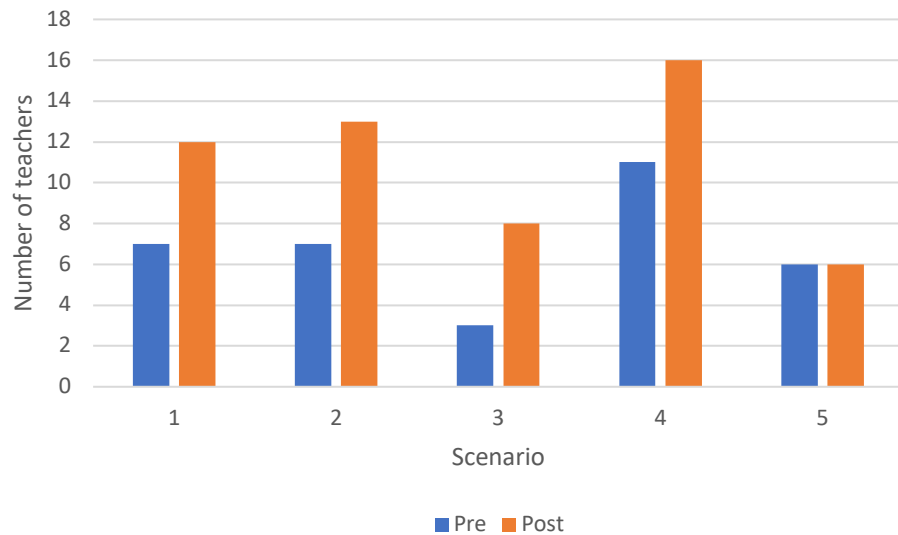


Table 11. Results for teacher prompts across the five scenarios pre- and post-PLD

Prompt criteria	Pre-		Post-		<i>t</i>	<i>d</i>
	M	SD	M	SD		
Code-cue first	1.67	1.06	2.81	1.36	4.72**	0.93
Decoding strategy	0.81	0.98	3.20	1.12	8.77**	2.15

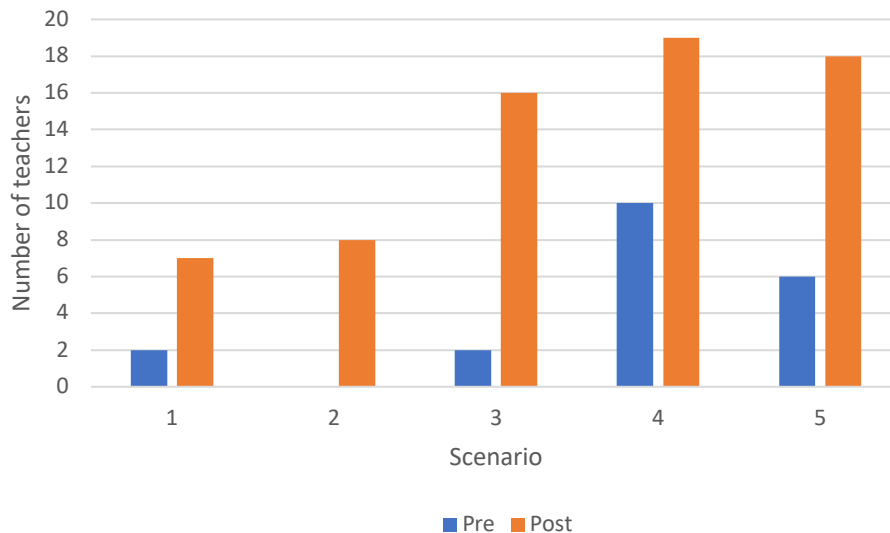
\*\*  $p < .01$

Code cue first: A paired samples *t*-test result was statistically significant for comparing the use of a code-cue as the first prompt. Pre-PLD across all scenarios, 32% of teachers directed children to the word first, whereas 68% suggested a context-cue as the first cue. The suggestions included context prompts such as “Did that make sense and sound right?” After the PLD, 52% of teachers now made prompts suggestions with a focus on code-cue first. While the use of a code-cue as the first prompt increased, for scenario 3 and 5, many teachers continued to prompt for meaning before any prompt for code detail. Figure 5 illustrates the changes made at each scenario for code-cue as the first prompt.



*Figure 5. Numbers of teachers prompting for code-cue as the first prompt for each scenario pre- and post-PLD*

*Decoding strategies:* A paired samples *t*-test was statistically significant for comparing teachers' suggestions for the use of specific decoding strategies, prior to and after the PLD (Table 11). The large increase in mean scores across the five scenarios represents an increase from 20% to 65% of teachers selecting a decoding strategy as a prompt after PLD. Prompts common prior to the PLD included generalised prompts such as "Can you find your mistake?", "Try that again", or "Get your mouth ready". The most common guidance for directing children towards a decoding strategy was to use the first letter of the word, with very few suggestions guiding a learner to use other sub-lexical units. After the PLD, many teachers directed children to use decoding strategies, for example, "Let's look at the word and break it into sounds". The graph in Figure 6 shows the results for prompts using a decoding strategy.



*Figure 6. Numbers of teachers suggesting decoding strategy prompts pre- and post-PLD*

### **Summary of teaching practice**

A significant change occurred in teaching practice within small group reading instruction. Prior to the PLD, all lessons were rated in the implicit categories, as would be expected in a system that has promoted a top-down approach to the teaching of reading. After the PLD programme, just under half of all lessons were rated explicit, in the intentional or systematic categories; just over half of lessons were rated as implicit in the discovery or incidental categories. Almost half of the lessons now focused on teaching the code component, guided by the *scope and sequence* from the PLD workshops. These lessons included a specified section where teachers explained new knowledge and modelled a decoding strategy. In these lessons, children practiced the learning at a word level, before applying the knowledge to the independent reading of a short text.

A significant change occurred with the approach to suggested prompts at an unknown word. Prior to the PLD, teachers predominantly promoted context-cues, such as semantics and syntax, as the first and main sources children should use to work out unknown words. The code cues generally received little emphasis, with most teachers directing children to say the first letter and then use the context to guess the word. It was rare to find evidence of teachers promoting decoding strategies for the whole of the word. The change after the PLD showed that many teachers directed children to code-cues and decoding strategies showing a change in emphasis for the use of the code component.

### ***Correlations of teachers' knowledge with teacher practice***

The results from the test of teacher knowledge and the observations of practice showed that after PLD, teachers' knowledge had increased and teaching practice was more intentional and systematic. However, a post-PLD Pearson  $r$  calculation was low and not statistically significant,  $r(17) = .21, p = 0.42$ .

While the correlation was not statistically significant, a teacher-by-teacher analysis revealed some connections. All teachers with post-PLD lessons categorised in the two explicit teaching categories had high teacher knowledge. Significant change occurred in both knowledge and practice for these teachers. Only one teacher had a low teacher knowledge score post-PLD and this teacher's lesson was categorised as implicit. This teacher made little change in knowledge during the PLD but teaching practice changed from a pre-PLD score of 1.0 (discovery category) to a score of 2.7 (incidental category), revealing more change in practice than change in knowledge.

The lack of correlation between knowledge and practice most likely occurred because of the nine teachers with high teacher knowledge (above 70%) had practice that was categorised in the two implicit teaching categories. Four of these nine teachers scored above 70% in the knowledge test, but remained below 2.5 in the lesson rubric, resulting in a mismatch between knowledge and practice. The graph in Appendix 10 shows the correlations.

### Teacher interviews

Interviews were conducted with teachers to help identify influences other than teacher knowledge on change to teaching the code component to children as beginning readers. The teachers selected for interview varied in their years of teaching, the school decile, and extra training (see Table 12). The teachers selected for interview covered a range of school decile and years teaching. Each of the interviewees is assigned a pseudonym for the presentation of the data.

*Table 12. Information on interview teachers*

	Ria*	Carol*	Kate*	Jill*
Decile band	low	mid	high	mid
Years of teaching	8	12	6	+25
Qualification	degree	diploma	degree	diploma
Reading Recovery	yes	yes	no	no
Phonics programme	yes	yes	no	yes
Years of New Entrant experience	>5	>5	<5	>5

\* Each of the participants was assigned a pseudonym by the researcher.

Data from the quantitative phase of the study showed that interview teachers had different scores in the teacher knowledge and teaching practice measures. Ria suggested fewer prompts for code-cue first and had a more implicit approach to small group lessons than the others in the group. Carol showed a similar level to Ria of using code-cue as the first prompt but more change toward explicit approach to small group lessons. Kate and Jill showed the most change to a code-cue as the first prompt and most change towards explicit teaching in small group lessons. Table 13 below shows the results from the knowledge and practice measures for each interview teacher.

*Table 13. Data from the teacher measures for the four interview teachers*

Measures	Ria		Carol		Kate		Jill	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Knowledge	29	32	17	26	15	28	22	27
Self-confidence	29	24	17	20	15	13	22	22
Observation	1.0	2.1	2.1	2.6	1.6	2.8	1.8	3.9
Prompts: Code first	0	2	2	3	2	5	1	4
Prompts: decoding	0	3	1	3	2	4	1	4

The interviews are described and analysed under thematic headings derived from the initial interview analysis, using NVivo software. The themes were present in the responses of all participants, with the theme in some cases an enabler and in other cases a barrier. As outlined in the Methods chapter, the collection and the analysis are affected by the role of the researcher as interviewer

and PLD provider. Some of the interpretations arise from the researcher's own knowledge of classroom teaching and of making a change in teaching practice.

### ***Teacher beliefs***

Teachers were asked about the changes they had made to their approach to teaching reading since the PLD. Many of the responses showed that teachers held strong beliefs about how children learn to read and how reading should be taught, which appeared to influence the amount of change towards explicit systematic teaching of the code.

Ria described her attempts to change her practice from a context-cue first, multiple-cues approach to a focus on the code component.

*I'm putting a lot more emphasis on ... not so much emphasis on meaning and more emphasis on trying [the word]. But I know I'm not as explicit as I could be, and I also know that personally I'm very meaning driven. I love books and I read all the time. So, for me, well, if it hasn't got a story well what's the point? So, it's a mindset that's very embedded. (Ria)*

Ria's response revealed a conflict about the consequences for meaning as an outcome if the teaching emphasis changes to using a code-cue first. The conflict is confirmed in prompts data, where suggesting context-cues first remains evident. Video observations showed many lessons retained a dominant focus on the meaning of the story, rather than on strategies that would help the children decode the words. Beliefs about the priority of meaning for reading appear to override the need to help children master a range of skills in the code component. Kate's responses revealed a similar conflict over the position of meaning.

*I haven't given up on meaning though because I feel like that is a really important part, but I feel I would probably say that I use the code first and then use the meaning because I still want children to be excited about reading books.* (Kate)

Kate's response suggested she confused meaning used as a processing strategy and meaning as an outcome of reading. In contrast to Ria, the prompts data showed Kate suggested a code-cue first prompt for all five scenarios and a decoding strategy for four scenarios. Her lesson included a specific section on teaching code knowledge. The changes she made to her practice suggest she did separate meaning as outcome from meaning used as process, even though this interview response reveals some ongoing conflict in stated beliefs.

Evidence of the difference between teachers' responses and practice was seen in another of Kate's responses. When Kate was shown the scenario results where she suggested code-cue prompts first, she reflected on her attempts to change the way she taught reading.

*I definitely think that the meaning and structure are important, but this [the PLD] has shown me to put focus on the code, but not in isolation and it's getting the children to explicitly notice the code.* (Kate)

Kate's response reflected the change in her views of the code component. However, the phrase "not in isolation" reflected a belief, commonly found in what teachers say about how they teach reading, that word study should only occur while reading or writing an authentic text, rather than as explicit instruction in a section of the lesson prior to the reading of text.



Ria stated her preference to teach code knowledge during writing lessons, which may mean she did not see the need to change to code teaching within small group reading lessons.

*I do a lot of my strategy sound work in writing. What can you hear?*

*Pull it out. And then apply that when I can in their reading ... make the links.* (Ria)

Ria's comment that the application to reading would be "when I can" showed that teaching code knowledge was regarded as an incidental opportunity, rather than following a sequence. The response indicates that phonic knowledge from a writing lesson may not be transferred to a reading context in a manner that promotes timely repetition to secure the code detail. Ria did not appear to recognise the difficulty an incidental teaching approach created for applying new learning.

Another belief evident in teacher responses to the interview question about small group reading instruction was the place of whole word learning as a key approach in teaching beginning readers. Sight word or high frequency word learning featured in Kate's response to a question about helping children make progress as beginning readers.

*She struggled with looking [closely at the word]. I focused on high frequency words ... lots of work on high frequency words which give her ability to do some reading and transfer to her writing.* (Kate)

Kate's response reflected a belief that learning key high frequency words provides the framework from which to build the reading and writing process. In

this approach, teachers use texts that have enough of the known sight words for the child to begin reading a sentence, then use semantics and syntax to help guess the unknown words. The approach is evident in Kate's response, in her observed lessons, and is evident in observations of other teachers' lessons. Carol's response also revealed the belief that children learn to read with a focus on learning whole words.

*I relate it [the word learning] back to the books because I want to have my word for the week so that book's got to have that word. (Carol)*

Carol's response shows the practice of learning sight words was central to how the code component is taught, similar to Kate's description of using sight words.

Jill indicated she had a changed her beliefs about teaching reading after trialling a new teaching practice. Although her belief in a meaning-first approach was dominant prior to the PLD, she was able to adjust her beliefs after seeing that a change in practice had a positive effect for the learners.

*At first, I was worried about trying the word first because I thought children needed the meaning. I've always done it that way. But I'm so glad I tried it because the children can do it. (Jill)*

The interview responses revealed teachers' beliefs about how children learn to read, and the teaching practice needed. The responses showed that teachers believed that children learn to read through using connected text. Teachers emphasised meaning first and the learning of high frequency words, rather than teaching children the importance of phoneme-grapheme relationships

to reading a word. Lesson observations confirmed the teachers' beliefs as occurring in practice. All teachers made some changes towards practice that included more focus on the code component. However, some hesitance to change from a meaning-first approach was still evident.

### ***Systems and practices***

Beliefs about the teaching of reading were also revealed in the use of particular practices. Kate described the difficulty in changing from the familiar practice of guided reading where the focus of teaching was on the levelled text.

*So, I haven't [been able to not use a book] ... and it's a school policy anyway to do the guided reading. (Kate)*

Kate's response indicated that guided reading remained the main practice for all lessons, even for children at the early levels of reading. In Kate's observed post-PLD lesson, she included an initial section of teaching code knowledge, with close reference to the *scope and sequence*. However, the selected text did not enable application of the teaching focus. The natural language text had many words outside of the decoding capacity of the group so was difficult for the group to read successfully. The teacher and the children had to rely on a multiple-cues approach to the text, with the teacher telling children many of the unknown words.

Similarly, Carol attempted to change from a lesson dominated by the levelled book, towards using a skills-based approach. Carol attempted to find word patterns in the group's levelled book that related to the *scope and sequence*.

*Having a focus on the skills rather than the book would be one of the main shifts. You're much more conscious when you choose a book of the chunks and endings and word bits ... the words you choose to work on are words that ... mine are always from the book.* (Carol)

The response shows that the changes Carol made remained within a continued focus of the levelled book. Carol's response reveals the book is still the main focus with skills teaching arising from difficulties in reading the book.

Teachers were asked about teaching phonic knowledge from the *scope and sequence* within the lesson, rather than as a separate phonics lesson as was the practice in some schools.

*I've trialled it but in terms of making it fit into the way we were running the lessons, it was a little tricky because we work across the three classes. We do Letterland [a phonics programme] and I find it really quite effective, so I need to think how to keep that.* (Ria)

Ria could see the importance of the *scope and sequence* progression but had concerns about replacing the existing phonics programme. Carol reported a similar concern because the school data showed that children's word knowledge had improved since introducing a phonics programme to supplement the existing reading programme. In both these schools, the teachers valued the explicit teaching of phonics in a directed programme but relied on separate lessons and cross-grouping across classes to enable teaching at the right stage in the phonics programme. It appeared that using a structured programme gave teachers a sense of security in teaching code knowledge.

Another system that made changes difficult was the sending home of the instructional text from each day's lesson. Jill noted that it was difficult to change from the book as a focus in instructional reading because of parental expectation of a book for home reading each night.

*I'm doing a lot more teaching on the whiteboard or a sentence written in their books because I'm following the scope and sequence. But parents expect a book. Their kids come to school and they expect to have a book to read.* (Jill)

Systems and set practices can enable efficiency in teaching. However, systems can hinder change. The interview responses showed that teachers had difficulty when changes they wanted to trial were in opposition to usual practice that can become an embedded system.

### **Resources**

In the interviews, teachers were asked to consider the role of resources in their teaching. In particular, the interviewer asked how new resources presented in workshops supported change to explicit teaching of the code component of reading. All teachers found the *scope and sequence* was a positive support in changing their teaching practice. Kate described the effect of the knowledge provided in the *scope and sequence*.

*The phases were a good light bulb moment for me, because I realise this is why I am so stuck with these children. I realise that I was trying really, really hard and don't feel like we're getting anywhere ... so the phases*

*helped me think what do I need to give children earlier so then I can speed them along faster?* (Kate)

Carol remarked that the *scope and sequence* guided the selection of a teaching focus. A video of Carol's lesson showed she selected a word pattern from the selected book that was also appropriate to the *scope and sequence*.

*I started using the immediate letters for the text and using the scope and sequence for what to teach ... much more detailed than what I was doing.* (Carol)

The *scope and sequence* provided teachers with knowledge about appropriate teaching points for each learner. Ria reflected on attempting to apply the strategies from the *scope and sequence* to existing book resources.

*I'm trying to use the scope and sequence without necessarily having changed the book. So, you need to get your texts quite carefully selected, that it's going to be a wee bit tricky, and you'll be able to do a bit of teaching work on that.* (Ria)

Many teachers found it difficult to use natural language texts (e.g. *Ready to Read*) and texts based on sight word knowledge (e.g. *Price Milburn* series) with the systematic *scope and sequence* because the texts are not structured according to word patterns. In general, teachers showed a continued commitment to using instructional texts that closely aligned to spoken language. Some teachers found that decodable texts, where words are presented according to their linguistic structure, were difficult to use.

*You need to have the right resources but some of the books were so hard to get your head around because they didn't make sense, you know, some of the wording just didn't ... it doesn't seem like a sentence. (Ria)*

Ria's reaction to the simplistic texts is understandable because natural language texts are more enjoyable to listen to. The decodable texts restrict the words used to single syllable and certain spelling patterns, making them unusual from a natural language view. However, contrary to Ria's comment, the sentences do make sense. Ria's comment reflects a preference for particular books to teach beginning readers and that changing to decodable texts was difficult as a teacher used to other texts.

In regards to natural language texts, Ria noted that students did not need to use code detail in the same way as they did with decodable texts because using the context enabled them to work out the word with a small amount of the print detail.

*The difficulty is if you are using a book where it's really obvious what the word is and they don't see the point [to look at code detail] so that's where those other books come in. (Ria)*

Ria identified that context cues can compensate for closely attending to print. Teachers can over-rely on a child's tendency to use the context by accepting attempts without checking how the child succeeded in the attempt. As an example, observation of Ria's lesson revealed she did not check if the child had used code detail or context, once a correct guess was made.

Ria noted that the decodable texts ("the other books") would have a use for specific teaching of decoding because the structure of the text demands the child

focus at print level. When asked to consider the use of the decodable texts, Ria noted that the focus on decoding the words rather than using multiple cues was a challenge for teachers and learners.

*The kids get really frustrated and the teachers do too because the reading's so hard, so you can only do a little bit of that.* (Ria)

Ria's response indicated that decodable texts may appear more simplistic in variety of word patterns and types of sentences, but the need to decode every word provided a cognitive challenge for which her learners were not prepared.

Teachers reported the challenge of finding instructional reading material to support explicit teaching of code knowledge in a developmental progression. Kate adapted a guided reading approach to include a section of explicit teaching, prior to introducing a levelled book. Discussing the video of the lesson with Kate showed she placed high priority on the explicit teaching section of the lesson.

*I tried to teach specific things before introducing the text, knowing there was a connection and I was choosing the books more carefully, so it had a correlation to the book I was using.* (Kate)

Using a levelled instructional text remained predominant. The emphasis on natural language texts promoted by Kate's school made it difficult to connect the teaching focus from the *scope and sequence* to the levelled text. The selected text included only two c-v-c patterns for the group to practice (*sit/sat*) with all other words difficult for these beginning readers to decode (*walked, came, jumped*). Kate attempted to solve the difficulty that the range of word patterns presented.



*The Ready to Reads are tricky for this group. ... So I try not to focus on too many things. From the workshops, I think I got better at when to give a word and thinking that is not where the child is at yet. (Kate)*

Kate shows she has considered learner needs and how she can support them to read the selected text. The difficulty with using a reading series that relies on a multiple cues approach to teaching reading, resulted in Kate telling the unknown words or directing children to meaning and sentence structure. The technique creates a useful short-term solution (a meaningful reading of the text) but not a long-term solution of having effective strategies for reading other texts.

### **Teacher knowledge**

The PLD in this study focused on increasing teacher knowledge in linguistic constructs of English and provided teachers with a *scope and sequence* as a guide to teaching. When asked about the knowledge about language from the PLD workshops, Kate discussed the influence she felt it had on her teaching.

*That has definitely helped me. It has improved my teacher practice, which then has made me a better teacher of reading. To understand where words come from and how they are put together so if I know that, I can know what I need to communicate or teach to the children. Not all of it you have to share but when you know the stuff as a teacher, you can know how to use it for the children. (Kate)*

Kate identified that her increased knowledge benefitted her teaching and her learners. Kate's comment showed she found knowledge was vital for teaching

the code component when she combined it with explicit teaching opportunities. Similarly, Carol mentioned the knowledge she gained about words.

*The 'soft c' rule. I never knew that rule. We just know the spelling and that's it, but we don't know the rule.* (Carol)

Carol's response illustrated that teachers often have implicit knowledge about spelling patterns, a point that corresponded with results from the knowledge test. While Carol noted the new knowledge about word patterns, a query she raised about the need for the level or detail of knowledge showed some conflict.

*I made one comment somewhere "does it really matter for five-year olds to know open and closed?" I mean, I know that there's two different – trapped and not trapped – but then I get mixed up with which is which. As long as we know that, then is my five-year old going to need to know that?* (Carol)

Carol's response indicated she thought the knowledge was important for teachers ("as long as we know"), while admitting her knowledge of concepts was unstable ("but I get mixed up"). Questioning the necessity of the knowledge may indicate a lack of confidence in her own knowledge and could act as a barrier to change. The comment contrasts with Kate's understanding that teachers' knowledge combines with pedagogy for effective teaching.

### ***Colleagues and management***

All interviewees attended the PLD workshops with at least one other school colleague. Jill found colleague support within the workshops to be useful. She and her attending colleague used the videos of their lessons to give feedback about practice. She hoped to continue reflection on video of lessons and to share the knowledge with the wider team. Jill was also keen to share her learning with the rest of her team.

*I just feel so privileged to be part of this and that's why I want to share it with the team. I think that if we can get in next year and really go for it and we get the team on board. I just think it's so powerful. (Jill)*

Jill's reflection showed the positive side of colleague support. In contrast, Kate noted that colleague influence could make change in practice difficult.

*Quite a lot of the messages I was getting through the course and the messages I was getting through school were different so for me as a new learner, trying to gather new information and work it out for the children I was teaching was difficult. (Kate)*

The difficulty for Kate was that she wanted to change practice to include more of the code component and could see the importance for many of her learners. The predominance of an implicit and multiple cues approach in her school was a source of conflict for Kate because the levelled book needed to take precedence over teaching code knowledge. Similarly, Carol experienced conflict from team expectations for teaching the code in a separate phonics lesson.

*I was putting the scope and sequence into the phonics time. But John [principal] suggests we do the phonics teaching as part of the reading lesson. Some of the team will find that change hard because we swap groups to get the right level.* (Carol)

Carol's response indicates that she experienced conflict between what colleagues in the team expected and what the PLD and the principal advocated. Another example of positive support from a principal was in a lesson that Ria trialled, using the model lessons from the workshops.

*The lesson was very specific, and the kids were really engaged. The principal was very happy with it.* (Ria)

Ria acknowledged that the lesson worked well, and that the principal wanted the changes, but was hesitant to change from lessons that focused on reading a levelled text with phonics lessons separate.

*I am happy with the way we have things going. We need to know that this new way will work before we try it.* (Ria)

Colleague influence was an enabler to change in practice when other teachers and senior management at the school supported the change. Colleague influence was a barrier to making changes to practice when the majority of teachers and the senior management in the school rejected the direction. However, Kate made significant changes to her practice, even with challenges from colleagues, and Ria made less change, even though her principal supported the change. It appears that change can be influenced by the individual teacher's response, in spite of a colleague's opinion.

### **Student progress and needs**

Children's progress in reading confirmed for some teachers that the changes made to teaching practice were effective. Jill commented how the learners' progress had influenced her commitment to the teaching changes.

*It's slow at the start just to get it established, you know, because you can't see it. I watched their little faces and there was confusion for a few of them. But suddenly the light went on for one and I knew in the next lesson he'd have it and then the others might click. We do the sounding and blending, and I know it's early stages, but they get it. Then they do it in their writing and I can see it.* (Jill)

Jill reported that the change from a multiple-cues, meaning-based approach was difficult at first for teacher and learners. Jill's commitment to explicit teaching of code knowledge and decoding strategies ensured the children's progress.

*I have used the little decodables and let the kids do the work because I won't do it for them. I think they are empowered enough now to have a go. So, she came to a word and she looked at me and I said "No, you look at it and break it up and then you put it back together again" and she did it!* (Jill)

Jill attributed the children's progress to the explicit teaching and the specific resources. Positive student progress had a powerful effect on this teacher's commitment to a change in practice. Kate made a similar observation about the effect her change in teaching and improved teacher knowledge had on a student's progress.

*I noticed M's spelling became better. We used syllables in reading and then she used that for her spelling and got better at that. (Kate)*

### **Time constraints**

Time as a constraint was a theme that arose as having an effect on making changes suggested in the workshops. Ria trialled a lesson that followed the PLD recommendations, using explicit teaching of code knowledge followed by presenting a carefully selected text for the group to read. Ria found that the lesson took much longer than a guided reading approach that focused on the reading of a book.

*My difficulty was that it was way too long and I don't have enough time to get through the numbers so it's about being smarter with that and cutting it down a bit. (Ria)*

The time issue occurred as a result of Ria's commitment to reading all of a text. Attempting to add the explicit teaching section to the existing lesson structure caused a time difficulty. Ria was unsure how the time issue could be addressed within the constraints of a guided reading lesson for all groups.

Another time issue occurred from the demands of new professional learning. It was evident during interviews that teachers worked long hours and had many demands on their professional time. Jill noted that other school commitments made it difficult to process the new knowledge from the PLD.

*I am disappointed that I haven't done it justice in that I haven't had the time because we've actually had three things on the go. We would*

*return from a day at the workshops and have a staff meeting on Inquiry. I don't think I did justice to the readings and things because you almost need a day to digest it afterwards and consolidate. We didn't have time to really reflect on what we had learnt.* (Jill)

Jill had high expectations of her practice and wanted to utilise the new knowledge from the PLD. She noted three times during the interview that the readings from workshops were on her list of things to catch up with over the holidays. Kate also found that time to adapt practice was an issue.

*To have had the time to talk about it and to have been shown more. Teachers are so busy so if time can be utilised in the act of teaching, I think it sticks better. Yes, you need to go out and gain knowledge, but you also need time to try and be supported to try. And have it sequenced so we are getting more over time. And get feedback from an expert there and then.* (Kate)

The time issue is related to the process of PLD and the inclusion of a coaching element.

Teachers agreed that using decodable texts would be useful but changing their programme to include them as the core texts was more challenging. Teachers found they needed time and support to be able to include the new resources into the current programme.

*Yes, I know we have them [decodable text series] there but I just haven't looked at how to use them. We wanted to save them for next year and work out exactly how we are going to slot them in.* (Jill)

Jill was committed to adapting her practice in small group reading instruction and used some of the provided texts. However, the comment suggests she needed time to consider how to use the decodable texts within the current programme.

Workshops were spaced over the year in order to enable teachers to apply new learning to their teaching. Kate found that the workshops spaced over the year had both a positive and negative aspect.

*I liked that it was spaced over the year because at the beginning it doesn't quite make sense, but you have to be patient because all the pieces have to come in and help it all make sense. But because we did the first part of the course in the first term, we couldn't put things in action until the second term and I felt I was chasing my tail all the time. (Kate)*

Kate's response shows that the information from across all the workshops was necessary to have full understanding. She liked the time to process but found that each piece made more sense once all workshops had been completed. Kate also found that new knowledge could not be applied to practice immediately and that the children's progress was possibly slower as a result.

### ***Attitude for change***

The interview responses revealed variables that were barriers or enablers to a change in teaching practice. A theme that emerged during analysis was different attitudes for change. Two of the interview teachers appeared more open to a change in their practice. Kate reflected on the contribution of new knowledge and more explicit teaching practice to a learner's progress.



*She had been having trouble, but I think it was my teaching that was at fault. I think she needed more explicit teaching and I didn't have the skills, so when they improved, I was able to support her. (Kate)*

Kate's response that it was her teaching at fault highlights the importance of teacher attitude in making changes to practice. She did not attribute lack of progress to the learners but reflected on her own knowledge and practice. Kate's interview responses showed she invited further support and critique by suggesting a layer of coaching. She mentioned the importance of her own continuing learning a number of times through the interview. Her engagement in the workshops, observations of practice, change in suggested prompts, and increased teacher knowledge all confirmed this attitude to learning. Her comparatively low self-evaluation may be attributed to feeling she had less experience than her colleagues as she was new to teaching beginning readers.

Jill showed an attitude of preparedness to change. She had initially been reluctant to change from using a multiple-cue, meaning-first approach to using the code information needed as the first cue. However, after her efforts to change seemed to provide children with more success, she committed to the change in practice. Observation of her teaching video shows a change from implicit practice to a focus on explicit instruction of the code component. Her interview responses show her commitment to reflecting on her practice and what this means for her learners.

Jill and Kate's teaching videos showed they both changed from using questioning as the dominant teaching strategy to utilising explanations and direct teaching. The data showed that Jill and Kate suggested code-based prompts first

and prompts that focused on a decoding strategy. In contrast, Ria and Carol's videos showed teacher questions as the main teaching strategy. Their observations and prompts task results showed a preference for multiple cues and meaning-based prompts.

Ria said she remained open to considering the changes to teaching that had been presented in the workshops but was concerned about children's progress when current assessments (running records) were used. Ria was committed to her learners' progress but believed the current programme was providing for those needs.

The interview responses from Jill and Kate confirmed data from the observations and prompts that showed a commitment to change to explicitly teaching the code component of reading. Carol's interview responses showed evidence of a change in thinking, but the observations and scenarios showed that she retained more implicit teaching than Jill and Kate. Ria's interview responses, observations, and scenario prompts show some reluctance to change the approach to teaching reading.

An analysis of the interview responses showed that the two teachers whose lessons retained a more implicit approach both had specific training as teachers of Reading Recovery. Both teachers had high levels of teacher knowledge and were committed to student progress, but they had some difficulty in changing from lessons where meaning dominated. Ria, whose lessons retained the most implicit approach to teaching the code was currently providing the Reading Recovery programme in the school. Her interview responses showed that she conflated the use of context-cues in the process of reading with reading for meaning.

Carol was not currently teaching in the school's Reading Recovery provision. She made more changes to teaching the code component than Ria did, but less change than Jill and Kate who were not Reading Recovery trained. Observed lessons showed predominant use of meaning prompts. The teaching of decoding strategies involved an analytic (whole-to-part) approach to teaching phonic knowledge, rather than a synthetic (part-to-whole) approach of blending letters to make a word. The lessons showed the continued dominance of the instructional text for the teaching points.

### ***Summary of interviews***

The interviews provide information that shows a range of influences on teachers making a change to explicit teaching practice. In particular, teachers' beliefs about the place of meaning in the reading process appears to be a barrier to change. Teachers with extra training in programmes that promoted a meaning dominated approach found it more difficult to change to explicit teaching practice of the code component. The interviews provided many examples of how the PLD enabled change. The most important outcomes from any change is if the change in practice makes a difference to outcomes for students.

### **Student data**

The PLD programme was carried out with the aim of improving teacher knowledge and explicit teaching of the code component, in order to positively affect outcomes for beginning readers. The data from the implementation group and the comparison group were used to compare effects on students whose

teachers participated in the PLD and those children whose teachers were in the non-PLD group.

The student data are presented as Time 1 (T1) and Time 2 (T2) to differentiate them from the teacher data. Means (M) and standard deviations (SD) for the implementation and comparison groups are presented for T1 in Table 14 and T2 in Table 15. Following the tables, the results are presented for MANOVAs in a 2 (Group) by 3 (Decile Band) design. Information on the ANOVAs is included where the MANOVA were statistically significant.

Table 14. Time 1 student outcomes for implementation and comparison group students on all measures

Variables. (Max.)	Implementation										Comparison					
	Low decile		Mid decile		High decile		Total		Low decile		Mid decile		High decile		Total	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Phonological awareness	n=41		n=37		n=31		n=109		n=15		n=21		n=25		n=61	
Elision (34)	3.34	4.44	2.98	2.84	5.23	3.79	3.70	3.84	2.92	3.43	4.29	3.24	5.92	3.19	4.66	3.45
Matching (33)	4.64	4.87	5.45	4.68	9.43	5.38	6.17	5.28	4.85	6.04	5.00	3.86	7.75	5.28	6.10	5.11
Blending (26)	7.09	4.09	5.24	3.68	6.57	2.50	6.28	3.65	5.69	3.23	6.33	2.90	7.25	4.10	6.57	3.51
Alphabetic coding	n=36		n=35		n=29		n=100		n=8		n=20		n=24		n=52	
Letter name (54)	13.91	17.73	16.95	16.14	23.00	18.51	17.36	17.60	6.92	9.35	20.86	14.19	25.76	19.32	19.86	17.17
Letter sound (54)	4.89	13.12	9.86	11.90	11.30	16.96	8.34	13.97	3.15	5.76	8.90	9.96	20.44	17.74	12.53	14.39
Language processing	n=38		n=35		n=31		n=104		n=15		n=21		n=25		n=61	
Receptive vocabulary	93.63	11.57	100.50	10.97	105.19	9.16	99.21	11.64	91.67	11.48	97.57	11.76	96.67	10.31	95.95	11.23
Reading spelling outcomes	n=35		n=34		n=31		n=100		n=8		n=21		n=23		n=52	
Clay (15)	0.39	1.73	0.33	1.56	0.57	0.97	0.41	1.49	0.08	0.29	0.10	0.44	1.25	1.48	0.58	1.15
Invent spell. (18)	0.02	0.15	0.02	0.15	0.20	0.66	0.07	0.37	0.00	0.00	0.00	0.00	0.04	0.13	0.02	0.13

*Table 15. Time 2 student outcomes for implementation and comparison group students on all measures*

Variables. (Max.)	Implementation												Comparison								
	Low Decile			Mid Decile			High Decile			Total			Low Decile		Mid Decile		High Decile		Total		
	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n
Phonological awareness	n=41			n=37			n=31			n=109		n=15			n=21			n=25			n=61
Elision (34)	11.27	6.00		11.08	6.60		14.52	3.62		12.13	5.81	4.47	5.01		12.00	4.93	12.52	6.08		10.36	6.35
Matching (33)	14.88	7.46		16.35	6.98		18.35	4.98		16.37	6.76	7.73	4.48		13.48	6.62	16.56	7.59		13.33	7.38
Blending (26)	14.85	6.03		16.14	6.77		19.19	4.45		16.52	6.11	7.40	3.81		14.33	5.54	15.84	6.49		13.25	6.50
Alphabetic coding	n=36			n=35			n=29			n=100		n=8			n=20			n=24			n=52
Digraphs (20)	2.36	1.90		3.57	1.38		3.14	1.68		3.01	1.73	0.25	0.71		2.00	1.97	3.17	1.81		2.27	2.01
Blends (5)	11.00	8.52		10.54	7.28		16.62	4.20		12.47	7.48	0.75	1.40		9.10	8.04	12.38	7.96		9.33	8.30
Sp. phonemes (72)	45.36	15.81		52.40	14.71		52.21	10.31		49.81	14.28	17.13	15.81		38.45	18.86	46.37	17.31		38.83	20.07
Language processing	n=38			n=35			n=31			n=104		n=15			n=21			n=25			n=61
Mispronounce (40)	8.68	4.94		12.37	8.39		9.45	4.02		10.15	6.27	3.93	2.25		6.67	3.28	6.80	3.38		6.05	3.29
Nonword rep. (34)	13.89	6.25		12.37	3.61		17.03	3.39		14.32	5.03	10.33	5.02		14.86	2.76	14.88	3.93		13.75	4.30
Outcomes	n=35			n=34			n=31			n=100		n=8			n=21			n=23			n=52
Burt	18.20	12.08		20.85	11.70		21.26	9.96		20.05	11.30	4.00	3.85		14.24	7.77	21.35	9.04		15.81	9.88
Pseudoword	5.06	6.41		7.47	6.23		7.94	6.78		6.77	6.53	0.50	1.41		3.86	6.39	5.65	4.84		4.13	5.43
Spelling (45)	4.37	2.88		6.62	3.61		5.29	2.48		5.42	3.15	0.50	1.07		3.29	2.70	4.65	2.79		3.46	2.90

### ***Code component***

Information on children's ability in the code component of reading was obtained from measures of phonological awareness and alphabetic coding skills. Analyses using a series of MANOVA revealed that the implementation and comparison groups were functionally equivalent on all measures at school entry, but differences as a function of decile bands were apparent. Students in the high decile band obtained statistically significant higher mean scores than students in the low decile band on all measures at T1 and T2. The graphs in Appendix 11 show the results for Group by Decile Band in code component tasks.

### ***Phonological awareness***

The T1 multivariate analyses results of the three measures of phonological awareness showed the children in the implementation and comparison groups obtained similar results in all three tests: elision, blending, and matching (see Table 14). The MANOVA main effect for Group was not statistically significant,  $F(3, 166) = .88, p = .45$ . The main effect for Decile Band was statistically significant,  $F(6, 334) = 3.64, p = .00$ . ANOVAs for Decile Band revealed that students from the low decile performed significantly lower than students from middle and high decile bands. The interaction effect for Group by Decile Band was not statistically significant,  $F(6, 334) = 1.12, p = .35$ , indicating that the results for decile bands were similar for the implementation and comparison groups. The mean scores and standard deviations are shown in Table 14.

The T2 results for the phonological awareness variables showed differences between the groups. The MANOVA main effect for Group was statistically significant,  $F(3, 162) = 7.33, p < .01$ . The implementation group scores were higher

than the comparison group on all variables. An examination of the ANOVAs showed the effect was significant for elision,  $F(1, 170) = 8.35, p < .01$ , blending,  $F(1, 170) = 19.84, p < .01$ , and matching,  $F(1, 170) = 13.25, p < .01$ .

The main effect for Decile Band was significant,  $F(6, 326) = 2.25, p < .01$ . ANOVAs revealed the effect was significant for all three tests in the cluster: elision,  $F(2, 164) = 12.66, p < .01$ , blending,  $F(2, 164) = 15.00, p < .01$ , and matching,  $F(2, 164) = 15.00, p < .01$ . An examination of the results showed that the effect for decile band was the result of the higher mean scores obtained by the high decile band in both groups.

The interaction effect for Group by Decile Band was statistically significant,  $F(6, 326) = 2.25, p = .04$ . ANOVAs revealed the significant effects for elision,  $F(2, 164) = 5.80, p < .00$  and blending,  $F(2, 164) = 2.99, p = .05$ , but not for matching,  $F(2, 164) = 2.14, p = .12$ . An analysis of mean scores shows that the low decile band implementation group exceeded the scores of the low-decile comparison group. In addition, the implementation group at least matched and sometimes exceeded the mid decile mean scores of the comparison group (Table 15). Graphs in Appendix 11 show the comparison in post-PLD outcomes in phonological awareness.

### *Alphabetic coding*

Alphabetic coding skills were assessed at T1 with letter knowledge measures as appropriate for school entry, and T2 with measures of blends, digraphs, and spelling phonemes. The T2 measures are a progression of the skills measured at T1 as described in the methods chapter.



Analysis of T1 results showed the MANOVA main effect for Group was not statistically significant,  $F(2, 168) = 1.22, p = .30$ . The main effect for Decile Band was statistically significant,  $F(4, 338) = 4.85, p = .00$ , with ANOVAs revealing the differences were for tests of both letter name and letter sound. The children in the low decile band obtained lower scores than the children in the mid and high decile bands. The interaction effect for Group by Decile Band was statistically significant,  $F(8, 334) = 2.91, p = .01$ . ANOVAs revealed a statistically significant result for lower case letter sound,  $F(2, 175) = 3.20, p < .05$ , with the high decile band comparison group obtaining a mean score double that of the high decile implementation group.

Table 14 shows the mean scores and standard deviations for letter knowledge pre-PLD. Both the implementation and the comparison groups had higher mean scores in letter name than in letter sound. The PLD children knew 32% of letter names and 15% of letter sounds, while the comparison group knew 37% of letter names and 18% of letter sounds at school entry. The mean scores were lower for the low decile bands than the mid and high decile bands in both groups.

T2 data for alphabetic coding showed emerging differences between the two groups, particularly in the results for the implementation group children in low and mid decile bands. The MANOVA main effect for Group was statistically significant,  $F(3, 144) = 10.60, p < .01$ . ANOVAs revealed the PLD group obtained statistically significant higher scores for blends,  $F(1, 144) = 16.01, p < .01$ , digraphs,  $F(1, 144) = 14.98, p < .01$ , and for spelling phonemes  $F(1, 144) = 31.75, p < .01$ . The main effect for Decile Band was significant,  $F(6, 290) = 6.31, p < .01$ .

ANOVAs revealed a significant effect for all three tests, with the high and mid decile groups outperforming the low decile groups. The interaction effect for Group by Decile Band was statistically significant,  $F(6, 290) = 4.17, p < .01$ .

ANOVAs revealed the implementation group children in low and mid decile bands obtained higher scores than their counterparts in the comparison group.

### ***Language component***

School entry data for children's receptive vocabulary were obtained from the British Picture Vocabulary Scale (BPVS). An ANOVA was run resulting in a statistically significant main effect for Group,  $F(1, 167) = 6.05, p < .05$ . The result for Decile Band was statistically significant,  $F(2, 167) = 6.77, p < .01$ . An examination of mean scores showed the effect was due to lower mean scores for the students in the low decile band for both groups. The interaction effect for Group by Decile Band was not significant showing that differences among decile band scores were similar in the two groups.

After the PLD, the language component was analysed with processing tasks of non-word repetition and mispronunciation. Mean scores and standard deviations are shown in Table 15. The graphs in Appendix 11 show the results for Group by Decile Band in the language processing tasks.

The MANOVA main effect for Group was statistically significant,  $F(2, 158) = 12.96, p < .01$ . ANOVAs revealed the implementation group obtained higher scores than the comparison group for the mispronunciation task with ANOVA result,  $F(1, 159) = 26.05, p < .01$ . The results for the non-word test were not statistically

significant,  $F(1, 159) = 2.21, p = .14$ , with both groups obtaining similar outcome scores.

The main effect for Decile Band was statistically significant,  $F(4, 318) = 6.79, p < .01$ , with both tests showing significant results. The mispronunciation results showed the effect was due to the mid-decile band obtaining a higher score than the other decile bands. An analysis of the nonword repetition results showed a higher mean score for the high decile band compared to the low and middle decile bands.

The interaction effect for Group by Decile Band was statistically significant,  $F(4, 318) = 4.62, p < .01$ . ANOVAs revealed the children in each decile band in the implementation group obtained higher scores on the mispronunciation task than each decile bands of the comparison group. The low decile band PLD group obtained higher scores on the nonword repetition task than the low decile band of the comparison group and almost as high as both the mid and high decile comparisons.

### ***Reading and spelling outcomes***

Outcomes data were obtained from word tests for reading and spelling. Clay word and invented spelling tests were used for analysis of pre-PLD data. Burt word test, pseudo-word reading, and the WRAT spelling test were used for post-PLD analysis.

The analysis of T1 data showed the MANOVA main effect for Group was not statistically significant,  $F(2, 166) = .99, p = .37$ . The main effect for Decile Band was statistically significant,  $F(4, 334) = 2.65, p = .03$ . ANOVAs revealed the difference

was in the Clay word test,  $F(2, 167) = 4.30, p < .05$ , with the high decile group obtaining a higher score than the other two decile bands. The interaction effect was not statistically significant for Group by Decile Band,  $F(4, 334) = 1.73, p = .14$ . The data confirm that the groups were functionally equivalent for reading and spelling outcomes at school entry. On average and as expected, children in both groups in the study were able to read or spell very few words at school entry. The mean scores in reading and spelling words were lower than one for both groups as a whole (see Table 14).

At T2, reading and spelling outcomes were analysed using the clustered measures of Burt word test, spelling test, and pseudo-word reading. The MANOVA main effect for Group was statistically significant,  $F(3, 144) = 7.95, p < .01$ . The differences were the result of the PLD group obtaining higher scores than the comparison group with ANOVAs for Burt,  $F(1, 151) = 13.16, p < .01$ ; spelling  $F(1, 151) = 23.98, p < .01$ ; and pseudo-word,  $F(1, 151) = 9.64, p < .01$ .

The main effect for Decile Band was statistically significant,  $F(6, 290) = 4.08, p < .01$ . ANOVAs revealed a significant effect for all three tests, Burt,  $F(2, 146) = 3.81, p < .05$ , Spelling,  $F(2, 146) = 7.95, p < .01$ , and pseudo-word test,  $F(2, 146) = 8.54, p < .01$ . An examination of the data showed the effect was due to the low decile band obtaining significantly lower scores than the mid and high decile bands.

The interaction effect for Group by Decile Band was statistically significant,  $F(6, 290) = 2.50, p < .01$ . ANOVAs revealed significance for spelling,  $F(2, 146) = 3.96, p = .02$  and Burt,  $F(2, 146) = 4.32, p < .05$  but not for pseudo-word reading,  $F(2, 146) = 0.34, p = .71$ . An analysis of mean scores shows that the low decile band

implementation group had significantly better scores than the comparison group. Additionally, the implementation low-decile band mean scores at least matched and sometimes exceeded the mean scores of the mid-decile comparison group. The mean scores and standard deviations are shown in Table 15. The results illustrate the higher outcomes for the implementation group along with the comparatively better outcomes for the low and mid decile band children in the implementation group. The graphs in Appendix 11 show the results for Group by Decile Band in the reading and spelling tasks.

### ***Summary of student data***

The results show there was a statistically significant difference between the outcomes for children whose teachers participated in the PLD that focused on increasing teachers' knowledge of beginning reading and explicit teaching practice. There was no discernible advantage between the implementation and comparison groups at school entry according to the data at T1. The results showed that decile band had an effect on results. In most measures at T1, the students in the low decile band group had the lowest mean scores and the high decile band group had the highest mean scores. It is apparent that decile band affected outcomes for students. There was no discernible difference in T1 results for the Group by Decile Band, showing the decile effect was the same for both groups at T1.

Analysis of results at the end of one year at school revealed that the children in the implementation group obtained higher mean scores than the children in the comparison group in all four clusters of variables. The differences among decile bands remained, with children in the lower decile band generally obtaining lower scores than those in the high decile band. However, importantly at

T2, the students in the low decile band implementation group obtained mean scores as high or higher than the low- and mid-decile band comparison groups on all measures, and higher than the high-decile band comparison group on two measures. The PLD appears to have had a positive effect on children in the low decile band, with decile band effect reduced for the implementation group by the end of the year.

Principally, the student outcome results showed that the implementation group outperformed the comparison group on all measures used to indicate progress towards reading outcomes. The *phonological awareness* tests showed that children were better able to match sounds, segment words, and blend sub-lexical units. The results also showed the implementation group had superior knowledge of the alphabetic principle as evident from the higher mean score in the items *consonant blends, digraphs, and spelling phonemes*. The higher mean scores in the measures for skills in the alphabetic principle, which is essential knowledge for learning to read words, were continued in better scores on the Burt word test. The implementation group children were more able in decoding (pseudo-word task) and spelling (WRAT test) and were more able to correct a mispronounced word, using their vocabulary knowledge to suggest an alternative vowel pronunciation.

## **Chapter summary**

The teacher knowledge findings showed that, as expected, many teachers had weaknesses in their knowledge of the code component. After the PLD, teachers' knowledge had significantly increased in all constructs. The pre-PLD knowledge gaps were reflected in teachers' lower self-confidence for teaching the

code component compared to the meaning component of reading. After the PLD, self-confidence for teaching the code component increased to be equal with confidence for the meaning component. The improvements in knowledge and confidence indicated that the PLD had a positive effect on the knowledge teachers had for teaching beginning readers.

Results for the test of teachers' knowledge of linguistic constructs showed that teachers' knowledge had been largely implicit. Knowledge was higher in *phonologic* and *phonemic* constructs than in *phonic* and *morphologic* constructs. Most teachers were successful on implicit phonological knowledge tasks that asked them to count syllables and many were also successful in implicit phonemic task of counting phonemes. However, many were not successful in items of explicit knowledge such as differentiating between definitions for *phonological* and *phonemic awareness*. Similarly, many teachers were successful on implicit phonics knowledge tasks where they could identify words that illustrated a particular spelling pattern. However, the test results revealed a lack of explicit phonic knowledge for many teachers about the difference between consonant digraphs and consonant blends. The results also revealed a lack of understanding for most teachers about the *morphologic* construct.

The study found that, as expected prior to the PLD, teaching practice in small group reading lessons was mostly implicit, and teachers relied on directing children to use multiple cues to read a text. The observation rubric results showed that half of the group of teachers made changes towards explicit teaching practice after the PLD. In addition, the prompts task results showed that teachers were more likely to direct children to code-cues first and to use specific decoding

strategies. Half of the group retained a more implicit approach to small group instruction, suggesting that certain practices remained embedded for these teachers. However, very few lessons remained categorised in the most implicit of the rubric's four categories.

The data showed there was not a significant correlation between increased teacher knowledge and explicit teaching practice. Interviews were conducted to ascertain other influences that affected the teaching of the code component of reading. A major barrier to changing practice appeared to be teacher beliefs about how children learn to read and a commitment to the teaching methods associated with those beliefs.

The student outcome results showed significantly improved scores for students whose teachers participated in the PLD compared to students whose teachers did not receive the PLD. The implementation students' results were consistently higher across all measures. Importantly, the results for lower decile bands suggested that a focus on explicitly teaching the code component can mitigate disadvantages that would otherwise contribute to the cycle of under achievement. The following chapter discusses the findings in relation to existing literature and provides insight into teacher knowledge and practice changes that could improve outcomes for students.





## CHAPTER FIVE: DISCUSSION

### Introduction

The aim of the current study was to examine the influence of teacher knowledge and teaching practice on improved reading outcomes for beginning readers. The research questions examined teachers' knowledge of the linguistic constructs needed to teach children to read (RQ 1); whether teaching practice in small group instruction was implicit or explicit (RQ 2); the enablers and barriers to changing to explicit teaching (RQ 3); and whether any differences were seen in student reading outcomes between the implementation and comparison groups (RQ 4).

The study was a mixed methods explanatory sequential design with a quantitative and qualitative data phase. The measures provided quantitative data on teachers' knowledge and teaching practice, which allowed for a phase one comparison of results pre- and post-PLD. In addition to the quantitative data, teacher interviews in phase two provided information on what teachers found to be the barriers and enablers in change to explicit teaching practice. Student outcomes from the implementation and a comparison group were used to provide evidence for any difference in outcomes for beginning readers.

In the current chapter, the results from the measures are combined and discussed in relation to the research questions and with reference to the studies examined in the literature review. Firstly, the discussion chapter considers the teachers' knowledge and teaching practice prior to the PLD. The findings are compared to the research recommendations for teaching beginning reading. Secondly, the discussion covers the changes that occurred after the PLD and the possible implications of these changes. The discussion considers the barriers and enablers teachers experienced in changing to explicit teaching practice in small group reading lessons and what these findings suggest for how to support teachers in adopting research-informed practice. The chapter continues with discussion on the outcomes for students and insights the study can provide for improvement in reading outcomes.

### **Teacher knowledge and practice prior to PLD**

The studies included in the literature review chapter highlighted the knowledge about language that teachers need to effectively teach beginning readers. In addition, the review included studies that showed the importance of explicitly teaching the code component to beginning readers. This section outlines the knowledge and practice for teachers in the current study, prior to the PLD. The outline gives an indication of what was common for this group of New Zealand teachers and provides the background to the section that discusses the changes to teachers' knowledge and practice after the PLD.

The teacher knowledge data from the current study indicated that prior to the PLD, many teachers had an implicit knowledge of language but there was less

evidence of specific knowledge of linguistic constructs. Effective teaching for beginning readers requires that teachers can explain concepts, choose examples wisely, and to give targeted feedback when errors occur (Moats, 2009), which all require an explicit knowledge about language.

The pre-PLD teacher knowledge findings in the current study are consistent with studies outlined in the literature review that showed low to moderate levels of teacher knowledge in linguistic constructs (e.g., Bos et al., 2001; Carroll et al., 2012; Foorman & Moats, 2004; Moats, 1995; Piasta et al., 2009; Washburn et al., 2011) with notable gaps in knowledge of the *phonics* and *morphological* constructs. The mean scores were higher for *phonological* and *phonemic* constructs, but there were gaps in understanding key concepts such as *phonological* and *phonemic* awareness. The consistency of results among the studies, including the current study, indicates that teachers' knowledge needs to be improved and that high levels of knowledge cannot be assumed from a teacher's ability to read and write (Stainthorp, 2004).

The lower mean scores in the *phonic* and *morphologic* constructs across studies appears to indicate that such knowledge might be given little attention in teacher training (Cochran-Smith, Keefe, Chang, & Carney, 2018; Cunningham & O'Donnell, 2015; Joshi et al., 2009; Lyon, 1999; Moats, 2009; Washburn et al., 2011). Without training in this knowledge, teachers rely on inferences about spelling patterns, rather than have a technical understanding of English orthography. Teachers without explicit knowledge of linguistic constructs are likely to approach teaching the code implicitly rather than explicitly.

The gaps highlighted in teachers' linguistic knowledge would likely negatively influence teachers' confidence for teaching the code component. In support of the suggested lower confidence, findings from the pre-PLD survey showed that fewer teachers selected a confidence rating of *very good* for teaching the code component than for the meaning component of reading. These results are important because teachers are likely to select the activities that they feel comfortable to teach (Cunningham & O'Donnell, 2015; McCutchen, Abbott, et al., 2002; Moats, 2009). Moats (2009) reported that teachers with more knowledge of the code spent more time teaching the foundation skills.

It is understandable that linguistic knowledge and confidence to teach the code explicitly and systematically would be low for many teachers. As the literature review showed, there is a lack of provision for teachers to be experts about the code (Chapman et al., 2018; Cunningham & O'Donnell, 2015; Lyon, 1999; Foorman & Moats, 2004; Moats, 2009; Tetley & Jones, 2014; Tunmer, Greaney, & Prochnow, 2015). When teachers do not have specialised knowledge about the code component of reading, they are likely to defer to an implicit teaching approach. Teachers deserve to be equipped with the knowledge they need for optimum effectiveness of their teaching and cannot be expected to teach what they do not know.

In addition to low levels of teacher knowledge, the pre-PLD results revealed that teaching practice reflected a top-down approach for teaching reading. The results from the observation rubric showed that small group reading lessons were dominated by the use of a levelled book that had a strong storyline and natural language. Teaching was dominated by a multiple-cues approach, with any teaching

of the code component addressed incidentally and implicitly. Most lessons showed little explicit teaching of elements of the code. The prompts task showed most teachers favoured context-based prompts and did not suggest decoding strategies at a child's reading error.

The pre-PLD findings about teaching practice reflect the long-term direction in New Zealand literacy teaching (McNeill & Kirk, 2013; Nicholson, 2000; Tunmer et al., 2004; Tunmer et al., 2015). Explicit teaching of foundational skills has been given less priority than the reading of connected text. Guided reading using a levelled book is the main approach promoted for small group lessons (Clay, 2005; Department of Education, 1985; Hood, 2000; Ministry of Education, 2003; J. Smith & Elley, 1997). The advice provided to teachers in the *Literacy Learning Progressions* (Ministry of Education, 2010), that children “begin reading texts as soon as they begin school” (p. 10), has resulted in a levelled instructional text being used from the very first reading lessons for a child. As most beginning readers do not have skills for reading words, teaching children to read using these levelled texts requires a reliance on context-cues within a multiple-cues approach. The findings that teachers would favour meaning-cues as first prompts confirms findings in other studies that reported a dominance of context-based or neutral prompts suggested when a reading error occurs (Chapman et al., 2018; Greaney, 2001) and reflect the advice that New Zealand teachers have been given over many years (Clay, 2005, 2016; Department of Education, 1985; Ministry of Education, 1996a, 1996b, 2003, 2015).

The PLD in the current study was designed to guide teachers to change how they teach beginning reading, with a focus on improving teacher knowledge about

the code component and changing teaching to be more explicit and systematic.

When the dominant approach is considered alongside the long-term and ongoing inequity in data, the findings suggest the need to evaluate and reconsider how reading is theorised, what reading models are used to guide teaching, and which teaching practices are promoted.

### **Changes to teachers' knowledge and practice**

The results showed that after the PLD, teacher knowledge improved, indicating that teachers are able to improve their knowledge with support from a PLD focused on the code component of reading. The data showed that teachers now had more explicit knowledge in the *phonemic* and *phonological* constructs, including knowledge about phonemes and syllables. Many teachers had improved understanding of the difference between the key terms of *phonological awareness* and *phonics*. Teachers had improved their knowledge of spelling patterns (*phonics*) and about morphemes. The changes are important because increased teacher knowledge has been shown to have an impact on student achievement (Connor et al., 2004). In addition, more time in teaching sessions only has an impact if teachers' knowledge is high (Piasta et al., 2009).

The current study results indicate that teachers have improved their knowledge for explicit teaching in the code component. The importance of expert teacher knowledge about the code has been well researched and reported (Cunningham et al., 2009; Moats, 2009; Spear-Swerling & Brucker, 2003; Stainthorp, 2004). Moats (1999) suggested that knowledge enabled teachers to interpret and respond to student errors, to create useful explanations that suit the

learner, and to integrate word study into meaningful activities. Teachers need a well-developed knowledge of phonemic awareness and its association to phonics to support children to learn the alphabetic principle for success in decoding and spelling. In addition, a knowledge of morphemes helps teachers to see the patterns in the English code and how to explain these to learners.

Improved knowledge is necessary for improved confidence for teaching. In the current study, post-PLD results showed a significant increase in teachers who rated their knowledge as *very good* for teaching the code component of reading. In addition, the numbers of teachers who rated their confidence to teach the code component as *very good* surpassed the number who rated their teaching in the meaning component as *very good*. The results suggest that post-PLD, the teachers would more likely provide explicit teaching and opportunities for children to engage in the code component of reading. Explicit teaching and extra time in the activities likely have a positive impact on student mastery of code skills.

After the PLD, teaching practice changed significantly with almost half of the lessons now reflecting the explicit teaching indicators of the observation rubric. Using the *scope and sequence* enabled teachers to select a focus for intentional teaching of the knowledge and strategies that children needed for reading the text. Carefully selected instructional texts provided opportunities for children to independently apply new learning to the reading task. Increased use of a variety of teaching materials, including whiteboards and magnetic letters, allowed teachers to give explanations and actively engage children in learning.

In addition to changes in teaching during lessons, the prompts task showed a significant shift to suggesting a code-cue as the first prompt and to directing



children to use decoding strategies. The changes are evidence that teachers suggested more productive and direct teaching responses (Greaney, 2001), which show children how to use the information provided by the printed code and improve children's reading strategies. The changes show many teachers replacing context-cues prompts with code-based prompts.

The teacher knowledge and practice results are important because they show that teachers of beginning readers are able to make significant changes, when provided with fit-for-purpose PLD. The teaching after the PLD showed evidence of research-informed practice, with explicit teaching of the code component taking precedence for many teachers. It is reasonable to expect that the teachers' changes will have a positive effect on reading outcomes, particularly for children who need more support in learning the code.

It might be assumed that increased teacher knowledge would correlate with more explicit teaching practice, but the results in the current study showed that correlations between changes in teachers' knowledge and teaching practice were low and not statistically significant. The low correlation is consistent with other studies, which found that a high level of teacher knowledge was necessary but not sufficient to make a difference to student outcomes (Arrow et al., 2019; Cirino et al., 2007; McCutchen et al., 2009).

The low correlation might be attributed to the continued use of an implicit teaching approach, where it is assumed that children learn to read by applying a reading processing system, rather than needing any explicit teaching. The observation results show that some teachers with high levels of knowledge did change to explicit teaching practice after the intervention, but the lessons of four

teachers with high levels of knowledge remained classified in the implicit categories of the rubric. The main teaching opportunities utilised in these implicit lessons arose while the child read a levelled text and no explicit teaching occurred prior to the introduction of the text to be read. The results indicate that some teachers continued with what they believed to be the best methods for teaching children to read, even when the teachers had high levels of knowledge about the written code.

An analysis of the observation data revealed that after the intervention, the lesson elements of *lesson focus*, *code teaching*, *reading strategies*, and *resource materials* had mean scores of above 2.5. Mean scores in the lesson elements of *text selection* and *teaching strategies* remained the most implicit, both at under 2.5, showing less change towards the explicit indicators for these two elements. It appears that teachers needed more support to change to using texts that support explicit teaching. In addition, the results suggest that teachers had some difficulty with changing from a multiple-cues, context-cue first approach. The data from the teacher prompts support the finding that some teachers prefer a context-cue first approach to teaching reading and appear to find it difficult to change this embedded practice.

In the current study, one teacher remained with low teacher knowledge after the intervention. However, despite low knowledge results, the teacher showed a change towards explicit teaching in observations, with an overall lesson score of 2.7. It appears the teacher was able to implement some of the changes to practice promoted in PLD workshops, even though there was no apparent improvement in knowledge. The result is consistent with a study by Piasta et al.

(2009), which showed that teachers can make changes when given practical direction in explicit teaching. However, Piasta et al. and Connor et al. (2014) reported that change in practice alone is unlikely to positively affect student outcomes (Connor et al., 2014; Piasta et al., 2009). The teacher knowledge and practice data in the current study show the importance of considering how to improve teacher knowledge and influence a change in teaching practice.

### **Barriers and enablers for change**

The interviews provided an insight into influences other than teachers' knowledge on changes to teaching practice. The themes that emerged from the interview results showed that enablers to change included resources, teacher knowledge, colleague support, and student progress. Resources, colleagues, and concern about student progress also acted as a barrier for some teachers. Other barriers to change were teachers' beliefs, set practices, and time or workload.

#### ***Enablers***

Resources: Interviews revealed that the combination of explicit teaching based on the *scope and sequence* and using supportive instructional texts was important for children's success. Teachers were able to use the *scope and sequence* to select a teaching focus and they used materials, such as magnetic letters, to help explain the new learning. Many teachers added a focused teaching time to lessons, supported by the *scope and sequence*. In addition, decodable texts with controlled introduction of orthographic patterns were essential to support the explicit teaching focus. It is possible that teachers who were provided the book series were able to be more effective in teaching explicitly and systematically in accordance

with the provided *scope and sequence*. The statistically significant outcomes for decile 1-3 band students suggests the importance of fit-for-purpose texts for improving outcomes.

The use of supportive curriculum materials with guidelines for explicit instruction has been found to positively influence teaching practice and student outcomes in a number of studies about teaching reading (Arrow et al., 2019; Foorman & Moats, 2004; Fuchs et al., 2001). Together, the findings of these studies and the current study suggest that resources, including a supportive curriculum, are necessary for change. For teachers to use a systematic, code-based approach, they require appropriate texts, such as decodable texts that maximise opportunities to practice taught word patterns.

Another resource that may have influenced change in teaching practice was the coaching provided for the implementation group. Evidence from the interviews is that coaching was considered important and that teachers appreciated the opportunity to discuss changes in practice with the visiting coach. Coaching is an important consideration for further research, particularly to establish the type and quantity of coaching that would be optimum.

*Colleague support:* Interview data showed that some teachers found the support of colleagues to be helpful as they trialled change to practice. The support was apparent when their colleagues were open to the change or when a team of teachers worked together to make changes to practice. This positive aspect of colleagues is supported by studies from the literature review that highlighted the importance of a teacher's social environment (Fives & Buehl, 2012; Goleman et al., 2001).

*Improved teacher knowledge:* The literature review showed that teacher knowledge is an essential element for effective teaching and for changes to student outcomes (Moats, 2009; Piasta et al., 2009). The data from the current study showed that teacher knowledge needed to improve and that this occurred after the PLD. Teacher interviews confirmed that teachers found their improved knowledge was important for their teaching. The knowledge provided in the PLD enabled teachers to select teaching content for children having difficulty with learning to read and to teach more explicitly. Increased teacher knowledge is one of the vital influences for improved teaching and outcomes for children.

*Student outcomes:* Positive change for students was an important impetus for teachers to continue with any teaching practice changes they had trialled. Teachers who found a change in teaching practice made a difference to their students' progress were encouraged to continue with the changed practice. The influence is consistent with findings from other studies that showed that teachers are more likely to sustain changes to practice when they see a positive effect on student achievement (Connor et al., 2004; Guskey, 1986; Marzano et al., 2005). If teachers can be supported to make changes to practice, resulting positive student outcomes may help sustain the change.

### **Barriers**

*Set practices:* Adherence to particular practices can mean that change in teaching practice is difficult. Examples of set practices seen in the current study included a focus on the instructional text as the medium for teaching, a multiple-cues approach, and a focus on teaching sight words rather than mastery of code skills to ensure success in reading a text. In addition, established assessment

procedures can drive teaching practice and act as a barrier to change (Swan & Swain, 2010).

In the current study some teachers perceived that students would not be successful on the commonly used running record assessment if the levelled book did not remain as core to the lesson. Relying on running records had the effect of privileging the dominant practice of using the instructional text. As it is difficult to discard a familiar practice, it may be necessary to critique previous practices in relation to what research shows about reading.

Another set practice was the use of writing opportunities for explicit teaching of code knowledge, rather than a systematic approach to teaching about word patterns for decoding as part of reading. The practice is based on arguments by Goodman (1976) and by Clay (1991) that children deduce knowledge about word patterns as they write. Teachers' assumptions about children deducing knowledge as they read and write was evident in interview responses where teachers stated that word study should not be in isolation. "Not in isolation" is a statement the researcher has heard used to direct teachers to only provide explicit instruction at a sub-lexical level of the word within a context such as reading or writing a text. This guidance for teachers has been highly influential on teachers, including the researcher's own previous teaching practice.

Resources: Observations of lessons and interview responses showed that a key difficulty for making a change to explicit teaching was the structure of the instructional book series commonly available to teachers (i.e., *Ready to Read*). The large number of word patterns the child may not know required teachers to give extensive support in background knowledge, vocabulary, and sentence structure

and use teacher prompts that were global, context, or partial-code cues. The conflict teachers experienced with text selection is evidence that the different types of texts are underpinned by different theories of reading. Helping teachers to see the importance of lesson-to-text match (Mesmer, 2001, 2010) needs to include how to match the text to the child's needs and finding the right text for the teaching approach.

*Colleague influence:* The literature review established that teachers need support from their teaching environment (Fives & Buehl, 2012; Goleman et al., 2001). Unfortunately, some teachers experienced conflict with other colleagues in their school or with literacy specialists that made changing practice difficult. Interview responses revealed that Reading Recovery specialists seemed to be particularly concerned when a change to a focus on the code component was promoted. The example shows that some teachers or programmes have an influence on the change that other teachers are prepared to make (Robbins, 2000).

The evidence from the current study that the interview teachers trained in Reading Recovery made less change to explicitly teaching the code is supported by findings in research. Greenberg and Baron (2000) found that a strong belief in the effectiveness of prior training can take precedence over enacting change. In addition, teachers can feel they need to be seen as the expert or that their training has made them the expert. Podhajski et al. (2009) suggested that teachers' over-estimation of their reading related knowledge affected receptiveness to new learning, with the possibility of an attitude of "I know it all and there is nothing new to learn" (Gersten, Dimino, Jayanthi, Kim, & Santoro, 2010, p. 730). Teachers

with extra training in literacy programmes that conflict with new PLD may find it more difficult to change practice.

*Teaching beliefs:* Beliefs teachers held about teaching reading featured in interviews as a particularly relevant barrier. Many teachers felt hesitant to emphasise code-cues because it was viewed to be in opposition to reading for meaning. This is an example of considering the use of context cues as commensurate with making meaning from the text (Hempenstall, 2003). Castles et al. (2018) highlighted such thinking as an incorrect assumption that the endpoint of learning to read determines how it should be taught. The view was clearly apparent in most interviews and is supported by pre- and some post-PLD prompts task data.

Research on teacher change shows beliefs can be a major influence on teaching practice. While Beswick (2005) suggested that beliefs may need to be addressed before a change can be made to practice, another possible avenue for change is to encourage teachers to try new approaches and materials without necessarily changing their whole belief system (Fullan, 2007; Guskey, 1986). Some teachers may not change practice because of certain prioritised beliefs, while some teachers attempt a change to practice and a change to beliefs follows. Teacher content knowledge can be a key influence on whether teachers will change practice (McCutchen, Abbott, et al., 2002; McCutchen, Harry, et al., 2002). However, the results from the current study indicate that for some teachers, embedded beliefs about the teaching of reading made it difficult for them to change to explicit and code-based practice, even with improved teacher knowledge. The findings in



the current study provide evidence that beliefs and teaching actions interact in teacher change.

### **Change in student outcomes**

The student outcome results showed that the implementation group outperformed the comparison group on all measures used to indicate progress towards improved reading outcomes. The significant difference for implementation group students in tests of item knowledge and reading skills are an illustration of the difference that can be made when teachers use a more explicit approach to teaching reading. While not all teachers changed to explicit teaching as measured by the observation rubric, there were few teachers using a highly implicit approach to small group teaching post-PLD. The change away from highly implicit teaching towards a more explicit approach to the code component appeared to have a positive effect for students. In addition, the change from a multiple-cues, context-first approach when a child makes a reading error to a code-based cue approach may have resulted in a focus on the foundation skills needed for success in decoding. Small changes in teaching approach appear to have had a large effect on student outcomes.

The improvement in student outcomes shown in the current study is consistent with a number of studies that have found links to improved reading scores from explicit teaching of the code (Buckingham, Wheldall, & Beaman-Wheldall, 2013; Connor, Jakobsons, Crowe, & Meadows, 2009; Foorman & Torgesen, 2001; Cunningham et al., 2009; Gillon et al., 2019; McCutchen, Abbott, et al., 2002; Moats, 2009; Piasta et al., 2009; Rayner, Foorman, Perfetti, Pesetsky, &

Seidenberg, 2001; Taylor, Pearson, Clark, & Walpole, 2000). In an analysis of a number of studies, Young (2017) reported that as many as 60% of children require an explicit approach and do not benefit from an implicit approach to learning to read. As an example, Foorman and Torgesen (2001) found that students with lower phonemic awareness entry scores achieved success at similar rates to those with high entry scores, showing a mitigating of the disadvantages when explicit teaching was used.

The most important outcome from the student data is the difference for children in the lower decile band in the implementation group. On all measures the low and mid-decile band in the implementation group performed better than their counterparts in the comparison group. In most measures, the reduction in the gap between the high and low-decile bands was remarkable. The difference suggests that equitable outcomes are possible when there is a change to explicit teacher knowledge and teaching practice, confirming results found in previous studies (Gillon et al., 2019; Greaney & Arrow, 2012; Nicholson, 2009; Ryder, Tunmer, & Greaney, 2008; Tunmer et al., 2015). Gillon et al. (2019) reported significantly improved scores for children with early literacy challenges when they were involved in an intervention focused on explicit teaching of the foundational literacy skills of vocabulary and phonological awareness.

Studies of explicit teaching of foundational skills indicate the steps necessary for disrupting the inequity in score distributions prevalent in New Zealand data (Nicholson, 2009; Tunmer et al., 2015). Despite past attempts to improve outcomes and reduce disparity, the achievement gap for lower decile groups in New Zealand has remained and even widened (Tunmer & Chapman,

2015). The current study shows that a reduction in disparity is possible when particular teaching variables are given attention.

## Chapter summary

The current study showed that teachers' knowledge about the code component of reading was general and implicit prior to the PLD and more specialised and explicit after the PLD. Teaching children to read was dominated by implicit teaching, with a change to more explicit teaching after the PLD. It appears that improvement in teachers' knowledge about the code component helped teachers to adapt practice and possibly influenced a change in some teachers' beliefs about the teaching of beginning reading. A supportive curriculum outline such as the *scope and sequence* and resources such as a decodable book series appeared to contribute to changes in teaching practice.

Beliefs about teaching of reading played a role as a barrier to changing practice, with some teachers resisting a change to explicit teaching of the code component because of beliefs they held about how children learn to read through a top-down, multiple-cues and meaning-based approach. For those teachers who did attempt change to explicit teaching of the code, positive student outcomes assisted in changing beliefs about teaching reading. Colleagues had an important role and could have a positive or negative effect on teacher change.

The findings contribute to an overall indication that combining explicit teacher knowledge and explicit teaching practice in the code component of reading could have a positive effect in addressing the ongoing reading under-achievement

identified in New Zealand. Enacting change requires a multi-faceted approach for an effective and long-term solution.

The final chapter concludes the study by synthesising key findings, addressing implications, and making recommendations that arose from the results and findings. The chapter includes a reflection on the overall aim and research questions and how the study has addressed the gap identified in the literature. The overall significance of the study is considered.



## **CHAPTER SIX: CONCLUSION**

### **Introduction**

A key claim of the current study is that improvement in reading outcomes requires a combination of explicit teacher knowledge and explicit teaching practice focused on the code component of reading. The task of the beginning reader is highly complex, because learners progress from not knowing the marks on the page to being able to read sentences and whole texts within the first year at school. The task of the teacher of beginning readers is to ensure all children develop the foundation to be successful as a reader. Effective teaching in the first year of school is vital for success for beginning readers and has an impact throughout a child's schooling.

### **Summary of findings**

The current study examined the influence of teachers' knowledge and teaching practice on successful outcomes for children in their first year at school. The code component was selected as a focus for the study because of the evidence that children who fail to make expected reading progress often have a difficulty with mastering the code. Previous research examined in the current study showed

that teachers' knowledge about the code has generally been low. In addition, New Zealand teaching of reading follows a top-down view where learning about the code occurs incidentally, while children read an instructional text. The study sought to examine if, through a workshop programme of PLD, teachers' linguistic knowledge could increase, teaching practice could change to a more explicit and systematic approach, and what effect any changes to teachers' knowledge and practice may have on student outcomes.

The findings of the study revealed that prior to the PLD, most teachers had lower than optimum levels of linguistic knowledge needed for effective teaching of beginning reading. In addition, teaching practice was implicit and followed a multiple cues approach, rather than following research-informed practice of explicit and systematic teaching of code knowledge for beginning readers. Context cues were prioritised over directing learners to decode the printed word.

After participating in the PLD, the current study showed a significant improvement in teachers' knowledge and an increase in explicit teaching practice. Most teachers made a change towards more explicit teaching of the code component and few lessons were categorised in the most implicit (discovery) category after the PLD. However, the findings revealed that half of the group of teachers continued with an incidental approach to teaching beginning readers about the code. The interview findings suggested that beliefs about how children learn to read and how reading should be taught have been highly influential and act as a barrier to changing to explicit teaching practice.

The student outcomes data showed significantly improved results for the implementation group students, particularly for those in the lower decile band.

The positive effect signals the benefits of increased teacher knowledge and explicit and systematic teaching to improve student reading outcomes, including having the potential to reduce inequity for currently disadvantaged groups of learners. The results for the comparison group, taken together with evidence from PIRLS results (Mullis et al., 2003, Mullis et al., 2007, Mullis et al., 2012, Mullis et al., 2017), provide evidence that without improvements in teacher knowledge and changes to teaching practice, the disparities in outcomes will likely remain.

### **Contribution of findings**

The study adds to a growing number of New Zealand studies that have focused on scientific studies of reading and a code-based approach to teaching children to read (Carroll, 2006; Chapman et al., 2018; Gillon et al., 2019; McNeill & Kirk, 2013; Ryder et al., 2008; Tunmer et al., 2015). In particular, this study contributes to the field as a longitudinal study that showed change in teacher knowledge and teaching practice occurred after participation in PLD that emphasised explicit teaching of the code component of reading. The inclusion of an implementation and comparison group of students contributes evidence that improving teacher capability in the code component of reading made a significant difference to outcomes of foundational skills for beginning readers.

The mixed methods design used in the current study provided different types of data that have helped to answer the research questions. The quantitative data enabled a comparison of pre- and post-PLD change for teachers. In addition, the student outcomes data provided strong evidence of the positive effect for student achievement. The qualitative data from teacher interviews were used to



provide explanations that the quantitative data could not offer about the influences on teacher change.

The study provides evidence that change can be difficult and that for change to be effective, teachers require support and guidance. In particular, the study showed the influence that teachers' beliefs about learning to read had on resistance to change of practice. It was difficult for some teachers to change to explicit teaching because of the belief that teaching children to read is best approached through the meaning of a sentence rather than a close examination of the printed code. The current study showed that teachers were concerned that increasing the focus on teaching the code could diminish the progress children were able to make in their reading and reduce the meaning they could make from text. Such a view is detrimental to teachers adopting a more explicit approach to teaching reading.

The study included the development of two specifically designed measures for obtaining and analysing data. The observation rubric, designed and used for analysing the video lessons, was developed through an iterative process, referring to research on implicit and explicit teaching, and viewing and re-viewing the lessons in the study to develop indicators of teaching practice. The novel rubric enabled large amounts of video to be analysed efficiently, and to clearly identify teaching practice as implicit or explicit. The rubric indicators describe teaching actions that can be used to categorise current teaching practice and suggest steps to change to explicit practice. The rubric would be a useful tool for teacher change alongside PLD that used the Cognitive Foundations Framework (Tunmer & Hoover, 2019).

The current study findings showed that improved student outcomes occurred after teachers engaged in PLD that focused on improved teacher knowledge and explicit teaching of the code component of reading. If the evidence of practice and knowledge from this study is indicative of New Zealand teaching more generally, then a change to teacher training and education policy is necessary to achieve equitable outcomes nationwide.

### **Implications and recommendations**

The improvement in student outcomes for the group whose teachers participated in the PLD showed the positive contribution of improved teacher knowledge and more explicit teaching practice of the code component for success in beginning reading. The study has shown that change is possible and that PLD that is focused on research-informed theory and practice can have a positive effect on student outcomes. As a result, the findings of the current study have implications for how reading is taught in the first year of schooling. The implications include the need for changes to teacher training, teaching support materials, and the advice and guidance given to teachers and schools.

The framework for literacy acquisition in the *Effective Literacy Practice in Years 1 to 4* handbook for teachers (Ministry of Education, 2003) does not provide clear guidance for teachers to focus explicitly and systematically on teaching children to master the printed code. The framework's cycle of learning the code, making meaning, and thinking critically does not clearly suggest necessary foundations for teaching reading. The results from the current study suggest that the code component warrants explicit and systematic teaching in a child's first

year at school. Therefore, a recommendation from the current study is that the current framework is replaced with a research-informed model to guide the teaching of reading. The Cognitive Foundations Framework (Tunmer & Hoover, 2019) based on the Simple View of Reading (Gough & Tunmer, 1986) provides a guideline for what children need to be taught and for assessing children's reading progress. A change to the use of frameworks such as the SVR would align New Zealand literacy teaching with the cognitive and scientific studies of reading.

A change to an explicit and systematic teaching approach requires support from a number of materials. The currently available series of levelled books do not have a controlled introduction of word patterns and leave many readers in danger of failing to embed foundational skills. Explicit and systematic teaching requires a supporting instructional book series, where early learners can decipher most words with ease and accuracy, by applying their emerging decoding skills (Snow et al., 1998). Using decodable books as first instructional texts offers a support for children to learn the code gradually and systematically.

Teachers need a curriculum with clear guidelines of the knowledge and strategies to teach for success in reading. An evidence-based curriculum supports consistency in teaching and could mitigate initial disadvantage experienced by some students (Rayner et al., 2001). A scope of knowledge and a sequence of learning is recommended to be the basis of teaching and assessment in the first three years of learning to read. The *scope and sequence* document provides clear curriculum and assessment guidelines that support teachers to teach and monitor progress in the required skills. Such monitoring helps teachers to have a sense of

urgency about children mastering foundation skills. Assessment focused on the foundation skills allows teachers to spend time to teach skills to mastery.

The findings suggest that New Zealand teachers have not received the necessary training and support to teach beginning readers effectively. The lack of support for teachers to develop the required knowledge and the lack of promoting research-informed practice are likely contributing to the ongoing inequity in reading outcomes. Training needs to be based on the well-established and ongoing findings from scientific studies of reading. New teaching handbooks are recommended that provide teachers with the necessary foundations of knowledge about how children learn to read and a specific understanding of English orthography for teaching the alphabetic principle. Teachers need knowledge of linguistic constructs, training in explicit teaching, and knowledge about a scope and sequence to guide the teaching of the code component. Re-training would involve the same elements as initial training but include coaching support. The coaching could include a video stimulated recall approach, using the observation rubric from the current study.

### **Limitations and future research**

In the study's design, the lack of information about teachers of the comparison group of students is acknowledged as a limitation. The improvement for the implementation students is assumed to be linked to their teachers' participation in PLD and changes the teachers were able to make in knowledge and practice as a result. The data are interpreted within the assumption that the

comparison teachers' knowledge and teaching practice would be similar to the implementation teachers prior to PLD.

The interpretations from the data are considered in the context of the support given to the implementation group teachers that was not available to the teachers of the students in the comparison group. The support includes the workshops, the coaching, and the resources. A limitation of the interpretations is that it cannot be determined whether the improved student outcomes can be attributed to the workshops, the resources, the coaching, or a combination of these variables.

The current study was part of a project with a large number of student participants and their classroom teachers. However, the common practice of moving students to a new class within the first year at school made it difficult to link the teacher and student data sets. The result of this was that only low numbers of teacher-student pairings were available for correlations between changes in teacher practice and student progress, which limited the available results.

An additional difficulty was that the PLD workshops were offered across the year, rather than as an intensive block course offering. Effects of the change teachers made may be more evident in the year following the PLD. A longitudinal study that spans two years would enable a study to follow the teachers after the year of PLD with a new cohort of children in the following year. The adaptation would allow for correlations from changes teachers made to improvements in outcomes for students.

An intention of the current study was to give teachers the opportunity to view their lesson videos alongside a coach, using a process of video stimulated recall (Reitano & Sim, 2010). The current study was limited in the amount of time available for this process. The limitation could be addressed by including a coaching component to the PLD. The process would provide the teacher and a coach or peer an opportunity to identify practice and discuss possible next steps from a viewing of the videoed lesson.

The use of video stimulated recall in workshops or coaching visits could contribute to mitigating another limitation, that of monitoring the fidelity to the intended teaching practice. The workshops provided guidance only, and how teachers implemented that guidance will have varied from teacher to teacher. The approach taken in this study was to ensure social validity, where outcomes were as close as possible to usual classroom and PLD practices. However, it is acknowledged that generalisability and replicability of results may be limited as a result of this approach. Close monitoring of how teachers implement the suggested changes to practice would be recommended as part of any PLD approach.

### **Concluding thoughts**

This study aimed to examine the influence of teachers' linguistic knowledge and a change to explicit teaching practice of the code on improved reading outcomes for all beginning readers. The findings of the study indicate that increasing specific linguistic knowledge and providing support and resources for explicit and systematic teaching of the code component positively influences

teachers' capacity to teach all beginning readers, which is a core expectation of their role.

As outlined in other chapters, ongoing debate reveals a divide between educators who promote an implicit, multiple-cues approach to teaching reading and those who favour explicit teaching of code knowledge as a primary component. The emphasis on an implicit approach was evident for the teachers in the current study prior to PLD and some who continued with an implicit approach to teaching the code component post-PLD. The practice has become embedded and in many cases is impervious to evidence that shows the need for explicit teaching to address the learning needs of many children. It is clear that current approaches have not addressed the problem with reading outcomes.

The increased equity in outcomes is the most compelling evidence of a need for change in teacher knowledge and teaching practice. Too many children have been failed by a system committed to pedagogy that is ineffective for the learners most at risk of underachievement. It is vital that changes are made to how beginning reading is taught. Ineffective progress in learning to read cannot be readily compensated for in subsequent years, showing how vital it is to address effective teaching of reading for children in their first year of school.

The improvement in reading outcomes evident in the current study indicates that changes to teachers' knowledge and practice and the resources provided can have a significant positive effect for students. The findings determine that for improved outcomes to be evident, change is necessary to the teaching of reading. The changes recommended to improve teachers' linguistic knowledge and promote explicit teaching of the code would ensure that teachers have the

capability for teaching all children to read successfully. As a result of teacher expertise, fewer children would need remedial support. This is a desirable goal for all who have an interest in achieving equitable and optimum reading outcomes.

Overall, this study reinforced that teachers are committed to their students' success but overall teachers have not been provided with the necessary knowledge, approaches, and resources to teach beginning reading in a way that benefits all learners. Without the right knowledge and resources, teachers do not have the tools needed to support children in mastering the code. The main implication from the study is that an emphasis is needed on supporting and equipping teachers to provide reading instruction that maximises the proportion of children who achieve success (Castles et al., 2018). When teachers are provided with the knowledge and resources that make a positive difference, change is possible. Change is vital and a lack of change will result in the same children being disadvantaged in reading achievement. The impact of illiteracy on individual's lives makes change imperative.

In conclusion, New Zealand needs a future where success in reading is a reality for all children. Teachers deserve to be equipped with the required knowledge and practical expertise for teaching all children to read. All children deserve the teaching that enables them to succeed as readers. The current study indicates that such a future is possible.





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## APPENDICES

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## Appendix 1: Early Literacy Research Project scope and sequence

Phase and Teacher knowledge	Phonic knowledge content	Strategy to apply to the content	High frequency words
<p><b>Pre-alphabetic phase</b> (approx. child's first term)</p> <p><b>Teacher knowledge:</b> Consonant (C) letters stop the sound; Vowel (V) letters free the sound</p> <p>Early reading words are made of _VC or CVC combinations (a stop and a free)</p> <p>The strategy of sounding and blending builds orthographic maps that enable children to learn to read words as wholes</p>	<p><b>Letter names and sounds:</b> Bb, Tt, Pp, Oo, Aa Ss, Dd, Jj, Ee, Uu Kk, Mm, Ff, Rr, Ii Nn, Hh, Ll, Vv, Zz Gg, Cc, Ww, Yy, Qq</p> <p><b>Short vowel sounds</b></p> <p><b>Digraphs</b> (two letters make one new sound) Sh, ch, wh, th, ph</p> <p>Early punctuation (capital letters and full stops)</p>	<p>Letters have sounds that can be blended together to make words</p> <p>Sound and blend for reading (-VC and CVC words)</p> <p>Segment and blend for spelling</p> <p>Direction 1:1 matching</p>	<p>Suggested and possible sequence to adapt as suits</p> <p>the on, and a, to, in is, you, that it, he, was for, on, at I, am, to, up Look, here, come</p>
<p><b>Partial alphabetic</b> (approx. child's second term)</p> <p><b>Teacher knowledge:</b> consonant blends are limited to certain combinations It is worth teaching blends because child learns to chunk and that certain combinations are possible (and not possible)</p> <p>Silent e is a vowel digraph that is split by a consonant letter</p>	<p><b>Blends</b> (two/three consonant letters)</p> <p><b>Beginning</b> sl, bl, pl, cl, fl br, cr, dr, fr, tr, pr spr, str, scr, spl</p> <p><b>End</b> -mp, -nd, -ft -ng, -tch, -dge</p> <p><b>Silent letter patterns</b> kn-; -mb; pn-; -mn</p> <p><b>Silent letter for long vowel</b> o_e; a_e; u_e; i_e</p>	<p>Instantly recognise the letters that work as blends for decoding and spelling</p> <p>Sound and blend as above (cc-v-c; ccc-v-c; c-v-cc; c-v-ce as the long vowel)</p> <p>Use context cues to check after a decoding attempt</p>	<p>his, I, be, of from, have, or with, they, this had, by, but not, what, all, were, like, go we, when, your, can said, there, an, she do, their, if, will me, make; day</p>

<p><b>Full alphabetic</b> (approx. child's third term)</p> <p><b>Teacher knowledge:</b> English has 19 vowel sounds represented by five vowel letters so we have to team letters up to represent all the sounds</p> <p>Oi; oy; ou; ow are diphthongs which make a vowel sound made by two movements of the mouth</p>	<p><b>Vowel digraphs</b> or <b>vowel teams</b> as two or more letters that make one vowel sound (often long)</p> <p>-ai-; -ay; ei; -ey -au; -aw; -ea -ie; -ee; -ei- -igh; -ough -oe; oa-; -ow; -oo- (long and short) -ew; -ue oi; -oy; ou-; -ow -er; -ir; -ur; -or; ar (-r controlled) -all (-l controlled)</p>	<p>Recognise and use vowel digraphs in blending letters and chunks to read and spell words; moving from sounding and blending to analogy with onset-rime</p> <p>Finding and using punctuation for meaning and fluency</p> <p>Continue using context to confirm the decoding attempt</p>	<p>each; out; then them; these; so some; her; him; into; has; see; could; my; than; who; all; now did; only; long; over</p>
<p><b>Consolidated</b> (approx. child's fourth term)</p> <p><b>Teacher knowledge:</b> The 6 syllable types; how they affect the word's pronunciation; how they assist with decoding and spelling</p> <p>Base words + inflections (e.g. -s; -ed; -ing; -est;</p> <p>Base words + derivational affix alters part of speech or meaning (e.g. -ent; -ment; un-; dis-)</p>	<p><b>Bigger chunks</b></p> <p><b>Syllables</b> (6 types) Closed (short vowel sound) Open (long vowel sound) V-C-e Vowel team Vowel-r Consonant -le</p> <p><b>Morphemes</b> (2 types) Base words + inflections Base words + derivational affix</p> <p>Compound words (as known chunks with specific meaning to the word)</p>	<p>Looking for syllables and morphemes (largest chunk within word) to decode and spell words</p> <p>Using context and syntactic cues to confirm decoding trial</p> <p>Main ideas and summarizing as key comprehension strategies</p>	<p>Know; people; number; water;</p>

Scope and sequence suggestion based on phase theory (Ehri, 1995) and orthographic mapping (Juel & Minden-Cupp, 2000).

This is an adaptation of a sequence from The Early Literacy Project (Arrow, 2016).

## Appendix 2: Basic Linguistic Constructs test for teacher knowledge data

### The Basic Linguistic Constructs test

Please answer all questions. If you don't know an answer, it's OK to tick the box "no idea". The results are not used to make judgements about individuals. We are looking for patterns of knowledge.

A phoneme refers to:

- a single letter
- a single speech sound
- a single unit of meaning
- a grapheme
- no idea

If 'tife' is a word, the letter 'i' would sound like the 'i' in:

- if
- beautiful
- find
- ceiling
- sing
- no idea

A combination of two or three consonants pronounced so that each letter keeps its own identity is called:

- silent consonant
- consonant digraph
- diphthong
- consonant blend
- no idea

How many speech sounds are there in the following words? For example, the word 'cat' has 3 speech sounds /k/ /a/ /t/. Speech sounds do not necessarily equal the number of letters

	Number of sounds
box	
grass	
ship	
moon	
brush	
knee	
through	

What type of task would the following be? "Say the word 'cat'. Now say the word without the /k/ sound."

- blending
- rhyming
- segmentation
- deletion
- no idea

A 'soft c' is in the word

- Chicago
- cat
- chair
- city
- none of the above
- no idea

Identify the pair of words that begins with the same sound:

- joke-goat
- chef-shoe
- quiet-giant
- chip-chemist
- no idea

**The next 2 items involve saying a word and then reversing the order of the sounds. For example, the word 'back' would be 'cab'.**

If you sat the word, and then reverse the order of the sounds, 'ice' would be:

- easy
- sea
- size
- sigh
- no idea

If you say the word, and then reverse the order of the sounds, 'enough' would be:

- fun
- phone
- funny
- one
- no idea

All of the following nonsense words have a silent letter, except:

- bamb
- wrim
- shipe
- knam
- phop
- no idea

For each of the words in the left column, determine the number of syllables and the number of morphemes.

	Number of syllables	Number of morphemes
<b>disassemble</b>		
<b>heaven</b>		
<b>observer</b>		
<b>spinster</b>		
<b>pedestal</b>		
<b>frogs</b>		
<b>teacher</b>		

Which of the following words has an example of a stable syllable?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

Which of the following words has two closed syllables?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

Which of the following words contains an open syllable?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

Phonological awareness is:

- the ability to use letter-sound correspondences to decode
- the understanding of how spoken language is broken down and manipulated
- a teaching method for decoding skills
- the same as phonics
- no idea

What is the rule that governs the use of the letter 'k' in the initial position for the sound /k/?

- 'k' is used for /k/ in the initial position before 'e', 'i', or 'y'
- the use of 'k' for /k/ in the initial position is random and must be memorised
- 'k' is used for /k/ in the initial position before a, o, u, or any consonant
- none of the above
- no idea

Phonemic awareness is

- the same as phonological awareness
- the understanding of how letters and sounds are put together to form words
- the ability to break down and manipulate the individual sounds in spoken language
- the ability to use sound-symbol correspondences to read new words
- no idea

A morpheme refers to:

- a single letter
- a single speech sound
- a single unit of meaning
- a single grapheme
- no idea

What is the rule that governs the use of the letter 'c' in the initial position for the sound /k/?

- 'c' is used for /k/ in the initial position before 'e', 'i', or 'y'
- the use of 'c' for /k/ in the initial position is random and must be memorised
- 'c' is used for /k/ in the initial position before 'a', 'o', 'u', or any consonant
- none of the above
- no idea

Thank you for completing this survey. Your time is greatly appreciated.

## Appendix 3: Survey of teaching confidence

### Teacher evaluation of self-confidence in teaching literacy

Please evaluate your knowledge of the following:

	Minimal	Moderate	Very good	Expert
Phonemic awareness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phonics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fluency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vocabulary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comprehension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Children's literature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teaching literacy skills to English Language Learners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using assessment to inform reading instruction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix 4: Observation rubric created for small group reading lesson

		Explicit			
		Implicit		3: Intentional	4: Systematic
		1: Discovery	2: Incidental		
<b>1. Lesson focus</b>	Reading the levelled book is lesson focus. Purpose to find out what happens in story and discuss key ideas. Focus on fluent reading and meaning.	Reading of book is main focus. Selected words orally introduced in text introduction. May state a learning intention.	Explicit teaching for code knowledge and the words and sentences Ss need for a successful reading of the selected text. Focus on accuracy.	Explicit teaching of knowledge and strategies based on learner need. Systematically follows <i>scope and sequence</i> . Focus on using strategies	
<b>2. Teaching strategies</b>	T Qs as main strategy, leading Ss to self-monitor. "Did that sound right?"; "What did...?"; "What's this letter/sound?"	T Qs with prompts added when Ss need support e.g. "Look at..." "Point to..." "Let's try..." "Make the sound"	T uses prompts to guide children in new learning and explains or models when explicit teaching needed.	T uses explanation for new learning, then models, prompts or questions towards independent use of strategies.	
<b>3. Code teaching</b>	Ss learn code while reading connected text (a book). T supports decoding attempts as need arises in text.	Alphabet or sight words might be reviewed prior to reading text. Decoding support as need arises in the text.	Explicit teaching for letters/ words for selected book. Sight words taught as whole. Decoding strategies modelled.	Teaching <b>code knowledge</b> and <b>decoding strategies</b> as key priorities at early levels. Sight words analysed as parts and taught.	
<b>4. Text selection</b>	Text has <b>natural language</b> and strong storyline selected for Ss instructional level. Text includes words outside Ss known reading vocabulary	<b>Controlled</b> language, repetitions of sight words and sentence patterns to support learners. Text is chosen for Ss instructional level.	Text supports the explicit teaching focus. Controlled or natural language selected as appropriate.	Text selected to support explicit teaching of knowledge and strategy. Decodable texts or teacher made sentences related to phases.	
<b>5. Reading strategies</b>	T directs Ss to use <b>processing system</b> , m/s and first letter to predict.	T supports Ss to use processing system, m/s with word parts to predict.	T supports Ss to use code knowledge with m/s to predict or confirm.	Ss apply knowledge and strategies taught in lesson. T guides Ss to use code first with m/s to confirm.	
<b>6. Resource materials</b>	Instructional book is the material in the lesson.	Instructional book; modeling resource. T uses	Text, modeling resource, magnetic letters, word/letter cards. T uses.	Text, modeling resource, magnetic letters, word/letter cards, whiteboards. T and Ss use.	

T = teacher; Ss = students; Qs = questions; m/s = meaning/syntax

Notes: **Code knowledge:** learning the letter sounds, blends, vowel patterns, syllables and morphemes as appropriate to learner phase.

**Decoding strategies:** sounding/ blending/ chunking, recognizing and using vowel patterns, using syllables and morphemes as appropriate to learner phase.

**Natural language:** as close to natural speech and sentence structure as possible; full use of punctuation range (Ready to Read).

**Controlled:** based on speech patterns but with careful control of vocabulary in a leveled progression; full use of punctuation range (PM plus).

**Processing system:** self-monitor, re-run, check 1-1, read on, use 3 cues of meaning (picture), sentence structure, and as much of the printed code as needed.



## OBSERVATION RUBRIC VERSION 1: Observation of teaching Year 1 students during small group reading lesson

←----- -ve		+ve ----->	towards a	Differentiated approach
Non-productive		Traditional guided reading		Explicit teaching; main focus on code features appropriate for phase
Hands off	Ineffective	Implicit teaching; main focus on meaning		Code work is systematic and planned from learner phase. It is taught as first part of lesson and is main focus until later in full alphabetic phase
No code work before during or after text reading	T questions; may give confusing or wrong knowledge about print detail; punctuation may be the print focus	Code teaching arises as part of the reading of a text and occurs within the reading of text; punctuation may get as much focus as any other print detail focus because of how it relates to meaning of the story.	Code work planned for what is needed for reading today's text. May not suit phase	
	T questions check Ss meaning making before and after text reading	Meaning as main driver of all reading events	Meaning and print detail as drivers of lesson	Meaning as main focus of whole class interactive read aloud and part of small group focus at later stage of full alphabetic phase
No planned teaching; lesson assumes Ss know and are practicing what they know	Explanations lack clarity; Ss may be confused; under or over explained	Explicit teaching of reading processing system strategies. Rerun, read on and use picture.	Some explicit teaching of aspects of code that matches to learner phase; content more than strategy	Explicit teaching on content and strategy for code. Clear, detailed enough, not over explained. Links to learner phase and rest of lesson
No work on HF words at any point of lesson	T asks Qs rather than guides; child's view needs considering as may be confused	Ss learn words from connected text with little focus on specific words or code work	HF words taught, practiced and analysed prior to work with text; may not relate to learner phase	HF words are explicitly taught, analysed and practiced for use in today's text. Related to learner phase.
Text seems hard; children need support with large number of words. Or too easy.	Text is at learners' instructional level but seems inappropriate choice for this group	Text suits learner instructional level and prior knowledge. T supports readers in processing system. There may be many decoding challenges as child tries to use meaning and structure to support the working out of new words.	Text suits for instructional level, HF words and sentence patterns	Text suits learner phase Predictable->decodable->controlled-> natural language. Challenges are manageable and based on the explicit teaching.
Text reading focus is on completing the text or assigned section	Text focus is on reading and answering comprehension questions	The focus of the text reading is finding out what happens in the story. Meaning ↔ fluency	Focus of text reading is to incorporate the content taught e.g. HF words or letter taught	The focus of the text reading is to integrate the content and strategies taught in this lesson. Auto word recognition as way to fluency

Ss are given text to read silently with no support	Ss read after T intro or after T reads whole book aloud. Ss read choral, round robin or silent	<b>Approach to text reading</b>	Reading of text drives and dominates lesson; Ss whisper read after a T intro based on meaning.	Text reading dominates lesson: T supports Ss after introduction that may include focus on code; choral or whisper read	Use of echo, choral, or whisper reading that may not be right for learner phase Explicit teaching sets up for success	Echo reading at pre alphabetic; choral then partner then whisper reading as move through phases.
Reading strategies not discussed or outlined	T questions to ask Ss what strategies they will use	<b>Reading strategies emphasis</b>	Reminder of strategies to use for effective processing system (make sense, sound right, look right; reread, read on)	Reminder of strategies to use for processing system. Code focused content and decoding strategies used.	Explicit teaching of new content and strategy for learner phase, which can then be clearly linked to today's text. Use print detail as appropriate and meaning/syntax to check	
Qs and asks more Qs when child can't correctly answer	Use of T Qs seems not to guide children to success	<b>Instructional strategies used</b>	T Qs are main strategy for instruction, guiding children to recall prior knowledge to respond	T Qs tend to be dominant strategy used with some supported prompting	Explaining and modeling are main strategies with Q used for handover and checking. Deliberate choice of strategies is apparent	
Very little use of prompts or feedback	Prompts such as "Nearly", "Close", "Could be", "Try again", Feedback such as "Good", "Yes", "Well done"	<b>Prompts and feedback</b>	Prompts and feedback are about a processing strategy (e.g. you went back; you read on; you made it make sense)	Prompts at unknown word may use first letters but reverts to meaning/syntax when decoding attempt fails. Feedback is about the processing strategy taught	Prompts in line with learning phase. Reminds Ss of content and strategy from explicit teaching. Feedback is about how Ss uses content and strategies taught	
May not realise that Ss misunderstand and doesn't adapt teaching steps to suit	T Qs as way of checking understanding; unable to adapt teaching practice; may miss that children have not understood	<b>Checks for understanding</b>	Checks Ss understanding by noticing, questioning, referring to processing system. Ss seated so T can closely observe Ss engagement and understanding.	Notices misunderstanding and some adapting of teaching steps to suit	Checks Ss understanding during explicit teaching, text reading and opportunities for practice. Adapts teaching as necessary Repetition of learning points	
Book as only material of the lesson	Materials used briefly with little chance for Ss to engage; need to notice how S might view	<b>Materials used; opportunities for practice</b>	The main material is the book with modeling book to support	Some materials added to support specific teaching	T uses a variety of materials throughout (mag letters; modeling book; whiteboards). Children use it too. S view considered. Careful adaptations	
No evidence that cognitive load is considered; Ss struggle or find easy	Little support given after T intro of text; assumption Ss will cope	<b>Addressing cognitive load/ ZPD</b>	Cognitive load controlled by reference to meaning, syntax, illustrations Text may present many challenges	Cognitive load controlled by explicit teaching, use of materials. Text may be too difficult or too easy.	Cognitive load carefully controlled, reduced by explicit teaching and T support with code Teaching is at learner ZPD	
No links apparent	Links to text reading of previous day	<b>Links to other aspects of literacy</b>	Links in terms of story topic; engages Ss prior knowledge for topic	Links to recent teaching of print detail e.g. letter patterns	Links 2 elements of 5 pillars (e.g. PA – phonics or Phonics-vocab); links to letter formation or writing	
Loosely a literacy activity; not linked to specific focus	General literacy activity from a bank of activities	<b>Activity</b>	Activity is focused on meaning response	Activity focuses on practice with print detail taught today	Activity links to the explicit focus of the lesson; Ss get to practice new learning	

T = teacher; Ss = students; Q = question

## OBSERVATION RUBRIC VERSION 2: Observation of teaching Year 1 students during small group reading lesson

	A: Implicit/arising/text	B: Mixed/arising/text	C: Explicit/planned/text	D: Explicit/planned/needs
<b>1. Lesson focus</b>	Reading of book is lesson focus. T guides Ss to use processing system <sup>11</sup> for a successful reading of the text. Discussion for meaning.	Reading of book using processing system main focus. Decoding taught within book reading.	Explicit teaching for code knowledge <sup>12</sup> that Ss need for a successful reading of chosen text.	Explicit teaching of code knowledge and strategies for phase is main focus. Text is chosen to support the focus.
<b>2. Instructional strategies</b>	T Qs as main strategy, leading Ss to self-monitor: "Did that sound right?"; "What did...?"; "what's this letter/sound?"	T Qs, adds prompts when Ss need support e.g. "Look at..." "Point to..." "Let's try..." "Make the sound"	T Qs or prompts to guide children and explains or models when explicit teaching needed.	T explains and models new learning, then prompts or questions towards independence.
<b>3. Code knowledge</b>	Alphabet knowledge (letter names/sounds) recalled as text read. Ss learn words from reading connected text.	Alphabet or HF words practiced. Preview some words for book. Decoding taught during book.	Explicit teaching for code knowledge that Ss need for today's text. HF words taught as wholes and in parts.	Systematic, planned teaching of code; follows scope and sequence. Decoding strategies <sup>13</sup> taught explicitly for use on text.
<b>4. Reading strategies</b>	Ss apply processing system. Emphasis on self-monitor and problem solve, by using m/s and first letter to predict word.	Ss apply processing system. Self-monitor, problem solve, use m/s and parts of word to predict/ confirm.	Focus on 1:1; sound and blend; make sense; use m/s and as much of code as possible to predict/confirm.	Focus is on independent problem solving using code knowledge and strategies taught; use m/s to confirm.
<b>5. Choice of text</b>	Natural language <sup>14</sup> and strong storyline. Some words outside Ss reading vocab so use processing system. Sentence patterns vary.	Natural language and strong storyline with some repeats of HF words and sentence structures.	Controlled language <sup>15</sup> ; repetitions of HF words and sentence patterns to support learners.	Predictable <sup>16</sup> /decodable <sup>17</sup> controlled/ or natural language to suit learners. Text supports explicit teaching focus.
<b>6. Text introduction and reading purpose</b>	Introduction to book based on meaning and using processing system. Purpose of reading is to find out what happens in book.	Thorough intro with a focus on meaning, selected words and sentences used in book.	T intro to text shows Ss how to apply the code teaching from the explicit teaching of this lesson.	T intro allows Ss to independently apply knowledge and strategies taught.
<b>7. T support of text reading</b>	T supports Ss to use processing system and 3 cues. Teaching opportunities from text.	T supports Ss to use processing system and to decode variety of words in the book. Teaching opportunities from text.	T supports by reminding Ss of things taught: words, sentence structures, and any specific decoding strategy.	Echo, choral, or whisper as appropriate; aim is for Ss to read text independently, using knowledge and strategies taught
<b>8. Materials used</b>	Instructional book as the material	Instructional book; modeling book; word/letter cards.	Text, modeling book, magnetic letters, word/letter cards, whiteboard. T uses.	Text, modeling book, mag letters, word/letter cards, whiteboards. T and Ss use.

<sup>11</sup> **Processing system:** Self-monitor, reread, check 1-1, read on, use cues: picture, use initial letters.

<sup>12</sup> **Code knowledge:** letter sounds, blends, vowel patterns, and syllables as suits phase and learner need

<sup>13</sup> **Decoding strategies:** sounding/ blending, recognizing vowel patterns, using syllables and morphemes as appropriate to learner: phase

<sup>14</sup> **Natural language:** as close to natural speech and sentence structure as possible with some control of vocabulary; full use of punctuation range (Ready to Read).

<sup>15</sup> **Controlled:** based on speech patterns but with careful control of vocabulary; full use of punctuation range (PM plus);

<sup>16</sup> **Predictable:** set sentence pattern with minor changes per page; minimal punctuation range (PM Magenta; old style R to R);

<sup>17</sup> **Decodable:** set word patterns only are used with HF words taught; careful intro of punctuation range (Little Learners; Pocket Rocket; teacher made text).

**Appendix 5: Five scenarios used to identify teacher prompts at  
unknown word**

<i>Ready to Read</i> text used	Child's reading	Error type
<i>The Waterslide</i> Level 1-2	<u>Dad turned - the hose.</u> Dad turned on the hose	Omission
<i>A starfish for Oscar</i> Level 3-5	<u>We can get a photo.</u> We can take a photo.	Substitution
<i>A Bird in the classroom</i> Level 6-8	<u>We put some crooms by the door.</u> We put some crumbs by the door.	Medial vowel
<i>Stay where you are</i> Level 9-11	<u>I will be the l-_____.</u> I will be the leader.	Incomplete attempt
<i>Dad's hat</i> Level 12-14	<u>He weared the hat everywhere.</u> He wore the hat everywhere.	Over-generalised past tense

## Appendix 6: Questions for semi-structured interview

These questions ask about some of the professional development learning you were involved in with The Early Literacy Research Project and the barriers and enablers for incorporating this learning into classroom practice. The purpose of this interview is for me to be able to explore some of the ways the professional learning development supported you as teacher of reading and any challenges.

The first point explores some core practices for literacy teaching and whether the Professional development has helped you with those.

1. I would like to know how the PLD is supporting you in your classroom literacy practice. I am also interested in other supports and challenges you have.
  - Small group instructional reading
  - Selecting what to teach to whom
  - Children with difficulties
  - Grouping
  - Teaching alphabet and alphabetic principle
  - Teaching phonic or word knowledge
  - Assessments
  - Reading material
2. This question is about the video of your practice.
  - Consider where your practice has moved to as per the observation schedule (implicit to explicit). Discuss.
  - Selecting a piece to view. Consider... (question from tool)
3. I wonder if you have found any difference about how children cope with the text reading material in the lesson if you have done explicit teaching as part of the lesson.
4. Looking at the prompts you use during reading to support successful reading and the difference between prompts you used at T1.
5. Are there any policies or practices that you find support or hinder applying the workshop learning (e.g. assessment expectations; school events or policies; Ministry or school resources etc.)
6. If there were one thing you could ask for help with to improve outcomes for your students, what would it be? Based on the new teacher learning, how do you think this would enable better outcomes?
7. What do you see as strengths of your literacy teaching?
8. What do you see as places for development in your literacy teaching? Or what are some parts of literacy teaching that concern you?
9. In what ways do you think the professional development helped you as a teacher of early literacy? Can you describe some particular learning you did or some particular practices you have changed?
10. Are there any other things you can identify as barriers to applying the knowledge from the workshops?

## Appendix 7: Overview of interview themes as barriers and enablers of teacher change

Themes	Enabler	Barrier	Definition
Beliefs/ideology		•	Teachers' responses showed embedded thinking that was difficult to challenge
Systems/ practices		•	Some programmes or teaching approaches were resistant to change
Resources		•	Some resources reinforced particular ways of teaching
	•		Some resources enabled and supported change to teaching
Teacher knowledge	•		Teachers' knowledge of linguistic constructs and developmental progressions affected teaching
Colleagues	•		Collegial support was positive; sharing with others; teamwide changes
		•	Colleagues challenged or discouraged new practice; conflicting ideas in teams
Student progress	•		Student gains attributed to changes in practice lead to sustaining practice
		•	Lack of student progress attributed to the child was a barrier to change
Time		•	Time needed to embed new practice competes with many other time demands

## Appendix 8: Ethics approval letter, participant information sheets, and participant consent forms



Date: 08 July 2016

Dear Christine Braid

Re: Ethics Notification - **SOB 16/19 - A study into the challenges and supports teachers experience in ensuring expected reading progress for all children in their first year at school**

Thank you for the above application that was considered by the Massey University Human Ethics Committee: **Human Ethics Southern B Committee** at their meeting held on **Friday, 8 July, 2016**.

On behalf of the Committee I am pleased to advise you that the ethics of your application are approved.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Dr Brian Finch  
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)



**MASSEY UNIVERSITY**  
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TE KURA O TE MĀTAURANGA

## **A study into the challenges and supports teachers experience in ensuring expected reading progress for all children in their first year at school**

### **Information sheet for teachers**

Thank you for deciding to take part in the interview that will inform the case study for my doctoral thesis. I am looking forward to working with you to learn more about the challenges of being successful in teaching children to read in their first year at school and the things that you find support you in this success.

#### **Outline of the Project:**

My aim is to conduct semi-structured interviews or discussions in a one to one and face-to-face setting. The interviews will last up to 60 minutes each and will involve some questions to guide the discussion, but they are also an opportunity for you to share your own ideas. The interviews will occur two times over the year to give you a chance to discuss your actions from a number of the Early Literacy Project workshops.

As part of the interview, I will invite you to present some of your teacher video that was gathered for The Early Literacy Project. This video will be used for reflecting on and discussing how you are applying new teacher knowledge in your practice. You might also like to use any entries from a reflective journal. The video and journal may help to get as true a reflection as possible of the issues that have arisen in applying the workshop content to your teaching and classroom setting. Use of the video and the reflective journal in our discussion times are optional and it is your decision whether to present them.

The interviews will be arranged to happen at a time that is most suitable to you and at your school or nearby as suits. I would like to audio record the interview for subsequent transcribing and analysis. You will not be identified in any analysis or presentation of results. The recordings and transcription and any other artifacts will be kept secure and confidential. Your information will be identified by a code for you rather than your name.

#### **Researcher responsibilities**

I will:

- Follow ethics process according to Massey University requirements, which ensures confidentiality
- Allow you to choose the interview time and place
- With your consent, I will inform your principal of your involvement in this study, so they are aware of the commitment you have made to this research
- Provide you with a summary of the findings of my study



### **Participant rights**

As a participant, you are protected by the university's policy of a participant's rights as outlined below. You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Withdraw from the study at any time by informing the researcher
- Change interview time as suits you
- Ask any questions about the study as long as other participants' confidentiality is not compromised
- Engage in the interview, knowing that your name will not be used in any reports that arise
- Ask for the recorder to be turned off at any time
- Ask for audio to be deleted at any time
- Ask to be acknowledged as a named participant in this research in the thesis or any other publications. This would not associate any particular statement with you but be an acknowledgement of your participation overall. It will be assumed you want to **not** be named unless I receive your request to be acknowledged by name.

You will be able to read the transcript of our discussion and you can decide whether to sign a form to release the transcript for analysis purposes as outlined above.

### **Project contact details**

If you have any questions about this research, you are welcome to contact me to discuss it further. My contact details are:

Email: [REDACTED]

Phone: [REDACTED]

My supervisor, Alison Arrow is contactable at Massey:

Email: [REDACTED]

The Ethics Committee details are included below.

Thank you for considering being part of this study.

*This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 16/19. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email [humanethicsouthb@massey.ac.nz](mailto:humanethicsouthb@massey.ac.nz).*



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## **A study into the challenges and supports teachers experience in ensuring expected reading progress for all children in their first year at school**

### **Information sheet for principals**

My name is Christine Braid and I am currently studying towards a PhD. The topic of my study is the challenges and supports teachers face in ensuring expected reading progress for all children in their first year of school. My letter is to inform you of my study and to inform you that New Entrant teachers from your school may elect to be part of the interviews for this study.

I am inviting teachers from The Early Literacy Project to be interviewed at two points during the year. The interviews will happen in the teacher's own region and at a time that suits them.

The teacher interview will focus on how the knowledge from the workshops is being applied in their teaching and any difficulties they may have with this application.

Through this study, I hope to explore and examine the difficulties that might come to bear on a teacher of New Entrant children as they endeavour to implement reading teaching that brings about the best results for all children. I will also be exploring the possible supports that enable the teachers to be successful in teaching all children to read.

The information from the interviews will not identify the teacher or the school. All information remains confidential and the participants are protected by an agreement between the researcher and the Massey University Human Ethics Committee.

I am thankful to the teachers for being part of this study. I hope it will be the useful professional learning opportunity for them that I know it will be for me. I look forward to learning as much as I can about the challenging role of being a teacher of children in their first year of schooling and to examine the ways that these teachers can best be supported in enabling all children to lay a strong foundation in being a successful reader.

Kind Regards

Christine Braid

#### **Project contact details**

If you have any questions about this research, you are welcome to contact me to discuss it further. My contact details are:

Email: [REDACTED]

Phone: [REDACTED]

My supervisor, Alison Arrow is contactable at Massey:

Email: [REDACTED]

*This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 16/19. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email [humanethicssouthb@massey.ac.nz](mailto:humanethicssouthb@massey.ac.nz)*



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**A study into the challenges and supports teachers experience in ensuring  
expected reading progress for all children in their first year at school**

**PARTICIPANT CONSENT FORM - INDIVIDUAL**

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I wish/do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out in the Information Sheet.

**Signature:**

**Date:**

.....

**Full Name - printed**

.....



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expected reading progress for all children in their first year at school**

**Teacher information consent**

In addition to the interview transcript, the researcher would like to use videos that have been gathered and stored for the Project. This information will be used in the interview for a discussion on the challenges and supports that teachers face in making changes to classroom practice. You will not be identified in any way.

Signature.....

Date:.....

Full name (printed):.....



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**A study into the challenges and supports teachers experience in ensuring  
expected reading progress for all children in their first year at school**

**Authority for the Release of Transcripts**

I confirm that I have had the opportunity to read and amend the transcript of the interviews  
conducted with me.

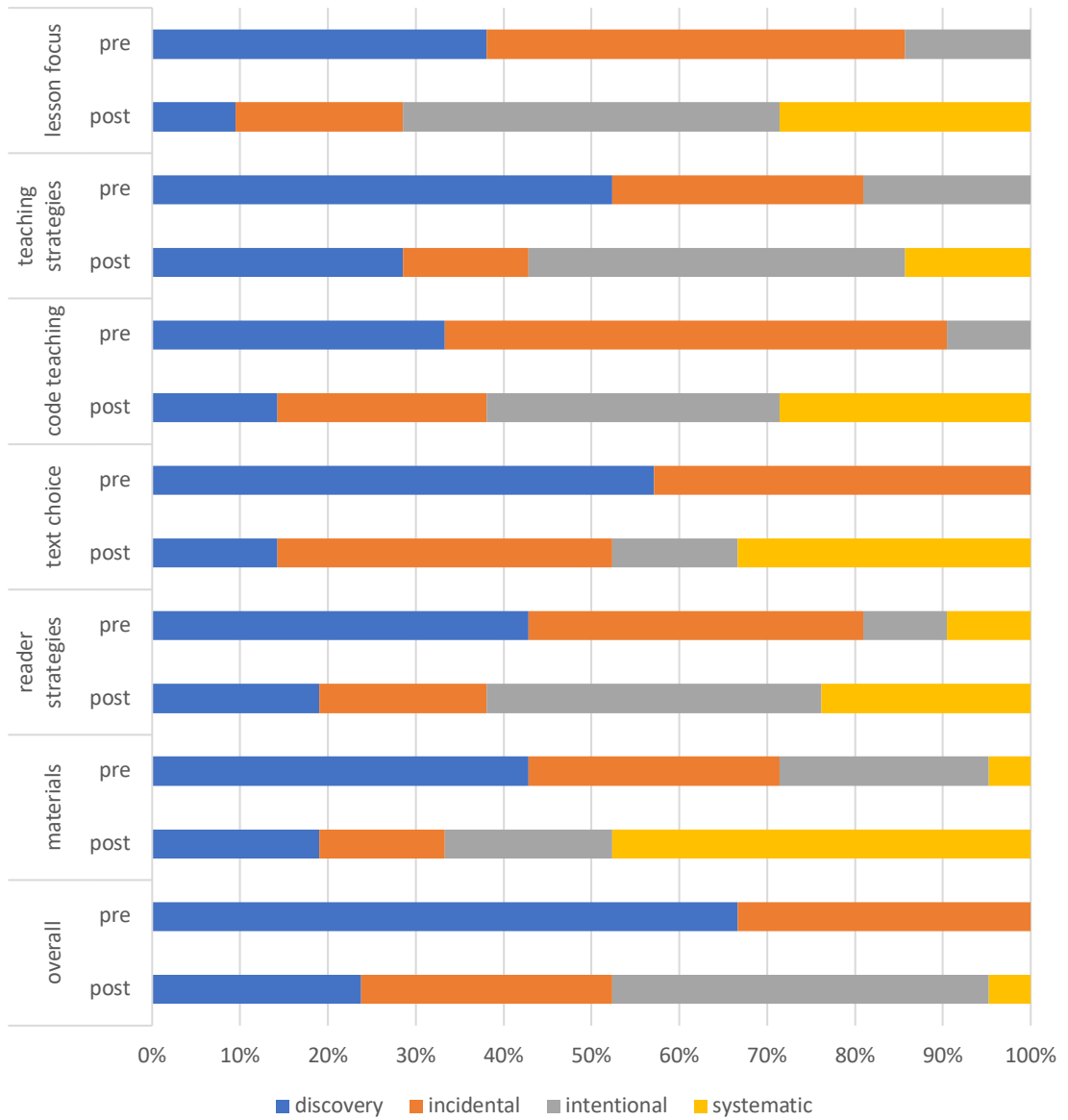
I agree that the edited transcript can be used as extracts in reports and publications arising from  
this research. I understand that I cannot be identified from these extracts.

Signature.....

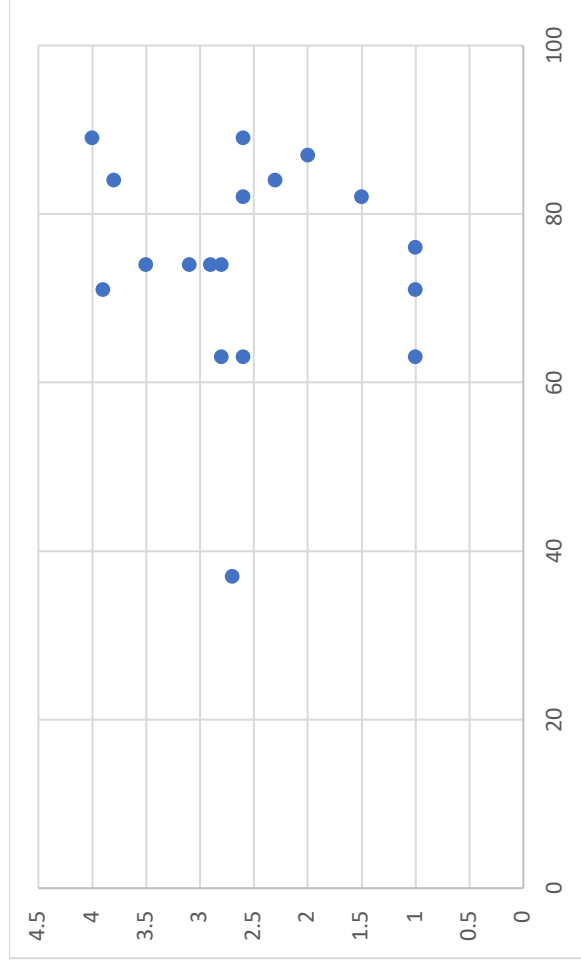
Date:.....

Full name (printed):.....

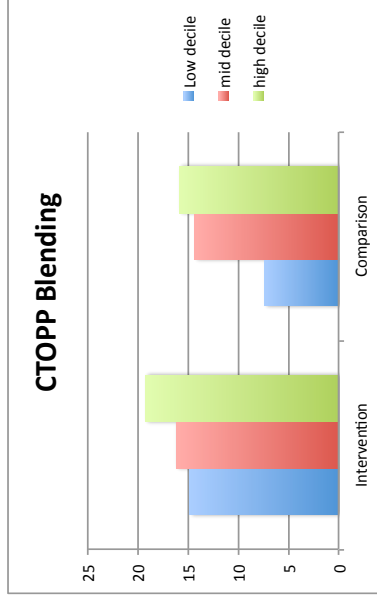
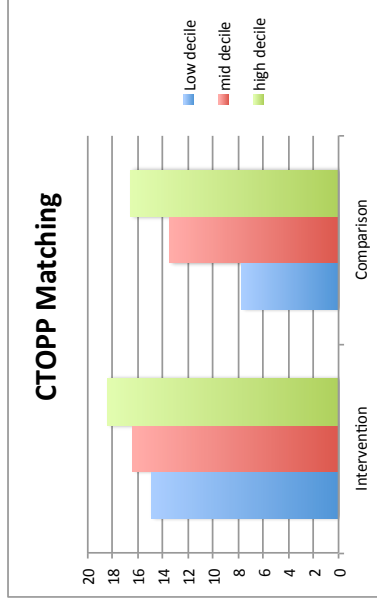
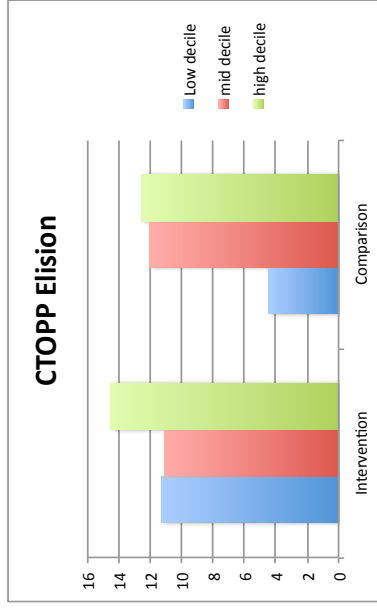
**Appendix 9: Graph of percentage of lessons in each rubric category, pre- and post-PLD**



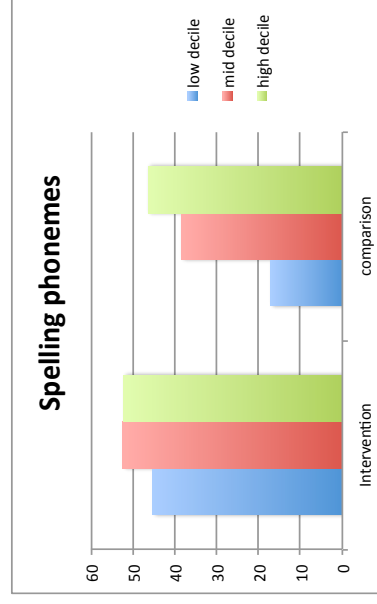
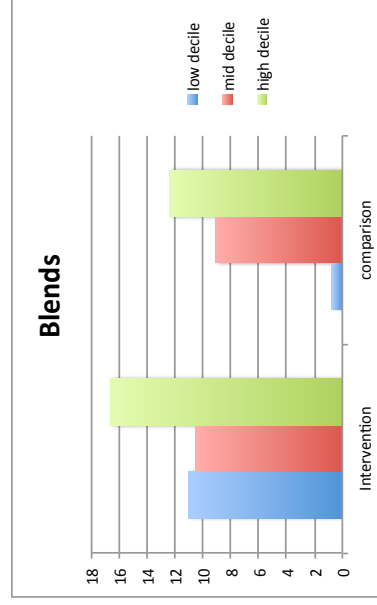
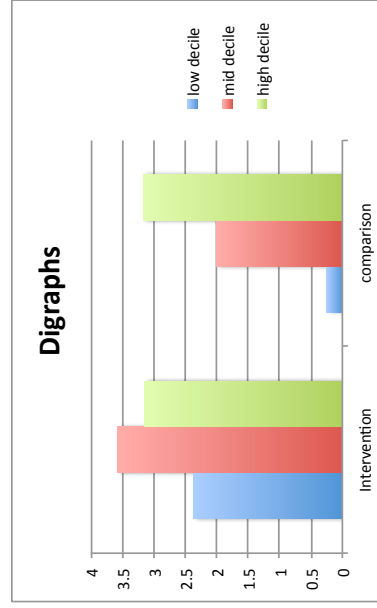
**Appendix 10: Graph of correlations between teacher practice and teacher knowledge**



## Appendix 11: Graphs of post-PLD student outcomes data for implementation and comparison groups

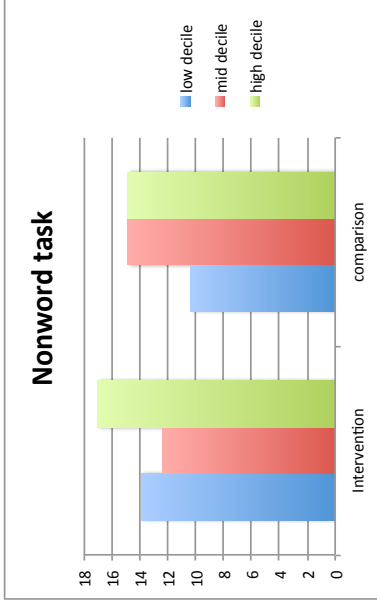
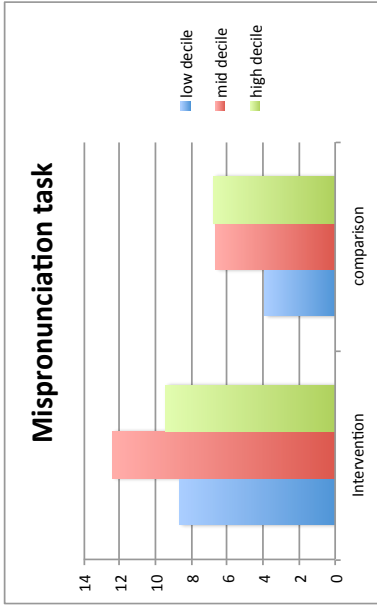


### Post-PLD Group x Decile Band Comparison for Phonological Awareness Variables

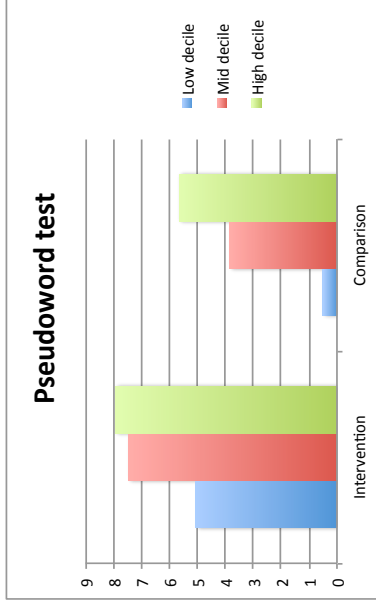
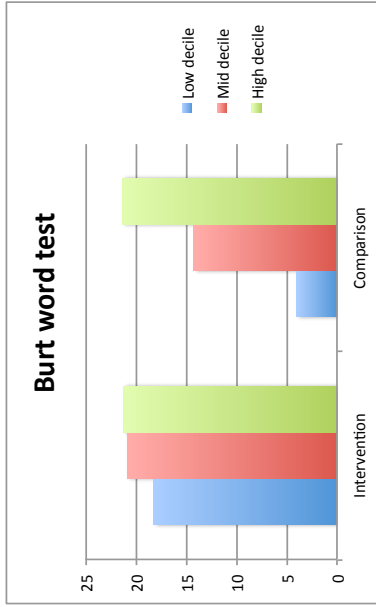


### Post-PLD Group x Decile Band Comparison for Alphabetic Coding Variables





*Post-PLD Group x Decile band comparison for Language Processing*



*Post-PLD Group x Decile band comparison for Reading and Spelling Outcomes*

