MASSEY UNIVERSITY
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UNIVERSITY OF NEW ZEALAND

EARLY LITERACY RESEARCH PROJECT

REPORT TO THE NEW ZEALAND MINISTRY OF EDUCATION FOR YEAR 1 (2015) PHASE

James W. Chapman, Alison W. Arrow,
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Massey University
May, 2016

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EXECUTIVE SUMMARY

This project involves three longitudinal studies. In this report we present results from the first year of the project involving the first phase of the first longitudinal study. We present the rationale for the Early Literacy Research Project undertaken by Massey University Institute of Education literacy researchers. Background to the rationale is presented in relation to the persistent literacy learning "gap" between good and struggling readers. We describe the rationale for the study, and the project emphasis on teacher professional learning and development as the key means for bringing about eventual improvements in students' literacy learning outcomes over the first few years of schooling. In particular, we discuss the benefits of a more explicit approach to ensuring children develop stronger code-based knowledge and strategies, together with the value of *differentiated literacy instruction*. For this to occur, we present evidence in support of teachers developing a stronger understanding of the basic structure of the English language, including an understanding of the sound–symbol correspondences of written English and how these influence reading development.

Before summarising the results of Year 1 of the project in this Executive Summary, we draw attention to the overall design of the project and changes that have been made from what was originally planned. Initially, we intended to follow a large sample of New Entrant/Year 1 students for 2 ½ years from the start of 2015 through to the middle of 2017. Approximately half of the students were to be in the Intervention group and half in the Comparison group. The Intervention students would have teachers who attended a series of professional learning and development (PLD) workshops during 2015. However, the number of schools which agreed to participate in the project was considerably smaller than originally planned. As a consequence, and following reflection on the Year 1 results presented in this report, we have added some important research design features to the project.

In addition to tracking the progress of Intervention and Comparison students who started school as New Entrants in February 2015, we have a new group of teachers who will participate in PLD workshops during 2016, and their New Entrant/Year 1 students will be assessed on numerous occasions through to the middle of 2017. The teachers in this group were among those in the 2015 Comparison group. We are also following the progress of

New Entrant/Year 1 students who in 2016 have teachers who participated in last year's PLD sessions. These design elements, involving three longitudinal studies, are described in more detail towards the end of this report.

The school sampling procedure at the outset of the study is described. In the latter part of 2014 we randomly selected and contacted 80 schools in the lower North Island to seek their participation in the project. By the start of Year 1 in February 2015, 38 schools confirmed their willingness to take part in the research. These schools represented a reasonably good range of decile rankings. Of the 38 schools that agreed to participate in the project, 24 had been randomly assigned to the intervention group, and 14 to the comparison group. A total of 62 teachers of New Entrant children were identified: 38 in the intervention schools and 24 in the comparison schools. Teacher numbers varied during the course of the year, but at the first PLD workshop in March, 45 teachers attended from the 24 intervention schools.

In terms of students participating in the project, males outnumbered females in the Intervention group (54% vs. 46%) whereas the Comparison group had a 51:49 gender split. Most of the students were Pākehā (64%); 25% were Māori; 5% Pasifika; 4% Asian; and, 3% "Other".

Analyses of the baseline (school entry) assessment scores revealed no statistically significant differences between the Intervention and Comparison groups. This finding indicates that vocabulary knowledge, alphabet knowledge, word knowledge, phonological processing, and phonemic awareness scores were reasonably similar for the two groups. As expected, many variables had marked "floor" effects, with very skewed distributions and large percentages of children obtaining scores of 0 or 1. Also expected on the basis of previous reports were significant differences for a number of variables as a function of decile groupings of schools: children from high decile schools tended to obtain higher scores than children in low decile schools on most school entry variables.

In addition, during the first half of 2015 a teacher survey was undertaken for both the Intervention and Comparison teachers. This survey covered teachers' knowledge of literacy-related basic language constructs, teachers' self-evaluations of literacy-related teaching knowledge, literacy teaching efficacy, and a word identification prompt scenario exercise that asked teachers to outline the prompts they would usually adopt to assist students to identify an unknown word in text. Unfortunately, there was a reasonable

amount of missing data resulting from teachers not completing all parts of the survey, or missing key questions in some sections. None of the teacher survey sections resulted in statistically significant differences between the Intervention and Comparison teachers. In general, teachers had reasonably positive views about their literacy teaching knowledge and positive feelings regarding literacy teaching efficacy. Their knowledge of basic language constructs was more variable with low levels of knowledge in some areas. Regarding the use of word identification prompts, there was a tendency for teachers to recommend to students that they use a text level prompt (illustration, meaning of the story) rather than a word level prompt (looking at letters and letter patterns) for identifying unfamiliar words in text.

End of Year 1 data revealed an overall attrition rate of 11.5% for students in the Intervention group and 21.5% for those in the Comparison group (due largely to the withdrawal of one Comparison school from the project). Not all assessments were completed by students at the end of the year, and data on school-assessed reading book levels has not been received from three schools despite numerous attempts to obtain these data.

Although we had asked that schools try to ensure that Intervention students remained with the same teacher throughout the year, this did not occur in many cases. The effect of a teacher change was quite dramatic for the assessment results of students who had a change of teacher during the year which involved a teacher who did not participate in the PLD workshops. We present data showing that those intervention students who had a new teacher during the year, who was not part of the project, obtained considerably lower scores on many end of Year 1 variables. To better test the effects on student end of year assessments in relation to their teachers' participation in the project PLD workshops, we removed from the analyses of end-of-year assessments Intervention students who had a new non-project teacher during the course of the year. This further reduced an already relatively low sample that had resulted from missing data.

We analysed the year-end student data by means of a series of two-way analyses variance, with group (Intervention & Comparison) and ethnicity (Pākehā & Māori) as the two factors. There were too few students of Pasifika background to include in these analyses. Largely as expected, there were no statistically significant differences in favour of the Intervention students. We explain the reasons for this. Consistent with other research

and Ministry of Education data, we found that for all variables, Pākehā students outperformed Māori students. Correlational data showed that letter knowledge at school entry was a very strong predictor of reading measures at the end of the first year of schooling.

We also undertook another survey of teachers' knowledge of basic language constructs. This was a much shorter survey than the earlier one, designed in the hope that the participation rate would be higher. Unfortunately, the participation rate was considerably lower with less than 50% taking the survey. Many items were missed by some teachers. Analyses of data from surveys that were completed indicated that there were no significant differences in teacher knowledge between the Intervention and Comparison teachers. This result was disappointing and we discuss reasons for this finding. We also undertook preliminary analysis of video data showing Intervention teachers conducting part of a typical reading lesson. These data revealed that few teachers had been able to translate the theory and activities covered in the workshops into actual teaching practice. We discuss possible reasons for this finding.

We have presented a section towards the end of this report on "Challenges" in this type of research, and a section identifying what has been learned from the first year of the project that have contributed to changes in the PLD sessions for the second (2016) year of the project. Specifically, changes to the nature of the PLD workshops for 2016 are outlined. It is clear from our 2015 experiences that PLD workshops require a much more explicit approach when presenting new information and when arranging for teaching activities. It has become apparent that there is a conflict of paradigms in terms of early literacy instruction (more explicit, code-orientated versus a more constructivist meaning-orientated approach), as well as in regard to the nature of teacher professional development (open inquiry within a known framework versus more explicit and systematic coverage of new material in an unfamiliar framework). These conflicts have had an impact on the first year of this project, and changes will be made to resolve these during the course of 2016.

INTRODUCTION

What is this Project About?

The purpose of the Early Literacy project is to examine the effect on literacy learning outcomes of a teacher professional learning and development programme designed to provide teachers with the knowledge and skills to adopt explicit and systematic word-level decoding strategies and skills in their literacy instruction with New Entrant/Year 1 children. The primary goal is to improve the literacy learning outcomes of these children, especially those of children from diverse backgrounds and in lower decile schools. The approach is based on research indicating that many children, and especially those in low decile schools and from diverse backgrounds, are likely to achieve better literacy learning outcomes if literacy instruction is more explicit and focussed on the development of word-level decoding skills and associated language skills that underpin reading acquisition.

Why Is this Research Being Undertaken?

Concerns have been expressed about the literacy performance levels of New Zealand children and adults for close to 15 years. The concerns have arisen from observations of data from international surveys of students and adults, as well as data collected by the Ministry of Education (MoE). It became evident during the 1990s that New Zealand had the largest spread of scores between good and poor readers compared to many OECD countries (Elley, 1992), and that low-performing readers were more likely to be Māori and/or from low-income backgrounds (Wagemaker, 1993). Research in New Zealand during the 1990s revealed disparities between children of different backgrounds in important literacy related skills at school entry (Gilmore, 1998; Nicholson, 1997) and that differences in literacy achievement between Māori and Pākehā students steadily increased over the first years of schooling (Crooks & Caygill, 1999; Flockton & Crooks, 1997), throughout high school (Nicholson, 1995; Nicholson & Gallienne, 1995) and into adulthood (Ministry of Education, 1997).

Concerns about the literacy skills of New Zealand children continued through the first decade of the 21st Century. National Standards were introduced in 2010 by the government as one means to regularly identify children's progress in literacy and numeracy. The year following the introduction of National Standards the MoE's Briefing to the

incoming Minister of Education (Ministry of Education, 2011), identified some overall improvement in education but noted that disparities in learning outcomes appear early and often persist throughout learning. The Briefing concluded that, “The greatest challenge facing the schooling sector is producing equitable outcomes for students” (p. 23).

This research is based on theory and previous studies to test the view that children may benefit from an approach to literacy instruction that places greater emphasis on the development of literacy-related language skills and word-level identification strategies. Further, some children are likely to derive more benefit from such an approach, and that a more differentiated approach to literacy instruction is likely to have advantages because of the recognition that not all children start school with the same experiences that contribute to successful literacy learning.

What Does Contemporary Research Say About Literacy Learning?

Research on how children learn to read indicates that achievement in reading comprehension performance depends on the ability to recognise the words in text accurately and quickly. For progress to occur in learning to read, the beginning reader must acquire the ability to translate letters and letter patterns into phonological forms (Ehri, 2005; Snow & Juel, 2005; Tunmer & Nicholson, 2011). Making use of letter-sound relationships provides the basis for constructing the detailed orthographic representations required for the automatization of word recognition (or what Ehri, 2005, calls sight word knowledge). When this occurs, cognitive resources can be allocated to sentence comprehension and text integration processes (Pressley, 2006). To discover mappings between spelling patterns and sound patterns, children must also be able to segment spoken words into subcomponents. Children who experience ongoing difficulties in detecting phonemic sequences in words (i.e., phonemic awareness) will not be able to fully grasp the alphabetic principle and discover spelling-to-sound relationships (Shankweiler & Fowler, 2004). As the reading attempts of beginning readers with a firm understanding of the alphabetic principle become more successful, they will begin making greater independent use of letter-sound information to identify unfamiliar words in text. Phonologically decoding words a few times ultimately cements the orthographic representations of the words in lexical memory from which additional spelling-sound

relationships can be induced without explicit instruction (Snow & Juel, 2005; Tunmer & Nicholson, 2011).

There is now a large body of research indicating that explicit, systematic instruction in the code relating spellings to pronunciations positively influences reading achievement, especially during the early stages of learning to read (Brady, 2011; Hattie, 2009; National Reading Panel, 2000; Snow & Juel, 2005; Tunmer & Arrow, 2013). From an examination of findings covering a wide range of sources that included studies of reading development, specific instructional practices and effective teachers and schools, Snow and Juel (2005) concluded that explicit attention to alphabetic coding skills in early reading instruction is helpful for all children and crucial for some.

HOW CAN CURRENT APPROACHES TO EARLY LITERACY INSTRUCTION BE ENHANCED?

Building teacher knowledge to increase word-level instruction

Effectively teaching reading skills to children requires that teachers have a high level of understanding of the basic structure of the English language, including an understanding of the sound–symbol correspondences of written English and how these influence reading development. Many children learn to read regardless of the method of instruction and/or their teachers' levels of understanding of the structure of English. However, for those children who present with early and often ongoing reading difficulties, teacher knowledge in this area is likely to be the critical element that influences the child's future success or difficulty in learning to read.

Before teachers are able to teach children to read or to develop the foundation skills for learning to read, it is important that they are not only knowledgeable about the code of written and spoken English, but also have knowledge of research-based literacy assessment and instructional procedures (Gersten, Compton, Connor, Dimino, Santoro, Linan-Thompson & Tilly, 2008; Spear-Swerling & Zibulsky, 2014). The importance of teacher knowledge for student development has been highlighted by Piasta, Connor, Fishman, and Morrison (2009), who found that time spent on explicit decoding instruction was only effective for student word-learning growth when teacher knowledge of phonology, orthography, morphology, literacy acquisition, and instruction was high.

To adequately meet the needs of all students, knowledge of contemporary effective literacy practices must also be part of a teacher's toolbox for literacy instruction. This is an area of teaching practice that has not been examined properly in New Zealand due to the different theoretical understandings of what reading is and how it should be taught. However, even when teachers have sufficient *knowledge* of appropriate instructional areas or practices, they seldom implement or plan for them in their lessons (McNeill & Kirk, 2014; Spear-Swerling & Zibulsky, 2014). McNeill and Kirk, for example, found that for the teaching of spelling, teachers were generally familiar with a variety of evidence-based practices, but tended not to use them because they felt that they lacked the explicit knowledge of how to use them in practice. Additionally, Fielding-Barnsley (2010) found that pre-service teachers

in both early childhood and primary education programmes knew the importance of teaching phonic knowledge to beginning readers but lacked sufficient clear understanding required to explicitly teach such knowledge to their students.

Professional Development in Literacy Teaching

In this research project, teacher professional development is directed towards developing in teachers a high level of the teacher knowledge that is required for effective teaching based on children's location on the developmental continuum. Teacher knowledge of English orthography and morphology can help teachers move beyond the limitations of a stand-alone phonics programme (Snow, Griffen, & Burns, 2005) and incorporate phonics into reading programmes. When the patterns for word decoding and word spelling are understood by teachers, it is easier for them to work with children to learn the essential skills for reading and spelling (McNeill & Kirk, 2013). Children who do not acquire an understanding of the patterns, either through explicit teaching or implicit learning, start to lag behind in their literacy development. They become reliant on identifying unfamiliar words in text by guessing or using non-text cues (e.g., illustrations), strategies which characterise poor readers (Nicholson, 1991, 1993; Pressley, 2006).

Teaching word-level knowledge requires explicit knowledge of words but also the ability to provide explicit, systematic instruction about words. This explicit approach is also necessary for teaching language-based strategies to teachers. Previous studies on the nature of professional development for teachers has found evidence of the effectiveness of explicit and specific examples and practice for teachers (Desimone, Porter, Garet, Yoon, & Birman, 2002) as well as ample time to implement changes to practice (Klingner, Vaughn, Hughes, & Arguelles, 1999).

A Framework for the Teaching of Word-Level Knowledge

We have adopted the Cognitive Foundations of Learning to Read[1] framework (Tunmer & Hoover, 2014; see Figure 1) for use in this project. This framework combines the cognitive elements underpinning the development of the language comprehension and word recognition components of the Simple View of Reading (Gough & Tunmer, 1988), and

[1] Hereafter shortened to Cognitive Foundations framework

is based on the assumption that learning to read follows a developmental progression from pre-reader to skilled reader that involves qualitatively different but overlapping phases. Skill in comprehending written text depends on the ability to recognize the words of text accurately and quickly; the development of automaticity in word recognition in turn depends on the ability to make use of letter-sound relationships in identifying unfamiliar words; and the ability to discover mappings between spelling patterns and sound patterns in turn depends on letter knowledge, phonemic awareness, and knowledge of the alphabetic principle. The literacy learning needs of beginning readers necessarily vary because they differ in the amount of reading-related knowledge, skills, and experiences they bring to the classroom on school entry, in the explicitness and intensity of instruction they require to learn skills and strategies for identifying words and comprehending text, and in their location along the developmental progression from pre-reader to skilled reader.

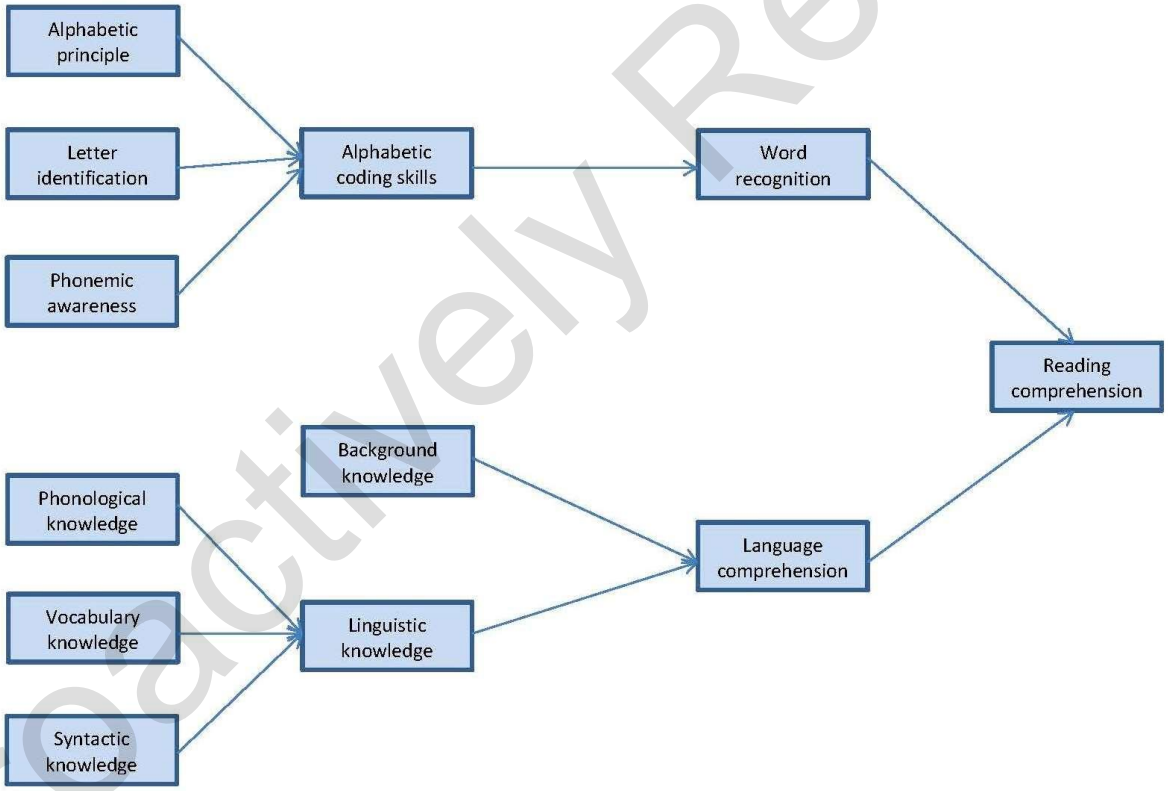


Figure 1: Cognitive Foundations of Learning to Read (Tunmer & Hoover, 2014)

Progress in learning to read is dependent on the child-by-instruction interactions that occur during instruction (Arrow & Tunmer, 2012). Child-by-instruction interactions can be described using Byrne's (2005) *division of labour for acts of learning* framework that takes into account differences children bring to the process of learning to read. Within this

framework, the division of labour assumes that any act of learning is a product of both the environment and the learner. Byrne (2005) argued that different acts of learning could be located along different points of the continuum representing the division of labour between the learner and the environment. At one end of the continuum, acts of learning require less structured and often fragmentary environmental input for learning to occur (such as learning spoken language), whereas the other end of the continuum represents learning that requires rich and highly structured input from the environment (such as learning calculus).

For some beginning readers, the processes of acquiring literacy skills are highly learner dependent because some children grasp the idea of what is needed to discover orthographic patterns after relatively small amounts of explicit teaching of phonologically-based skills and strategies. Other children, however, are more environment dependent, and benefit much more from a fairly structured and teacher-supported introduction to reading. At school entry, learner-dependent children typically come from more advantaged backgrounds and bring with them higher levels of essential reading-related knowledge. On the other hand, environment-dependent children tend to come from low-income backgrounds and have more limited amounts of essential reading-related knowledge. Therefore, differentiated teaching, where teachers use evidence-based assessment procedures and instructional strategies, caters to the different literacy learning needs of beginning readers from the outset of schooling.

The structure of the Cognitive Foundations framework provides the basis for diagnostic reading assessment. For example, if beginning readers are not progressing satisfactorily in learning to derive meaning from print (i.e., reading comprehension), it is because they are having problems understanding the language being read (i.e., language comprehension), problems recognizing the words of text quickly and accurately (i.e., word recognition), or both. Weakness in word recognition skill stems from insufficient explicit instruction in alphabetic coding skill or inadequate opportunities to practice and receive feedback on applying alphabetic coding skills while actively engaged in reading. If alphabetic coding skills are still weak despite exposure to explicit instruction and practice, it is because of inadequate knowledge of the alphabetic principle, letter knowledge, or phonemic awareness.

The structure of the framework does not imply that the development of the more advance cognitive elements cannot occur until all of the more fundamental elements are fully developed. Although some level of mastery of the more fundamental elements of the framework is needed to develop mastery of the more advanced ones, the elements tend to develop congruently and reinforce each other in a reciprocally facilitating manner. The elements of the framework should therefore not be taught in isolation from each other but instead should be taught in an integrated manner; beginning readers should be given plenty of opportunities to practice and receive feedback on applying their newly acquired skills while engaged in performing the more advanced cognitive functions specified in the model.

In Short

Using the Cognitive Foundations framework to understand the developmental progression with assessment means that teachers are able to assess each component and identify where each student's current needs lie. In New Zealand, teachers are most able to teach vocabulary, in the linguistic comprehension arm of the model, and teaching word recognition. However, the teaching of word recognition will only provide effective and efficient learning for children who have begun school with sufficient prior knowledge and are learner-dependent.

What are Our Research Questions for the First Year of the Project?

For the current phase of the research project, covering the first year (2015) of students' and teachers' participation in the research, the following research questions are addressed with the data that were collected at the start of year, when students first entered school as New Entrants, and at the end of the year, following participation by teachers in the Implementation group in a series of PLD workshops (described later in this report).

1. Will Year One children in the intervention classrooms show increased literacy gains at the end of their first year in school compared with children in the comparison classrooms?
2. Will the literacy intervention provide greater gains for children from low decile schools and for Māori and Pasifika children compared to children from higher decile

schools and from Pākehā backgrounds, and to children from similar schools and backgrounds in the comparison schools?

3. Will teacher knowledge of supplementary word-level decoding teaching strategies and teacher confidence in teaching beginning readers increase among those teachers who receive the professional development programme compared to teachers in the comparison group?

HOW DID WE DO THIS STUDY?

Method

This project involves three longitudinal studies. We are providing PLD workshops to two groups of teachers of New Entrant/Year 1 students, and following three cohorts of New Entrant students (discussed later). This report presents findings for the first year (2015) from the first group of teachers and the first cohort of New Entrant students. We are following this group of students through to the middle of 2017. Future reports will present findings from the second group of teachers and cohort of students, covering the 2016 year and through to the middle of 2017. We compare the results for students of teachers who undertook the PLD (Intervention Group) with students of teachers who did not participate in the PLD workshops (Comparison Group).

How Did We Select Schools for Participation in the Project?

This project started at the beginning of 2015. Based on Ministry of Education data for the 2014 school year, we estimated that it would be possible to identify approximately 1,600 New Entrant students in schools throughout the lower North Island. It was our goal to have around 800 students in an Intervention group and a similar number in a Comparison group. With this in mind, a random sample of schools was selected for participation in the project from regions of the lower North Island that include Wellington, Hutt Valley, Wairarapa, Kapiti, Horowhenua, Manawatu, Whanganui, Ruapehu, Tararua and Taranaki.

A stratified frame was used in an attempt to maximise participation of lower decile schools in the project. The initial selection process was drawn from state and integrated primary schools listed on a Ministry of Education database. Included in the draw were 80 schools that were expected to enrol eight or more New Entrant students at the start of 2015.

We excluded schools from the Rangitikei and Ruapehu districts because of their small size and the small number of New Entrant children expected to be enrolled at the start of the 2015 school year. In addition, to avoid confusion and “cross-contamination,” we excluded schools in the Porirua area and parts of Wellington and Hutt Valley that were participating in the *Shine Literacy Success for All* project.

Schools were randomly selected and randomly allocated to either the Intervention or Comparison conditions. This procedure was performed by means of a random number generator in the SPSS statistical package. The names of the schools were not known until the random selection process was completed.

Following the sampling process, schools were identified and principals of the selected schools were contacted and invited to participate in the project and to attend meetings in Wellington, Palmerston North, and Whanganui to discuss the goals and activities of the project. Explanations included which of the two groups, Intervention or Comparison, to which the school had been randomly assigned. Ministry of Education School Liaison Officers assisted with the school recruitment process.

Principals of the 80 randomly drawn schools were contacted towards the end 2014 to seek their agreement to participate in the project. By the start of the 2015 school year, less than half the schools approached (38) confirmed a willingness to take part in the research.

Our goal was to have a randomised control research design. However, because considerably fewer schools than we approached agreed to participate in the study, the result is a quasi-random volunteer sampling design. This outcome is less than ideal and raises questions about the practical realities of drawing truly randomised control samples for educational research.

What Were the Characteristics of the Teachers and Students?

Of the 38 schools that agreed to participate in the project, 24 had been randomly assigned to the intervention group, and 14 to the comparison group. A total of 62 teachers of New Entrant children were identified: 38 in the intervention schools and 24 in the comparison schools. These numbers fluctuated as teachers came and went for various personal or professional reasons. At the first of the scheduled intervention group teacher professional development workshops, 45 teachers attended from the 24 intervention schools.

Time 1 baseline assessment data were collected during February and early March 2015 from 359 New Entrant/Year 1 children. Of these, 201 (56%) were in intervention schools, and 158 (44%) were in comparison schools.

The mean age of the sample at the time of first assessment was 60.56 months, which is around 5 years, 6 months; the median age was 60 months, and the mode was 60 months. Clearly, the large majority of children were around 5 years of age. There was no statistically significant difference between the mean ages for the Intervention and Comparison groups: 60.69 and 60.38 months respectively.

In terms of gender, 52% of the children were boys and 48% were girls. However, there was a marginal imbalance for children in the intervention group: 54% (107) were boys compared to 46% (93) girls (one student's gender was unknown). The gender breakdown in the comparison group was even: 51% (80) boys and 49% (78) girls.

Regarding ethnic background, information was available for 312 (87%) of the sample. New Zealand European/ Pākehā students comprised 63.8% (199) of the sample; Māori were 24.7% (77); Pasifika were 5.1% (16); Asians were 3.5% (11); and Others were 2.9% (9). Some schools were unable to provide ethnic background information for all students.

Decile rankings of schools showed some differences between the intervention and comparison schools. We grouped decile rankings as follows: low = deciles 1 to 3; medium = deciles 4-7; high = deciles 8-10. The spread across these three decile groups was slightly more even for the Comparison schools than the Intervention schools. These data are presented in Table 1.

Table 1: Distribution of project participants by group and school decile band.

	Group	
	Intervention	Comparison
Decile band	Percent	Percent
1-3	26.4	36.7
4-7	54.3	31.3
8-10	19.2	31.9

What Assessments and Procedures Did We Adopt?

We obtained assessment data from students and teachers at the start and end of Year 1 (2015). Our goal here was to determine whether students in the Intervention and Comparison groups were similar in terms of literacy-related skills and knowledge at the start

of 2015, and whether the students in the Intervention group showed any improvement in literacy learning outcomes at the end of Year 1 when compared to students in the Comparison group. We also wanted to compare Intervention teachers' knowledge of literacy factors and instruction with the Comparison teachers' knowledge early in Year 1 and towards the end of the year.

Assessments with children

We employed research assistants to administer the assessments to children at the beginning and end of Year 1 (2015) for the first cohort. All assistants followed the same procedures for each individual assessment but were free to provide the assessments in the order that worked best for individual children. When testing appeared overwhelming for children they were returned to their classroom and had the assessments completed at a different time, either that day or on another day. Children were assessed in a quiet break-out space near their classroom or in another quiet space in the school. Some children were assessed in a quiet corner of the classroom when other children were there.

The following assessments were undertaken during February 2015: letter name and letter sound knowledge; vocabulary knowledge; word recognition; invented spelling; and phonological processing. Details of these assessments are presented in Appendix 1.

Teacher Survey

In addition to the student assessments, we also carried out a survey of teachers' literacy knowledge, self-evaluations of their literacy knowledge, literacy teaching self-efficacy, and six word identification prompt scenarios. These results were presented in a separate report to the Ministry of Education (Chapman, Arrow, Tunmer & Greaney, 2015). A summary of information included in that report is presented in appropriate sections of this report. Specific details about each of these teacher assessments are presented in Appendix 2.

What Did We Do in the Teacher PLD Workshops?

We ran five teacher PLD workshops during the year in Wellington, Palmerston North and Hawera. The first workshop, in March, was conducted over two days. The other four workshops were for one day each in May, July, September and November.

Teacher PLD Programme

The professional development (PLD) programme is the vehicle for providing the literacy instruction that is central to this research project. The PLD programme was designed to provide research-based strategies for teachers to supplement instruction in their existing literacy programmes. Teachers in the intervention group were asked to attend all five of the workshops during the course of 2015 on how to teach word-level skills to beginning readers, using language-orientated approaches. Between the workshops, an online interactive forum site was available to enable Intervention teachers to share ideas and strategies.

The PLD programme comprised five modules, each with some core components that occurred in each module. These components covered the content knowledge for teaching (e.g., different vowel sounds and their spelling patterns, the explicit strategies of sounding out and blending for decoding), analysing assessment data in terms of children's knowledge of the content and strategy knowledge; and, ways of teaching content knowledge to students including planning instruction using lesson planning templates that were provided in the workshops. Assessment data collected during the previous assessment occasion were used by the facilitators in the workshops.

Teachers were requested to access the online community and website where forums, video clips, word document templates of lesson plans, and other useful resources were provided. Teachers were also expected to review their video observations, and to provide a reflection using the confidential conversation tool on the website. The PLD facilitators monitored the online community to provide support and guidance as required. Unfortunately few teachers made use of the website, and all but two or three teachers were resistant to providing reflections following viewing of their videos.

The PLD modules were developed to correspond with the developmental nature of reading, as illustrated in the Cognitive Foundations Framework (Figure 1). The content of the first four modules was specifically linked to each corresponding element of the framework (vocabulary and phonological awareness; alphabetic principle; alphabetic coding; linguistic comprehension). The final module drew together the content of the previous modules to show how differentiated instruction can be implemented in the classroom. This module also drew on the participants' experiences in applying the teaching

approaches covered in the previous modules. Details for each module are presented in Appendix 3.

WHAT WERE THE RESULTS FOR TIME 1 ASSESSMENTS?

Student Assessment Data

Score Distributions

We examined the distribution of scores for the Time 1 variables for the total sample. Not surprisingly, all but one of the variables had skewed distributions, with nine of the 11 variables showing modal scores of 0. The measure of vocabulary knowledge (British Picture Vocabulary Test) resulted in standardised scores that were distributed in a relatively normal manner, with a mean of 98.49 (SD = 11.59), a median of 101, and a mode of 102.

Group Comparisons

We performed simple *t*-tests to test the hypothesis that there would be no significant differences in mean scores between the intervention and comparison groups on the Time 1 assessment variables. We posed this hypothesis because we anticipated that the random nature of the sampling should result in students in both the intervention and comparison groups being similar in terms of the entry scores on the measures that we used. The hypothesis was supported for each of the variables. A table of means and standard deviations for the Time 1 variables is presented in Appendix 4.

This finding is important and indicates that vocabulary knowledge, alphabet knowledge, word knowledge, phonological processing, and phonemic awareness scores are reasonably similar for the two groups. Of particular importance is the finding that vocabulary knowledge scores were almost identical for the two groups.

Decile Band Comparisons

We examined scores for the 11 variables in terms of decile bands for the total sample. These comparisons were conducted by means of one-way analyses of variance. Seven variables showed highly statistically significant effects: the four letter knowledge measures, phonological elision and blending, and vocabulary knowledge. The other measures did not result in statistically significant effects.

The means and standard deviations for the 11 variables are presented in Appendix 5. These data show that mean scores for children in the low decile band were generally lower

than for children in the high decile band, and in one case (vocabulary knowledge) lower than those in the middle decile band. No differences between with middle and high decile groups were statistically significant. These differences are consistent with earlier findings that students in low decile schools tend to have lower levels of literate cultural capital which impact on some of the key language-related factors associated with literacy acquisition (Tunmer, Chapman, Greaney, Prochnow & Arrow, 2013).

Teacher Survey Data

Fifty-five responses were received from the teacher survey conducted online through the *Survey Monkey* platform. Despite requests to complete all sections of the survey, not all of the 55 responses included complete data for all sections. Fewer responses were received for the teacher word identification prompt questions, which were located in the last section of the survey, than for the teacher efficacy questions that followed the demographic questions at the start of the survey.

Teacher Survey Demographic Data

Regarding gender, 1 male participated in the survey; 2 respondents skipped this question. Most respondents (44%) had been teaching for 21 or more years. Around 21% had been teaching for between 11 and 15 years, and nearly 20% were in the first 5 years of their teaching.

Most respondents (46%) had a bachelors degree as their “highest teaching qualification”; nearly 20% had a post-graduate diploma, 13% had a graduate diploma, and 11% had a 3-year teachers college diploma. A relatively small number (5%) recorded a Masters degree as their highest teaching qualification.

We asked respondents if they had a “specialized qualification relating to literacy”.The majority (63%) indicated they did not; 30% indicated that they were Reading Recovery trained; none responded that they had received training in the RT:Lit programme; 7% (n = 4) indicated that they had received “other” specialized training.

Teacher Knowledge

Data from the teacher knowledge of basic language constructs of literacy survey were analysed in terms of the types of teacher knowledge and as a function of

Intervention and Comparison groups. For the self-evaluation of literacy teaching knowledge, 54 valid responses were analysed by means of a *t*-test. There was no significant difference in mean scores between teachers in the Intervention and Comparison groups. Mean scores for each of the eight literacy teaching-related scores were mainly in the "moderate" to "very good" categories (over 90% of responses). The only area in which there was less perceived skills related to teaching English language learners: 23% thought they had "minimal" knowledge for working with such students.

For the teacher skills and knowledge of language constructs, total scores were calculated for phonemic, phonic, phonological and morphological variables. There were no statistically significant differences between teachers in the Intervention and Comparison groups.

We also analysed teacher knowledge results in terms of the percentage of sections answered correctly. For phonemic knowledge/skills, the Intervention teachers answered on average 62% of these items correctly; for the Comparison teachers, an average of 69% of the phonemic items was correctly answered. For the phonic knowledge/skills items, 52% of Intervention teachers' responses were correct, and 57% of Comparison teachers answered these items correctly. Phonological knowledge/skills items were generally answered correctly: 89% for Intervention teachers and 90% for Comparison teachers. Morphological knowledge/skills, however, were less well understood: 52% correct for Intervention teachers and 54% correct for Comparison teachers.

Teacher Prompts for Word Identification Errors

Teacher prompts for each of the six reading error scenarios were scored following Greaney's (2001) approach. We report response type (word-level; context; neutral) for the first prompt and for the total of three prompts in terms of percentages of prompts.

Overall, 40% of the prompts were word-level. These included such cues as "Let's sound that word again"; "can you see two words?"; "hear and say all the sounds you see"; "what comes after p...a then d...that rhymes with dad?"; "look at the blend at the start and try again"; "Let's see if looking at the chunks in the word can help".

On average, 45% of the prompts were based on context. Examples included "Try that again and think what would make sense"; "Look at the picture then try again"; "Go back to

the start of the sentence and think what will fit"; "Think about the story, what would make sense"; "Does the word you read match the picture?"

Neutral prompts accounted for an average of 15% of the cues teachers reported using as their first way of dealing with a reading error across the scenarios. These cues were generally lacking in useful information for helping the reader: "Try that again"; "That was lovely, but I wonder if you can find your mistake?"; "You made a mistake. Can you find it? Fix it?"; "Have a go"; "Good job. Good reading"; "Check it"; "Get your mouth ready".

In general, initial and total word level responses for the word identification scenarios tend to be fewer than 50% of the prompts teachers report favoring. However, Intervention teachers showed greater use of word-level prompts than Comparison teachers. This emerging difference may have been due to information provided during the first professional development seminar.

Teacher Efficacy

Total scores for the LTES were analysed to examine whether there were differences between the Intervention and Comparison teachers in terms of confidence to bring about a range of literacy outcomes in the classroom. The results revealed comparable and generally positive means for the two groups: Intervention M = 228.57 (SD = 39.16), Comparison M = 221.21 (SD = 38.86). The slight difference in means was not statistically significant.

Intercorrelations

Pearson product-moment correlations were computed for the teacher knowledge, self-evaluation, and teacher efficacy variables. There was a clear disjunction between teachers' self-evaluation of literacy-related knowledge and the measures of linguistic knowledge. Correlations for the self-evaluation variable ranged from a high of .34 with phonological knowledge to a low of .15 with phonemic knowledge. Perhaps not surprisingly, self-evaluation correlated reasonably highly with teacher efficacy: r = .53. However, all of the teacher efficacy correlations with the teacher knowledge variables were very low, ranging from -.01 (phonemic knowledge) to .16 (morphological knowledge). These results suggest that teachers generally hold fairly high levels of self-evaluation and

teaching efficacy, but that these are not reflected in their levels of knowledge for key language constructs associated with literacy teaching and learning.

Teacher Comments About the Survey

Respondents were provided with the opportunity to comment on the nature of the survey; 22 teachers provided comments. Six responses were negative, and included remarks such as “too long”, “we teach New Entrants…this is expecting us to be linguistic experts”, and “too much pressure for busy NE teachers”. Other teachers were positive and grateful for having the opportunity to participate in the survey: “It was really hard but the challenge was great because it really made me think about my knowledge and how I can apply it”; “Thanks for making me think!”; “Thank you, this survey really got me reflecting upon and analysing the strategies I am using during guided reading sessions and in class generally”. Some comments were more mixed: “It was hard! Highlights things I don’t know and maybe should know and using”; “I wish I hadn’t sat down to do this late at night! Interesting to reflect on though”; “Some very tricky questions! Some I had no idea about”.

WHAT DO THE SCHOOL ENTRY BASELINE RESULTS MEAN?

Student Results

Overall, findings from the school selection and randomisation process, together with data from the Time 1 assessments, indicate that students in the intervention and comparison groups were generally similar in terms of age and gender. Slightly more students are in the intervention group (56%) compared to the comparison group (44%), however, this difference is of little consequence in terms of statistical processes for treating the assessment data. In terms of decile ranking, fewer Intervention than Comparison students were from low decile scores, and fewer Comparison students were from middle decile schools. Similar percentages of Intervention and Comparison students were enrolled in high decile schools.

Of particular significance is the finding that the standardised scores for vocabulary knowledge are very similar for both groups of children. Vocabulary knowledge is an important indicator of verbal ability, and as such, shows that this key variable in literacy development is consistent across both groups. It is also worth noting however, that although not statistically significant the Intervention group had slightly lower overall starting abilities than the Comparison group.

An examination of the distribution characteristics of scores for almost all measures (the exception is vocabulary knowledge) revealed strongly skewed scores. On many variables, large numbers of children in both groups scored at “floor” levels. This finding is normal and expected for young children who have just entered school.

Finally, as expected, differences as a function of school decile band were apparent in these Time 1 data. The differences were especially notable for vocabulary knowledge, letter knowledge, and measures of phonological processing.

Teacher Survey Results

The overall purpose of the Teacher Survey was to provide information about literacy knowledge and efficacy for teachers participating in the project. Not all teachers responded to all items in the survey. The response attrition rate may have been due to the length of the survey. Some made comments at the end of the survey that it was too long.

Some items were not answered, especially in the teacher knowledge of language constructs section. Comments from several teachers suggested that it was not appropriate for them to know about aspects of literacy-related language constructs that formed the teacher knowledge survey. This viewpoint is disappointing but not surprising considering the lack of emphasis on language constructs in teacher education over the past four to five decades.

Regarding knowledge of language constructs, there was more variability. Although both groups of teachers had comparable levels of knowledge across the four domains, there were high levels of understanding of phonological skills/knowledge, medium levels of phonemic skills/knowledge, but lower levels of phonic and morphological skills/knowledge. Interestingly, although the scores revealed strengths in the area of phonological awareness, only 58% of teachers were able to provide an accurate definition of phonological awareness. This finding is similar to that reported by Washburn et al. (2012), and suggests that phonological knowledge is incomplete.

The questions associated with the alphabetic principle/phonics knowledge were more difficult for teachers in this survey. The accuracy rate for this section of the teacher knowledge survey was only 54%. Effective literacy instruction has been shown consistently to include systematic teaching of phonics (e.g., Adams, 1990; National Research Panel, 2000). Accordingly, explicit knowledge of phonics principles is required for teaching decoding and spelling (Washburn et al., 2011). It is concerning that only around half of the teachers in this survey were able to correctly identify when to use key reliable phonics principles.

Aspects of morphology were the most challenging for teachers who responded to this survey, with an overall accuracy rate of 52%. These findings are somewhat in line with those reported by Moats (1994), who found that post-graduate level teachers had considerable difficulty with various aspects of morphology.

In general, teachers had a mixed understanding of the literacy-related language structures required for effective teaching. As Mather et al. (2001) commented, teachers with insufficient grasp of such crucial language structures are unlikely to effectively teach reading skills explicitly to those children who show early signs of developing reading difficulties, which in New Zealand includes around 20% of the junior primary school population.

The data on teacher prompts from the six reading error scenarios showed that overall fewer than 50% of the first prompts were word-level cues. In general, context and neutral cues were together used more frequently by teachers. This preference probably reflects the

advice presented in publications on literacy teaching for beginning readers (e.g., *Reading in Junior Classes; The Learner as a Reader*; *Effective Literacy Practices in Years 1 to 4.*) A stronger weighting of word-level cues is considered essential for most children, and especially for those children who commence school with more limited literate cultural capital (Arrow & Tunmer, 2012).

Results of the LTES showed generally high levels of self-efficacy in regard to a range of literacy teaching situations. Relatively high self-ratings are common for such scales. Although teachers reported positive levels of confidence in their literacy teaching abilities, this confidence did not relate to their actual knowledge of key language constructs associated with literacy learning. A similar pattern of results was found with teachers' self-evaluation of their literacy teaching skills; the overall responses indicated that teachers felt they had moderate to very good levels of literacy teaching skills. Intervention and Comparison teachers were comparable in their self-evaluations. The finding that current in-service teachers hold high self-efficacy and high self-evaluation for the teaching of different components of reading when their actual knowledge is more limited, is in line with existing research findings (Cunningham, Perry, Stanovich, & Stanovich, 2004; Spear-Swearling, Brucker, & Alfano, 2005). Classroom teachers are not generally aware of the knowledge that they don't know and thus feel confident in their abilities and knowledge.

WHAT DID WE FIND AT THE END OF YEAR 1?

Student Sample

A total of 304 students remained in the sample at the end of the Year 1 data collection phase. Compared to the 359 students at the start of the project, the difference represents an attrition rate of 15.3%. Of the students who remained in the study at the end of Year 1, 178 were in the Intervention group (attrition rate = 11.3%) and 126 were in the Comparison group (attrition rate = 20.3%; this higher attrition rate was due to one school making a decision to withdraw from the project). Regarding gender, 102 males (57%) and 76 females (43%) were in the Intervention group, whereas 64 males (51%) and 62 females (49%) were in the Comparison group.

Not all students had complete data, which resulted in a further reduction in the sample. Despite numerous attempts to obtain complete data for all students in the project, some schools were unable or unwilling to meet our requests. This difficulty is frustrating and raises questions about how Ministry-funded researchers can obtain all data that are required to fully meet the terms of the research contract.

Of particular importance was the effect of teacher changes in regard to the Intervention sample. At the start of the project, we explained to schools participating in the Intervention that it was important for students to remain with the same teacher throughout the year. Our explanation included the crucial fact that teachers who participated in all of the teacher professional learning and development workshops throughout the year would have the greatest potential to improve the literacy learning outcomes of the New Entrant/Year 1 students. However, this request was not able to be met by a number of schools. Accordingly, some Intervention group students had different teachers during Year 1, some of whom had participated in the PLD workshops and some who had not. We discuss the effect of these changes in the results section.

Student Assessments

The same procedures for collecting the assessment data were used as for Time 1 at the beginning of the year. Some assessments, such as letter knowledge were not used at the end of the school year because mid-year data collection indicated that children had reached

ceiling on those measures. Additional assessments were introduced at the end of the year to match the developmental progression expected of students following completion of a year's literacy learning.

The following assessments were administered during November 2015: invented spelling; phonological processing; word identification; pseudoword reading; reading book level. Details about each of these assessments are presented in Appendix 6.

Teacher Assessments

Teacher knowledge survey. Following feedback from some teachers that the initial Teacher Survey was too long (supported by the relatively high attrition rate for sections of the survey that appeared towards the end), we included only the teacher knowledge of language structures section. While this decision meant we were unable to examine possible changes in the use of word identification prompts and teacher efficacy during the year, we considered that it was more important to increase the survey participation and completion rate by presenting a shortened survey with a focus on the key area of teacher knowledge of basic language constructs. With this in mind, teachers were informed that the survey was much shorter than the earlier version and that the focus was on teacher knowledge. We stressed the importance of being able to compare levels of knowledge earlier in the year with knowledge at the end of the year. We also stressed that it was completely acceptable to select the option "don't know" to any item, and that no individual judgements were going to be made about levels of knowledge.

Teacher practice video observations. During the course of the year all teachers were videoed three times during reading instruction time. The video observations were made to identify the extent to which Intervention teachers were implementing instructional approaches that were presented in the PLD seminars. The videoed sessions ranged in length from 10 minutes to 1 hour. The shorter sessions were always small group reading sessions and included some children who were not in the Intervention sample.

WHAT RESULTS DID WE OBTAIN AT THE END OF YEAR 1?

Student Data

Effects of Teacher Changes During Year 1

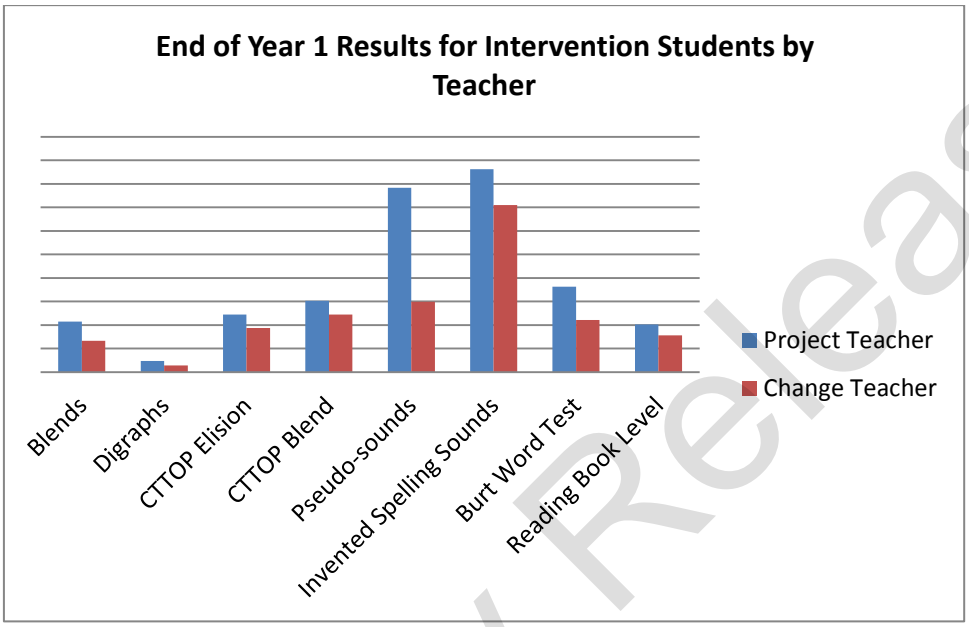
As we indicated earlier in this report, a number of schools were unable to accede to our request that students in the Intervention have the same New Entrant/Year 1 teacher throughout the year. This has had an important effect on the results and also on the sample size. Of the 39 Intervention schools in the project, 26 maintained the same teacher throughout the year for students in the Intervention sample. Two schools had team-teaching or modern learning environment teachers, who were also participating in the project PLD sessions, working with Intervention students. Six schools made teacher changes for Intervention students that involved teachers who were also participating in the PLD workshops. Seven schools moved Intervention students into classes with teachers who were not part of the project and two schools had project teachers who were absent for significant periods of time during the year. The total changes add to more than the 39 Intervention schools because a variety of practices were adopted in three schools.

Forty-five Intervention students had new teachers who were not part of the project or project teachers who were absent for lengthy periods of time during the year. We analysed end of Year 1 assessment data to examine whether major teacher changes (i.e., Intervention students having a non-project or absent teacher during the year) differentiated those students from other Intervention students who either had the same teacher throughout the year or a different teacher who was also involved in the project PLD workshops. The results of these analyses are important.

All of the eight end-of-year assessments showed highly statistically significant mean score differences between Intervention students who had the same or another project teacher during the year compared to students who had a different or “absent” project teacher during the year. In each case, the students with project teachers outperformed those who had significant teacher changes. The results reveal that skills emphasised in the PLD sessions (especially phonological processing as measured by Pseudoword sounds and Invented spelling sounds), along with word knowledge (Burt word test), resulted in very markedly higher scores for Intervention students whose teachers remained consistent

throughout the year. These differences are illustrated in Figure 2, and summary data are presented in a table in Appendix 7.

Figure 2. End of Year 1 Intervention Group Results by Teacher.



Note: The y axis scale has been removed because of the different metrics for each measure. The graph is designed simply to illustrate comparisons for each variable between student outcomes as a function of having the same or different teacher during the first year of the study.

Because of these marked effects, we eliminated those schools/students with major teacher changes from the analyses of end of Year 1 group comparison (Intervention vs. Comparison) data. This decision resulted in a reduction of the Intervention sample from 201 to 156. Further reductions occurred as a result of missing or incomplete data. As was the case in regard to baseline assessment data, not all students or schools completed or supplied assessment data for all students in the project, despite numerous requests. Especially disappointing was the inability of some schools to supply Reading Book Level data.

Analyses of Student Assessment Data

The two key research questions to be addressed by the end of Year 1 data were whether the Intervention group started to outperform the Comparison group, and in particular whether Māori students in the Intervention group were starting to outperform

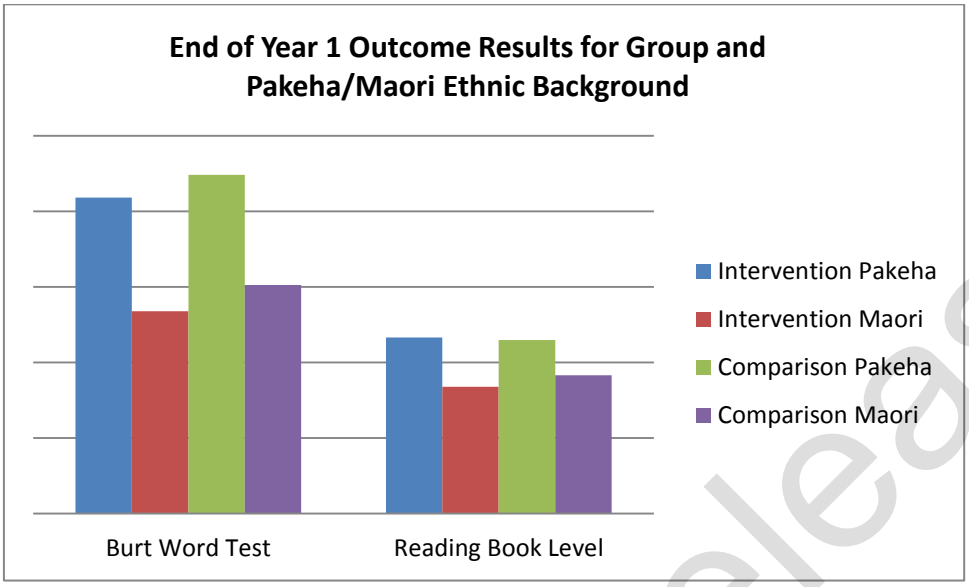
Māori students in the Comparison group.[2] There were too few students in other ethnic background categories to warrant inclusion in these analyses, and the focus on Māori students is consistent with the one of the primary research questions.

First, we conducted analyses on the following "process" variables: blends, digraphs, pseudoword sounds, CTTOP elision, CTTOP blending, and invented spelling sounds. There were no statistically significant differences between the Intervention and Comparison groups for any of these variables. Pākehā students obtained higher scores than Māori students on all variables. For one variable, blends, Comparison Māori students obtained higher scores than Intervention Māori students, and Intervention Pākehā students obtained higher scores than Comparison Pākehā students. Summary data from these ANOVAs are presented in Appendix 8.

We also conducted analyses on the two reading outcome assessment data: Burt Word Test, and Reading Book Level. For the Burt Test, there were no statistically significant differences between the Intervention and Comparison students. However, Māori students combined across both groups obtained lower scores than Pākehā students. Similarly, for Reading Book Level, with a lower sample resulting from three schools not supplying these data to us, there was no significant difference between the Intervention and Comparison groups. Pākehā students outperformed Māori students. Figure 3 illustrates these results; summary data are presented in Appendix 8.

[2] We contemplated analysing the literacy "process" variables by means of a 2 (Intervention vs Comparison group) by 2 (Pākehā vs Māori) Multivariate Analysis of Variance (MANOVA). However, missing data would have significantly reduced the sample size. Instead, we ran a series of 2-way ANOVAs (Group by Māori/Pākehā) on the end-of-Year 1 variables.

Figure 3. End of Year 1 Reading Outcome Measures by Group.



Note: The y axis scale has been removed because of the different metrics for each measure. The graph is designed simply to show comparisons between student outcomes as a function of group (Intervention vs. Comparison) and ethnic background (Pākehā vs Māori).

Finally, we computed product moment correlations between school entry variables and end of Year 1 reading outcome (Burt, Reading Book Level) variables in order to identify key predictors. Included in the entry variables were vocabulary knowledge, letter name and letter sound knowledge, invented spelling sounds, the phonological processing variables of elision and blending, and Clay word phonemes. The correlations were calculated for the complete sample of students who had scores for each of these variables.

The strongest predictor of the Burt word test was letter sound knowledge (combined upper and lower case scores), r = .67, followed by letter name knowledge (combined upper and lower case scores), r = .66. For reading book level, the highest correlation was letter name knowledge, r = .63, followed by letter sound knowledge, r = .60. These data are consistent with other studies indicating that knowledge of the alphabet is highly predictive of later reading ability. Interestingly, vocabulary knowledge was only moderately predictive of Burt word scores (r = .38) and reading book level (r = .44). Correlations are presented in Appendix 9.

Overall, the results from the analyses of end of Year 1 data are largely as we anticipated. We did not expect to find that the Intervention group would significantly

outperform the Comparison group at this stage of the project, although we did expect that the Intervention students would show signs of starting to outperform the Comparison students. This was not the case. We discuss possible reasons for this finding later in the report.

Teacher Data

Teacher Knowledge

To determine whether any changes occurred in teacher knowledge of literacy-related language constructs and self-evaluation of literacy between earlier in the year and end of year, a series of analyses were performed.[3] Disappointingly, data were available for only 24 teachers who had both sets of assessment scores (Intervention n = 14; Comparison n = 10). None of the domains of teacher knowledge resulted in the Intervention teachers outperforming the Comparison teachers at the end of Year 1. This result calls into question the effectiveness of the PLD sessions, because it would appear that the Intervention teachers were unable to expand their knowledge of basic language constructs involved in literacy teaching and learning as a result of the workshops. The result is very disappointing.

We also performed product moment correlations between teacher self-evaluations and knowledge of language constructs. None of the correlations between self-evaluations and each of the knowledge variables was statistically significant; the highest correlation was .14 (phonological knowledge). This finding may suggest that teachers' relatively positive self-evaluations of their literacy-related teaching knowledge do not relate to measures of their actual knowledge of basic language constructs.

Teacher Video Data

Teacher video data showed teacher practice during small group instruction. There are four major findings from a preliminary analysis of teacher practice observations in relation to the content of the workshops. The observations show:

1. A reliance on the *Ready to Read* book series as the curriculum and the process for teaching reading.

[3] We used ANOVAs with repeated measures for these analyses.

2. A reliance on implicit teaching and an associated lack of systematic, explicit teaching focused on a child or group's developmental progression and word-level decoding needs.
3. Some teaching items of word knowledge (alphabet, sounds, blends) but no teaching children to apply this knowledge in the reading process.
4. A dominance of teaching strategies that demand high input from the learner, rather than teacher input towards a gradual increase in learners' independence.

These observations are consistent with the lack of knowledge improvement shown by Intervention teachers as a result of the PLD workshops, and they provide insights as to why Intervention students did not start to show improvements in literacy learning outcomes when compared to the Comparison students.

Anecdotal Observations and Teacher Feedback from the PLD Sessions

The teacher workshops provided the opportunity to obtain feedback from teachers about the implementation of the project teaching strategies and materials. Many teachers were very supportive of the project and the content of the PLD sessions. Teachers indicated that they were developing an awareness of how to plan a scope and sequence for literacy instruction based primarily on the scope and sequence guidelines for Ehri's (2005; 2014) phases of developing word recognition. Many teachers began using the phases to plan the instruction for children rather than providing incidental instruction derived from the emphasis on text and meaning.

Numerous teachers indicated that focusing more on the skills associated with word recognition meant that they needed to slow down the initial progress through book levels to ensure children had a more comprehensive grasp of the foundation literacy knowledge. With this change in emphasis, teachers reported that their children were beginning to attack print before resorting to using picture cues or guessing unknown words in text. In addition, teachers often commented that they felt that the pressure of getting through a book was reduced, particularly for children who had difficulty accessing most of the text in the book. 'Slowing down to speed up' and 'working through the word' became two common themes across the workshops.

However, teachers also indicated that for a number of reasons they had difficulties in implementing the scope and sequence and more focused word-level instruction. In terms of our target children, many teachers noted several times that it was too late for them to make effective changes for the Intervention children based on the PLD sessions that ran throughout the year. This difficulty with applying significant changes to literacy instruction arose because teachers' new knowledge was developing at the same time. Implementation of instructional changes clearly was a challenge for many teachers. In some cases changes began during the middle of the year for the Intervention children; in other cases, some teachers were reluctant to make major instructional changes during the course of the year.

Other issues that arose were more systemic in nature. Many teachers voiced concerns that it was difficult to reconcile the current approach to literacy instruction with its emphasis on deriving meaning from text, with the project PLD materials which placed a greater emphasis on teaching word-level decoding strategies. There was a common view among the Intervention teachers that the current readers made it difficult for them to focus more on phonic knowledge and the related strategy of blending. Relatedly, many teachers indicated that they struggled with the developmental progression of phases, the current emphasis on text content rather than developing strategy knowledge, and requirements to "fill the gaps" to meet schools' expectations about children's reading book levels. In some cases teachers reported that they were not permitted in their school to use magenta texts for more than four weeks, or they were not allowed to give children a yellow level text until they had 'passed' the Red 3 running record.

Despite the many challenges it was notable that many teachers in the final workshop commented that it was in children's writing that they saw the greatest changes. This may be understandable if they only place that teachers felt more flexibility for implementing phonic knowledge is in writing, where it is completely necessary.

WHAT HAVE WE LEARNED FROM THE END OF YEAR 1 RESULTS?

The overall findings illustrate that Intervention children did not show any significant acceleration in outcome in relation to the Comparison students. This result is likely due to the observation that teachers did not make significant changes to their knowledge or to their practices. In the PLD workshops teachers readily engaged with new learning about how the element of word knowledge develops progressively, the importance of helping children develop orthographic maps, and the act of teaching explicitly. However, the teacher videos revealed that teachers had difficulty in applying this learning to their small group instructional activities, which in most cases are dominated by the use of a selected text as the way to teach reading. Teacher interviews indicated that many teachers rely on a published phonics programme for teaching word knowledge. It appears from the observations that often this knowledge is isolated to a phonics time and not specifically applied during small group reading or writing instructional sessions. It is during small group instructional time that teachers can direct such teaching to the specific needs of individual children and also demonstrate the strategies that will help them in reading a particular text. The similar levels of phonological awareness and initial alphabetic coding knowledge, such as blends and digraph knowledge, across the Intervention and Comparison groups can be explained in part by the use of phonics programmes in many schools. Feedback from teachers during the PLD sessions are consistent with these observations and provide compelling evidence for the failure to observe at least trends in the right direction for the Implementation students.

A primary goal in our study was for Intervention students to progress further in developing the language skills shown by research to be necessary for enhancing word identification strategies during the first year of reading instruction. However, we did not expect to observe the difficulties that teachers had in translating the knowledge and trial practice from the PLD sessions into different instructional approaches in the classroom. One reason appears to be the incompatibility between the stronger word-level decoding approach to initial reading instruction that is emphasized in the PLD sessions on the one hand, and the deeply embedded teacher practice of using the existing book series as the main method for teaching reading. These texts are generally structured to teach reading via

a process approach, such as a reliance on meaning, structure and possibly the first letter of an unknown word. The teacher observation data show most teachers use the texts in this manner. The reading series is generally based on a teaching paradigm not structured to suit a developmental approach to the learning and teaching of word knowledge (Ehri, 2014). Rather, the series is framed by the assumption that children learn to read mainly by exposure to words in text. This is clearly not the case for children who struggle with learning to read. The texts expose children to words from across a large number of word patterns which counteract efforts to systematically teach word-level decoding skills. Our data suggest that a reliance on these texts for teaching children to read appears to have left both teachers and children confused. For example, in one lesson the teacher was attempting to help children decode a red level text that included the words *want*, *what* and *does*. While sentence structure could carry some of the children's success with such a text, it is not useful as a text or a process for helping children to develop increasing levels of automaticity in word recognition.

Instead of adding strategies relating to the development of word knowledge and decoding skills to group instruction, most teachers seem to have maintained a traditional guided reading lesson, dominated by a reading of the text. While teacher knowledge of basic language constructs and how reading works as a code is vital, it appears that these elements cannot be incorporated into an approach in which teachers encourage children to use multiple cues for identifying unfamiliar words in text. This mismatch of approaches seems to have left many teachers confused. On the one hand teachers see the need for teaching children about word level concepts (as seen by the number of phonics programmes added on to current practice in most schools), and the need for explicit and systematic teaching. But on the other hand, they have been trained in and are familiar with a book series that requires a different type of teaching.

The video data, together with the teacher knowledge survey results, provide an explanation for why the Intervention students did at least start to outperform the Comparison students during this first year of the project.

REFLECTIONS ON THE DELIVERY OF TEACHER PLD

As a result of the teacher observation and survey data, together with the "flat" student achievement results for the Intervention group, we have concluded that changes should be made to our delivery and emphasis in PLD workshops in order to increase teachers' implementation of literacy instruction strategies that reflect the elements of the Cognitive Foundations framework. Consistent with theories and best practice in relation to professional development which involves significantly new instructional practices, we will include a range of more explicit instructional strategies with appropriate "scope and sequence" elements to facilitate earlier embedding of word decoding instruction in teachers' regular classroom literacy activities. We will adopt a much more explicit approach in demonstrating very specific ways in which teachers can significantly increase their emphasis on the development of word level skills. In keeping with the tendency in New Zealand for teacher PLD to take place within a co-constructivist framework, we were less explicit and directive than we should have been, and we made assumptions that teachers would be able to apply their new knowledge as a result of this co-constructivist approach.

An examination of the relevant teacher implementation literature clearly indicates that teacher PLD involving different pedagogical approaches than those currently practised by teachers should provide both explicit content knowledge and a practical 'how-to' guide for putting this new knowledge into practice. This more explicit approach is likely to be more effective than leaving teachers to try implementation on their own (Desimone, et al., 2002; Garat, et al., 2001; Pianta, et al., 2008; Stahl et al., 2013).

CHALLENGES

During the first year of this project we have encountered a number of unexpected challenges. The first challenge was obtaining a reasonably large number of schools to participate in the project, either in the Intervention or Comparison groupings. Although we adopted a randomised control design, the 39 schools of the 80 that were approached effectively were volunteer participants. The purposes of the project, incentives associated with PLD workshops, teacher release payments, and encouragement from Ministry of Education School Liaison Advisers were not sufficient to convince more principals to participate in the study.

As mentioned earlier, despite explanations about the need for Intervention students to remain in the same class with their teacher who participated in the PLD workshops, a number of schools were unable to accommodate this request. As a consequence, there was a significant impact on the assessment scores for those Intervention students who had a change in teacher during the year that did not involve someone who was participating in the PLD workshops, or whose Intervention teacher was absent for significant periods of time during the year. The students affected by these changes showed significantly lower scores on almost all variables assessed at the end of Year 1. Implementing a randomized control study that is as rigorous as possible is clearly a challenge when it is not possible for all/many schools to accede to the requirements of such research.

Although we anticipated that Intervention teachers would take time to “digest” the information and practical activities presented in the PLD workshops, it appears from the examination of teaching video data that more explicit guidance in these workshops is required. Anecdotal comments from many Intervention workshop participants were positive and attested to the value of the Cognitive Foundations Framework and the teaching strategies that flowed from this. However, more time is needed for the practices to be embedded in regular literacy instruction. There was a sense that many Intervention teachers felt somewhat overwhelmed by the instructional changes to what they had been taught, what they knew, and what for many of them was reasonably comfortable.

This sense of feeling overwhelmed is understandable, and may explain at least in part the low level of engagement in the online learning community that was established as

part of the resource base for the project. It may also explain why the participation in the end of year teacher survey was much lower than we anticipated. Despite our request to complete the much shortened survey, and the request to answer every question even if this was a “Don’t know” response, many teachers declined to answer all items, with some leaving the survey part-way through and others skipping various questions.

Project team members are aware of research on teacher change and teacher professional development. Despite that, we were somewhat surprised by the low levels of engagement by some teachers, and what appears to be fairly high levels of difficulty with implementing core elements of the PLD programme. Nonetheless, the experiences during this first year of the project are very instructive and will lead to a number of changes in our work with the second cohort of teachers in 2016; these teachers were those in Comparison schools during 2015.

WHAT CHANGES HAVE WE MADE TO THE PROJECT AS A RESULT OF THE YEAR 1 FINDINGS?

We have made a number of changes to the project as a result of there being a smaller sample than initially anticipated and also as a consequence of the Year 1 findings. We have taken the opportunity to strengthen the research project as follows:

1. During Years 2 and 3 of the project we will continue to follow the progress of Year 1 students.
2. We have included a new cohort of New Entrant students in 2016 who are in the classrooms of the teachers who last year participated in the project PLD sessions. This initiative will test the view that last year's teachers may be more successful this year with embedding the new knowledge into their literacy instruction. The anecdotal evidence indicated that this is a possible outcome. This new cohort of students will take the same assessments as those administered last year, and we will follow them through to the middle of 2017, when the project finishes.
3. We have another new cohort of New Entrant students in 2016 who are in the classrooms of teachers who formed the Comparison group last year. Working with last year's Teachers in PLD workshops this year will provide a further design element, enhanced by changes we will make to the delivery of the materials.
4. Presentation of materials in the PLD workshops this year will be much more explicit, with greater attention to "scope and sequence" to enhance word-level decoding skills among the students, and to learn how and when to offer differentiated literacy instruction.

As a result of these design initiatives, we anticipate having approximately 400 Intervention students and 200 Comparison students across the life of the project, although incomplete data will impact on the final numbers. Also, we will have approximately 70 teachers who will have completed the PLD workshops, and around 40 teachers who will have taught "comparison" students. Those in last year's PLD workshops will be compared with the teachers in this year's workshops in terms of teacher knowledge of language

constructs, and the literacy learning progress of their students. A schematic summary of the revised research design is presented below in Table 2.

Table 2. Revised Research Design.

		2015	2016	2017
Intervention				
	Cohort 1 1st Group Intervention Teachers 1st Group Intervention Students	X	X	X
	Cohort 2 1st Group Intervention Teachers 2nd Group Intervention Students		X	X
	Cohort 3 1st Group Comparison Teachers 3rd Group Intervention Students		X	X
Comparison				
	Cohort 1 1st Group Comparison Teachers 1st Group Comparison Students	X	X	X
	Cohort 2 2nd Group Comparison Teachers 2nd Group Comparison Students		X	X

[1] "X" denotes years in which assessments are done.

While the overall results are somewhat disappointing, we remain confident that the research-based approach to literacy instruction is appropriate for use with New Zealand children, and that children from diverse backgrounds are especially likely to obtain significant benefits from this approach. The key to deriving more successful outcomes will be on more explicit instruction and supports for teachers during the PLD sessions, together with face-to-face supports in their schools, as time and resources permit.

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APPENDIX 1

Time 1 Student Assessments (February/March 2015)

Letter Identification. Letter name and letter sound knowledge were assessed in terms of both upper case and lower case letters, using the Letter Identification task in the Diagnostic Survey (Clay, 1985). Children were asked to name each letter and to say the sound the letter represented for 26 upper case and 28 lowercase letters, two of which appeared in varying fonts. Scoring was based on the number of letters correctly identified by name, and by sound.

Vocabulary Knowledge. We used the British Picture Vocabulary Scale (BPVS: Dunn et al., 2009) to assess vocabulary knowledge. This knowledge refers to understanding the meaning of words, which is necessary for the production of functional language. Raw scores are converted to standard scores, which are related to the age of each participant.

Word Recognition. Word recognition refers to the fluent, rapid reading of words as they appear. Such words are usually known as *sight words*. We used one of the *Ready to Read* test lists (Clay, 2002). These tests comprise 45 words of the most frequently occurring words in the 12 "little" books of the *Ready to Read* series. We administered the first 15 words in one of the lists. Scoring was based on the number of words read correctly by each child. In addition, attempts at word reading accuracy were assessed by scoring the number of correct letter-to-sound correspondences in each word.

Invented Spelling. Invented spelling was assessed by having children write 18 words that were read aloud by the research assistant. The 26 (lower case) letters of the alphabet were displayed across the top of the children's response sheets. Each word that children wrote down received a score from 0 to 4. Maximum points were awarded if the sounds in the word were represented with letters, although unconventionally (e.g., *kik* for *kick*, *fil* for *fill, sid* for *side*). Two points were awarded if more than one phoneme (but not all) was represented with phonetically related or conventional letters (e.g., *sd* for *side, lup* for *lump*).

One point was awarded where the initial phoneme was represented with the correct letter (e.g., *f* for *fat*). Children were also asked to identify the sounds in the words that were read aloud. The total number of possible points for letters and sounds was 72 each.

Phonological Processing. Phonological processing was assessed using the Comprehensive Test of Phonological Processing, Second Edition (CTOPP-2: Wagner, Torgesen, Rashotte, & Pearson, 2013). This test is normed in the United States for use with people from 4 years to 25 years. The CTOPP-2 is used to help evaluate phonological processing abilities as a prerequisite to reading fluency. We administered three of the subtests: elision, blending and matching. Elision measures the ability to remove phonological segments from spoken words to form other words. There are 34 items in this test, with discontinuation occurring when each child missed three consecutive items. Blending Words measures the ability to synthesize sounds to form words. There were 33 items in this section; again, discontinuation occurred following three consecutive missed items. Sound Matching measures the ability to select words with the same initial and final sounds. This section comprised 26 items; testing was discontinued following three missed items.

APPENDIX 2

Teacher Survey Time 1

Teacher Knowledge. The teacher knowledge survey was based on a measure of teachers' knowledge of basic language constructs validated by Binks-Cantrell, Joshi and Washburn (2012). Basic language constructs considered essential for early reading success include phonological and phonemic awareness, the alphabetic principle (phonics), and morphology (Binks-Cantrell et al., 2012). Based on extensive research during the late 1980s and 1990s (e.g., Adams, 1990; Moats, 1999), the National Reading Panel (2000) in the United States stressed the importance of teachers having an explicit knowledge of such concepts for the effective teaching of decoding skills in a direct, systematic way to enable the successful acquisition of early reading skills for all beginning readers (Binks-Cantrell et al., 2012).

The Binks-Cantrell et al. (2012) scale included 46 questions that examined teachers' understanding of basic language constructs in terms of knowledge and skills in relation to phonological and decoding elements. For example, the question "A phoneme refers to…" is defined as a knowledge question in relation to phonemic understanding within the phonological domain. Skill-based items, for example, required teachers to count the number of phonemes in a word, such as *moon*, as well as count the number of syllables and morphemes in words such as *observer* and *frogs*. In addition, we included items designed to assess teacher's perceived teaching ability, such as "evaluate your knowledge of teaching phonemic awareness and comprehension". Binks-Cantrell et al. (2012) reported that the teacher knowledge measure has a Cronbach's alpha coefficient of 0.90 and good construct validity.

In our survey of teacher knowledge, 38 items were categorised into phonemic, phonic, phonological, and morphological skills/knowledge. An additional 8 items involved teacher self-evaluations of their perceived literacy-related teaching ability.

Word Identification Prompt Scenarios. The word identification prompt task was based on six scenarios used by Greaney (2001). These scenarios were selected from two series of publications commonly used in New Zealand primary schools; the *Ready to Read* series,

which is used in most junior classes, and the school journals. The scenarios were selected to exemplify three main types of reading errors (Greaney, 2001). Type A reading errors include a non-verbal response from a reader when she/he comes across an unfamiliar word, or a minimal response such as the initial letter only. Three scenarios involved Type A errors. One scenario involved a Type B error, in which the reader gave a non-word response for the target word (e.g., "brost" for *breakfast*). Type C errors involved the reader providing a real-word substitution that makes grammatical sense, but which is nonetheless incorrect (e.g., "rabbits" instead of *robins*). Two scenarios exemplified Type C errors.

Survey respondents were asked to provide brief narratives for up to three prompts for each of the six reading error scenarios. The prompts were categorised into word-level prompts (e.g., initial letter blends, letter-sound patterns), context-based cues (e.g., what makes sense in the story; look at the picture), and neutral prompts which included instructions by the teacher that did not relate specifically to any particular sources of information (e.g., "Are you sure?; "Keep trying"; "Have a go"; "Get your mouth ready").

Literacy Teaching Efficacy Scale (LTES). The LTES was developed specifically for this project. Following the recommendations and guidelines for self-efficacy assessment (e.g., Bandura, 2006; Tschannen-Moran & Wolfok Hoy, 2001), a range of items was developed to assess teachers' beliefs about their capability of engaging in literacy teaching practices that would lead to desirable student learning outcomes. These items followed the stem, *I am confident I can…* Each item required the respondents to select their level of confidence on an 11-point scale, from "highly confident" (10) to "not at all confident" (0). For example, the first item was "*I am confident I can…*Create enthusiasm for reading among boys".

The LTES used in the present project was developed following piloting with a sample of 274 teachers spread throughout the country, but not in the geographical region of our research. A 30-item scale resulted from the pilot project. Cronbach's alpha was .98; the mean was 264.45 (SD = 44.50); the lowest score was 83 and the highest was 329, with the total possible score being 330. A principal components analysis of items revealed one strong factor that accounted for 61.96% of the variance.

APPENDIX 3

Details of the Teacher PLD Modules

Module 1: Introduction and the importance of language

In this module teachers were introduced to the cognitive development of reading framework, and the associated assessment framework. This first module included an introduction to effective instruction, including the roles of direct explicit instruction and implicit learning. This meant distinguishing between learning to read as learning to read 'sight words' and learning to 'work-out words.' The second part of module 1 was a deeper examination of the role of vocabulary in decoding and language comprehension, as well as an introduction to what phonological awareness is. Vocabulary knowledge at the beginning of school not only appears to have an immediate impact on the development of word recognition skills but also has a strong direct relation to future reading comprehension performance (Senechal, Ouellette, & Rodney, 2006; Tunmer & Chapman, 2012a, 2012b). Children with limited understanding of the words of spoken language will encounter difficulty constructing meaning from text. During the early stages of learning to read, oral language factors, such as vocabulary knowledge, do not "show up" as major influences on reading comprehension because the inability to recognize the words in text limits the ability to understand text. However, this does not suggest that instruction in foundation skills should be delayed until children have acquired fast, accurate word recognition skills (Tunmer & Chapman, 2012b).

Module 2: Understanding letter knowledge and phonological awareness: learning how to read words

In this module teachers were introduced to the specific developmental processes of letter knowledge and its relationship with phonological awareness, emphasising the way that they interact to contribute to alphabetic coding skills. A large body of scientific research indicates that comprehending text in an alphabetic orthography depends on the ability to recognize the words in text accurately and quickly; that the development of automaticity in word recognition in turn depends on the ability to make use of letter-sound relationships in identifying unfamiliar words; and that the ability to discover mappings between spelling

patterns and sound patterns in turn depends on the ability to detect phonemic sequences in spoken words (Pressley, 2006). In this module teachers were provided with content knowledge distinguishing between vowels and consonants, how the sounds are similar and how they differ, as well as how children make use of sounding out for learning to read words independently.

Research on how children learn to read indicates that achievement in reading comprehension performance depends on the ability to recognize the words of text accurately and quickly. For progress to occur in learning to read, the beginning reader must acquire the ability to translate letters and letter patterns into phonological forms (Ehri, 2005; Snow & Juel, 2005; Tunmer & Nicholson, 2011). Making use of letter-sound relationships provides the basis for constructing the detailed orthographic representations required for the automatization of word recognition (or what Ehri, 2005, calls sight word knowledge), thus freeing up cognitive resources for allocation to sentence comprehension and text integration processes (Pressley, 2006).

Module 3: Developing word knowledge for fluency

In this module teachers were introduced to different word reading strategies that children need to learn, and how they are used in conjunction with each other. The teachers were provided with a scope-and-sequence, developmental progression, for the teaching of the different elements of phonic knowledge. They were also given specific instruction in the different long vowel sounds and digraphs, distinguishing between blend sounds and digraphs, and identifying morphemes in words. Another component of this module was the distinction between content knowledge (letters, sounds, phonic patterns, morphemes) and strategy instruction (how to make use of those components in reading as the way to read unfamiliar words).

Phonics instruction provides a ‘kick-start’ to phonological decoding for children who come to reading with few of the necessary cognitive entry skills, and who rely mostly on picture cues, partial visual cues, and sentence-context cues, with little interaction between the graphemes of printed words, and phonemes of spoken words (Tunmer & Greaney, 2010). For these children, the word recognition skills remain weak because they are unable to develop a rich network of sublexical connections between the orthographic and

phonological representations in lexical memory. The use of inefficient word recognition processes drains the cognitive resources for comprehending the text being read.

Venezky (1999) argues that phonics instruction provides the processes by which learners can make estimates of the phonological representation of an unknown word. Explicit phonics instruction enables learners to explicitly produce approximate phonological representations (i.e., partial decodings) of unknown printed words (Tunmer & Arrow, 2013). These partial decodings are then used to generate alternative pronunciations of the words until one is found that matches a word in lexical memory and fits the context as well (Tunmer & Chapman, 2012a). The size of the reader's vocabulary is a critical component of the generation of alternative pronunciations. If a reader does not have the attempted word in their vocabulary they will not be able to come up with a suitable alternative and will be unable to induce the patterns from that word. When spelling-sound relationships are correctly identified they are stored with the accurate orthographic representation of words, which provide the data base from which further letter-sound patterns can be induced. Once children reach this point of development explicit instruction is not needed for word recognition and decoding.

Module 4: Reading comprehension as the goal

In this module teachers were introduced to direct instruction in comprehension instruction and how this can be introduced in junior classrooms. To reduce the negative Matthew effects in literacy there are three sources of variance that teachers must take into account: the reader, the text, and the activity engaged in (Snow, 2002). Connor and colleagues have found that attention to all of these aspects contributes to greater vocabulary development and reading comprehension outcomes in third grade classrooms (Connor, et al., 2014). This module looked at explicit reading comprehension strategy instruction and its place in the year 1 classroom and provided teachers with instruction in understanding the text (genre structure and how to teach it). However, as linguistic comprehension is necessary for reading comprehension it also looked at sentence construction and explicit instruction in sentences. Finally, in terms of Snow's (2002) notion of activity, teachers engaged in planning activities for each of the components that are covered in the Cognitive Framework (i.e., background knowledge in terms of genre and comprehension strategy use as well as sentence knowledge).

Initial comprehension instruction for beginning readers is less directed than word reading and vocabulary building. With beginning readers the pre-requisite abilities for language comprehension, as indicated in Figure 1, are additional influences on reading comprehension (de Jong & van der Leij, 2002; Ouellette & Beers, 2010; Tunmer & Chapman, 2012b). These pre-requisites must first be assessed and identified before more dynamic comprehension-focused instruction can begin. Through the other aspects of reading already covered most children will be able to create basic meaning of text that is read; they will have sufficient cognitive processing abilities to do so as decoding skills become more efficient and a higher level of word level automaticity is achieved.

Module 5: Differentiated instruction as the goal

In this module teachers were focused on ideas for reconceptualising how to use whole class and small group instruction for the differentiated classroom from the start of the school year. Such changes had been introduced from Module 1 through the use of the templates guiding teachers to rethink their small group and whole class instruction including not only the how but also the what was taught in it. The long-standing approaches to reading in the junior classrooms are guided reading and shared reading (Ministry of Education, 2003). Vocabulary is critical so should be the cornerstone of instruction in beginning classrooms. Although the language experience approach is good at this, shared reading can build vocabulary beyond what language experience can do by the provision of text structure and vocabulary that children might not otherwise generate. Shared reading at the whole class level, during the first year of school, should emphasise the development of vocabulary and oral language, rather than as a means for introducing aspects of print and for developing fluency This approach encourages the use of multiple forms of shared book reading and reading aloud, including a variety of picture books (e.g., Braid, 2012) rather than the use of 'big books' alone.

Having an explicit knowledge of how children learn to read enables teachers to make informed instructional decisions that will move children forward. The use of specific assessments for beginning readers can also inform those decisions. Expectations are therefore based on what is known about the specific abilities, and what the next instructional steps should be. Another aspect of changing expectations is to be explicit in the use of direct instruction. This means telling children what they are learning and why

they are learning it (Davis, 2007; Duffy, 2009). The small group instruction that beginning readers receive in the first year should not take the form of guided reading, in which children read their way through a text (Fountas & Pinnell, 1996; Ministry of Education, 2003). Rather, it should be rethought of as small group reading instruction that may include book reading. The focus, however, is on the explicit teaching of the specific abilities and skills that assessments have indicated many children need. The teaching, therefore, is planned based on need and not what arises from the text, as is currently the premise of guided reading.

APPENDIX 4

Summary Time 1 Assessment Data as a Function of Group

	Intervention Group			Comparison Group		
Assessments	Mean	SD	*n*	Mean	SD	*n*
BPVS	98.44	11.54	199	98.49	11.70	148
Letter ID UC Name	11.12	8.87	201	11.74	9.07	158
Letter ID LC Name	9.81	8.71	201	10.60	8.79	158
Letter ID UC Sound	5.22	7.40	201	6.66	7.72	158
Letter ID LC Sound	5.03	7.42	201	6.16	7.69	158
Clay Word Test	0.51	1.55	200	0.57	1.86	158
Clay Word Phonemes	1.54	4.32	200	2.01	5.56	158
Invented Spelling	0.12	0.66	198	0.23	1.34	158
Invented Spelling Sounds	3.68	9.70	200	5.37	10.94	158
CTOPP Elision	4.24	4.28	201	4.57	4.30	157
CTOPP Blending	6.77	4.27	199	6.22	4.19	158

APPENDIX 5

Summary Time 1 Assessment Data as a Function of Decile Band

	Low Decile Band		Middle Decile Band		High Decile Band	
Variables	Mean	SD	Mean	SD	Mean	SD
BPVS*	93.76[ab]	10.55	99.63	11.52	102.67	11.03
Letter UC Name*	8.71[ab]	8.81	11.56	8.72	14.95	8.42
Letter LC Name*	7.54[ab]	8.24	10.31	8.58	13.66	8.60
Letter UC Sound*	4.32[a]	7.46	5.78	7.25	8.24	7.84
Letter LC Sound*	4.02[a]	7.11	5.50	7.33	7.80	8.13
CTOPP elision*	2.99[abc]	4.03	4.45	4.38	6.25	3.71
CTOPP blending	6.06	3.84	6.49	4.44	7.25	4.30
Clay word	0.47	1.81	0.47	1.50	0.77	1.89
Clay phonemes	1.67	5.37	1.51	4.30	2.35	5.37
Invented spelling	0.23	1.46	0.14	0.77	0.15	0.58
Invented spelling sounds	4.10	10.47	3.78	9.40	6.27	11.66

* Statistically Significant 1-way ANOVA, $p < .01$

[a] Low decile group significantly lower than high decile group

[b] Low decile group significantly lower than middle decile group

[c] Middle decile group significantly lower than high decile group

BPVS = British Picture Vocabulary Scale

UC = upper case; LC = lower case

CTOPP = Comprehensive Test of Phonological Processing

APPENDIX 6

Details of Student Assessments Used at the End of Year 1

Invented Spelling. Children's ability to produce preconventional spellings of words was assessed by an invented spelling task (Tunmer, Chapman, & Prochnow, 2003), discussed earlier in this report in relation to the baseline assessments.

Pseudoword Reading. An adapted version of a nonword reading task developed by Richardson and DiBenedetto (1985) was used to measure knowledge of letter-sound patterns. Thirty monosyllabic nonwords from Section 3 of their Decoding Skills Test were presented in the form of a game in which the children were asked to try to read the "funny sounding names of children who live in faraway lands." The items were scored according to the total number of sounds pronounced correctly in each item, provided the sounds in the item were blended together into a single syllable. The total number of possible points was 101. Scoring was based on the number of sounds pronounced correctly rather than the number of items pronounced correctly to discriminate between children who had little or no knowledge of letter-sound patterns and those who had sufficient knowledge to produce partial decodings, a skill that was considered important in the context of the current study.

Phonological Processing. Phonological processing was assessed using the Comprehensive Test of Phonological Processing, Second Edition (CTOPP-2: Wagner, Torgesen, Rashotte, & Pearson, 2013). Information about this test is reported in the earlier section on baseline assessments. CTOPP Matching is not reported for the end of Year 1.

Reading Book Level. Book level assessments are the most frequently literacy assessments undertaken by New Zealand teachers. This was assessed at the end of Year 1 by the children's classroom teacher or other suitably qualified school personnel and provided to the project so was not independently assessed by the research assistants. Children are assigned to the book level in which they are able to attain a word recognition accuracy rate of 90-94%. Book level is not an equal interval scale as the average increase in book level for

a given period of instruction is greater for the lower level books than for the higher level books. There are a total of 26 book levels, the characteristics of which are more fully described in Iversen and Tunmer (1993). Not all schools provided book level information as requested.

Word recognition. Word recognition refers to the fluent, rapid reading of words as they appear. The words read in this way are usually known as sight words. Sight words are not just the high-frequency words that children learn to read first, but the term is used to describe any word read with automaticity (Ehri, 2014). This automatic word recognition is expected of children by the end of the first year of school (Ministry of Education, 2009). The Burt Word Reading Test (Gilmore, Croft, & Reid, 1981) for single word reading was used. This test can capture word recognition abilities up to the age of 12.

APPENDIX 7

Summary of End of Year 1 Student Assessments for Intervention Students as a Function of Teacher Change

Variables	Same or other project teacher		Change to non-project teacher or absent teacher		
	M	SD	M	SD	t (df)
Blends	10.74	8.22	6.63	6.80	2.73** (171)
Digraphs	2.37	1.85	1.40	1.50	2.87** (171)
CTTOP Elision	12.26	6.61	9.37	6.25	2.34* (172)
CTTOP Blends	15.29	8.00	12.26	5.55	2.11* (172)
Pseudoword sounds	39.18	32.30	14.97	24.48	4.09** (169)
Invented spelling sounds	43.03	19.33	35.53	18.79	2.05* (171)
Burt word test	18.15	11.19	11.06	9.91	3.45** (172)
Reading Book Level	10.28	5.12	7.83	4.27	2.59* (150)

df = degrees of freedom

*p <.05 **p < .01

APPENDIX 8

Summary End of Year 1 Data for Intervention and Comparison Students.

	Intervention				Comparison						
	Pākehā		Māori		Pākehā		Māori				
Variables	M	SD	M	SD	M	SD	M	SD	*F*(Group)	*F*(Ethnicity	*F*(Interaction)
Blends	13.36	7.51	5.78	7.29	11.07	7.53	9.16	7.35	$0.22^{NS}(205)^{a}$	17.02^{**}	6.07^{*}
Digraphs	2.76	1.84	1.67	1.82	3.04	1.75	2.41	1.79	$3.42^{NS}(205)$	9.69^{**}	0.67^{NS}
CTTOP Elision	13.68	6.82	10.70	5.22	13.93	6.84	10.81	4.92	$0.03^{NS}(206)$	9.46^{**}	0.01^{NS}
CTTOP Blends	16.11	8.22	12.73	7.51	17.65	6.83	14.44	6.64	$1.98^{NS}(203)$	8.16^{**}	0.11^{NS}
Pseudoword sounds	45.81	30.83	29.85	32.66	46.93	33.56	26.28	26.83	$0.06^{NS}(203)$	14.01^{**}	0.23^{NS}
Invented spelling sounds	45.42	18.80	37.63	21.04	48.70	17.67	43.97	18.72	$2.79^{NS}(206)$	4.73^{*}	0.03^{NS}
Burt word test	20.92	10.76	13.38	11.18	22.41	15.18	14.81	9.14	$0.60^{NS}(205)$	15.79^{**}	0.00^{NS}
Reading Book Level	11.73	4.67	8.86	4.88	11.54	5.33	9.16	4.04	$0.01^{NS}(179)$	10.60^{**}	0.09^{NS}

[a] Degrees of Freedom are shown to indicate differing sample sizes. df for main and interaction effects is 1/degrees of freedom

$^{*}p < .05$; $^{**}p < .01$

APPENDIX 9

Correlations Between Entry Variables and End of Year 1 Outcome Variables

Entry variables	Burt Word Test	Reading Book Level
Vocabulary knowledge	.38	.44
Letter Name	.66	.63
Letter Sound	.67	.60
Invented spelling sound	.57	.45
CTTOP Elision	.57	.56
CTTOP Blends	.44	.39
Clay word phonemes	.52	.42