MASSEY UNIVERSITY
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QUICK60 LITERACY RESEARCH PROJECT

Research Report on the Predictive Abilities and Effectiveness of Assessment Tools for Monitoring Literacy Programmes in Primary Schools, Involving the *Quick60* Programme

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Disclosure Statement

This research project was undertaken because the developer of the *Quick60* programme, Dr Sandra Iversen, is a Masters and PhD graduate of Massey University. I was involved in the supervision of her post-graduate research. It is my opinion that the programme she has developed provides a good example of theory and research from her post-graduate study being used to develop a programme designed to enhance literacy learning outcomes of school students. I declare that I have no financial or other interests in the *Quick60* programme or any related products developed and distributed by Iversen Publishing. My interest is solely academic and the pursuit of better literacy learning outcomes for New Zealand students.

Executive Summary

The purpose of the current study was to examine the effectiveness of the *Quick60 Foundation* literacy programme with New Entrant/Year 1 students in low decile schools during their first and second years in school. The *Quick60* programme is designed for teachers to cover all of the necessary early literacy skills in an explicit and systematic manner, including alphabet letter names, sounds, and formation, and a bank of high-frequency words. Early phonemic awareness skills and comprehension strategies are taught alongside a progression of phonic skills for use in both reading and writing.

Eight low decile schools with significant numbers of Māori and Pasifika students participated in this two year study. Five schools were in the Intervention group and three in the Comparison group. Teachers in the Intervention schools began the *Quick60* programme at the start of the 2014 academic year. The programme formed the basis for the whole-class literacy instruction and continued for 32 weeks during Year 1 only. In year 2, the intervention students received the "normal" literacy programme.

Student assessment data were collected on five occasions: beginning, middle and end of Year 1; beginning and end of Year 2. Collection of Year 2 data was designed to assess the effects of the *Quick60* programme following the year of its implementation. The assessment data comprised a range of developmentally appropriate measures of language-related literacy knowledge and skills (e.g., letter knowledge, phonological and phonemic awareness) as well as measures of reading outcomes (e.g., sight word knowledge, reading book level, reading accuracy and comprehension, and spelling). Data were also collected relating to student home backgrounds, rated by teachers as being either "normal" or "challenging". Teacher data were collected in relation to their knowledge of basic language constructs associated with literacy teaching and learning.

The results showed that the *Quick60 Foundation* programme is associated with enhanced literacy learning outcomes for students in the intervention group compared to those in the Comparison group. The effects were stronger for "younger" students in the intervention group who started school as New Entrants at the beginning of the 2014 academic year in February. "Older" intervention students had been at school for varying periods of time during the preceding academic year (2013) and generally had higher baseline scores at the beginning of 2014 as a result. However, the "younger" students caught up on both process and outcome variables. The superior literacy learning outcomes for the intervention students is likely to result from the explicit and systematic instruction provided by means of the *Quick60 Foundation* programme from the start of the 2014 academic year and before all baseline assessments had been completed. By the end of Year 2, intervention students were reading, on average, at or above their chronological age level of 7 years. In contrast, the Comparison students were reading at levels that were on average 6 to 12 months behind, but more typical of students in low decile schools who receive the "normal" approach to literacy instruction.

Teachers in the intervention schools did not show markedly superior knowledge of basic language constructs associated with literacy teaching and learning. While there is considerable research to show that such knowledge is important, the carefully designed nature of the *Quick60 Foundation* programme, with the comprehensive and clear resources and guidelines for teachers may have compensated for their lower knowledge levels.

There were two unexpected outcomes. Students from home backgrounds described by teachers as "complex" or "challenging" did not perform markedly lower than students from "normal" home backgrounds. Most of the students from challenging backgrounds were in the Intervention group. It is possible that the *Quick60 Foundation* programme may have assisted in compensating for home background challenges.

The second unexpected outcome was in relation to the "summer effect". Numerous studies show that students often obtain lower scores on standardised assessments following a long summer holiday period. This study found no evidence of a summer effect for either the intervention or Comparison students.

The results of this study, albeit limited by relatively small sample sizes, are impressive in the context of literacy learning outcomes for students in low decile schools with large numbers of Māori and Pasifika students. Such students often start school with limited amounts of literate cultural capital. The predominant constructivist one-size-fits-all approach to literacy instruction fails to take these differences into account. As a consequence, such students are often disadvantaged from the outset of school entry; the initial gap in pre-literacy skills usually widens to become the literacy (and then learning) achievement gap. Programmes, such as *Quick60 Foundation*, that are based on scientific evidence and that emphasise the importance of developing appropriate language and alphabetic code skills for reading acquisition appear to be superior to the predominant constructivist approach to literacy instruction.

Introduction

New Zealand's Literacy Problem

New Zealand has a literacy problem (Tunmer & Chapman, 2015). This problem is observable in data from international surveys of students and adults, as well as data collected by the Ministry of Education (MoE). One of the key indicators of the problem is the high level of variability in the test scores from international surveys of reading achievement (Tunmer, Chapman, & Prochnow, 2003, 2004, 2006; Tunmer et al., 2008; Tunmer & Prochnow, 2009; Tunmer, Prochnow, Greaney, & Chapman, 2007). The high degree of variability in outcomes is somewhat unexpected. New Zealand has a unified national education system with a relatively uniform approach to literacy instruction and intervention. Most aspects of literacy education are controlled centrally by the MoE, including the setting and monitoring of the national curriculum, the establishment of national reading and writing standards, the production of beginning reading materials and instructional guides for beginning teachers, and the funding and monitoring of two major intervention programs for struggling readers: Reading Recovery (RR) and Resource Teachers: Literacy (Chamberlain, 2012).

Yet, despite this unified national education system, it was 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 the low-performing readers were likely to be Māori and/or from low-income backgrounds (Wagemaker, 1993). Further 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, 1997a). Home language was not considered as a possible explanation of the lower mean literacy achievement scores of Māori students because only a small number learn to speak Māori as a first language (Crooks & Caygill, 1999).

In response to the growing concerns about disparities in literacy learning outcomes, and the long tail of literacy underachievement, a Literacy Taskforce was established by the Government to provide advice on achieving its goal: that "By 2005, every child turning nine will be able to read, write, and do maths for success" (Ministry of Education, 1999, p. 4). To assist the Government in developing an effective national literacy strategy, the Taskforce, which comprised mostly practitioners, focused on recommendations aimed at raising the literacy achievement of all students but with particular attention given to "closing the gap between the lowest and highest achievers" (p. 7).

Further evidence of the mounting concern about the literacy levels of New Zealand children is shown with the Education and Science Committee of the New Zealand Parliament

March 2000 inquiry into the teaching of reading in New Zealand. The purpose of the inquiry was to determine "how and why many children are failing to learn to read effectively" and "to provide recommendations to the Government on how the reading gap can be closed" (New Zealand House of Representatives, 2001, p. 5). The Committee made 51 unanimously agreed recommendations that were largely rejected by the Government. Rejected recommendations included those calling for significant changes in New Zealand's approach to literacy education. For example, "that the Ministry of Education provide advice and support to schools to incorporate successful phonics programmes into the classroom" (p. 17), "that all primary teacher-training providers incorporate the teaching of phonetic skills and word-level decoding into their programmes" (p. 27) and that "there be a greater emphasis on the benefits of phonics instruction in Literacy Leadership materials" (p. 28).

Instead the Ministry of Education adopted recommendations that provided more resources and teacher professional development designed to enhance the predominant approach to literacy instruction. No need was seen by MoE officials to change this approach, because it was considered to be largely successful. For example, Smith and Elley (1997), two leading New Zealand literacy educators, noted that "expert commentators from other countries have been fulsome in their praise of our reading programmes, our reading teachers, our reading materials and our Reading Recovery methods" (p. 110). They further stated that "our methods of teaching . . . are all spreading to other parts of the world" and that "It is no wonder that New Zealand is held up as the country whose reading programmes are 'best in the world' (Newsweek, 1991)" (p. 110).

Data from major international studies, however, showed that these views about the success of literacy teaching in New Zealand were highly questionable. The Progress in International Reading Literacy Study (PIRLS) 2006 (Mullis, Martin, Kennedy, & Foy, 2007) became a major source of concern to the MoE because virtually no reduction in the relatively large disparity between good and poor readers had occurred since the PIRLS 2001 assessment (Mullis, Martin, Gonzalez, & Kennedy, 2003).

The PIRLS 2006 results contributed to two further developments. In March 2006, the Education and Science Committee of Parliament initiated an inquiry into "making the schooling system work for every child" (New Zealand House of Representatives, 2008, p. 37). In support of the decision to conduct the inquiry, the Committee cited a recent report by the Education Review Office stating that "New Zealand's best students perform with the best in other countries but there is a group at the bottom, perhaps as large as 20%, who are currently not succeeding in our education system" (p. 7). The Committee concluded that "evidence from national and international assessments and studies support the proposition that New Zealand has a disproportionate number of students who underachieve" (p. 7).

Recommendations of the Committee included devoting more resources to the "provision of comprehensive professional development in assessment practice so that by 2010 all schools will have experienced appropriate training in the collection and use of data"

(p. 3). Unlike the 2001 report of the Education and Science Committee, no recommendations were made regarding New Zealand's approach to teaching reading.

In 2010, the MoE introduced national standards in reading and writing for Years 1 to 8 as another strategy for reducing the literacy achievement gap (Ministry of Education, 2009). For Years 1 to 3, the standards are based on the book levels of the *Ready to Read* series, the core instructional series of books for New Zealand students. For example, the reading standard after one year at school is that "students will read, respond to, and think critically about fiction and non-fiction texts at the Green level of Ready to Read" (p. 20). Students meeting this standard are expected to read seen texts at the Green level with at least 90% accuracy (the Green level corresponds to a reading age of approximately six years). For each of Years 1 through 8, the reading standards also include illustrated examples of reading behaviours that teachers would be expected to observe in students who are meeting the standard.

More recently, in December 2011, the MoE's Briefing to the Incoming Minister (Ministry of Education, 2011), which occurs when a new government is formed after a national election, stated that, although there have been some overall improvements in education (largely in participation and retention rates):

> . . . the gap between our high performing and low performing students remains one of the widest in the Organization of Economic Cooperation and Development (OECD). These low performing students are likely to be Māori or Pasifika and/or from low socio-economic communities. Disparities in education appear early and persist throughout learning. (p. 8)

The Briefing indicated that over the preceding decade there had been little improvement in early literacy/numeracy, especially for Māori and Pasifika children. Data presented in the Briefing showed that 18% of Māori and 16% of Pasifika were not achieving basic literacy and numeracy skills by age 10, compared to only 4% of non-Māori and non-Pasifika children (p. 9). The Briefing concluded that, "The greatest challenge facing the schooling sector is producing equitable outcomes for students" (p. 23). Improving the quality of teaching, placing greater emphasis on the accountability framework for schools, and establishing charter schools were identified as strategies that would be pursued by the MoE to improve achievement outcomes.

The PIRLS 2011 survey is the most recent test of reading achievement developed by the International Association for the Evaluation of Educational Achievement (IEA). The PIRLS assessments focus on the achievement and literacy learning experiences of children from countries throughout the world in grades equivalent to Year 5 in New Zealand. The PIRLS, developed by Mullis et al. (2003), is a five-year cycle of assessments that was first administered in 2001, then in 2005/2006, and again in 2010/2011.

The general results observed for New Zealand in the PIRLS 2011 study was very similar to those reported in earlier PIRLS assessments. The mean achievement scores for the 45 participating countries ranged from a high of 571 (achieved by Hong Kong) to a low of

310 (the mean score for Morocco). Because there was a long tail in the distribution of the means of participating countries, 32 countries scored significantly higher than the centrepoint score of 500 and 12 countries scored significantly lower. New Zealand was ranked 23rd with a mean score of 531.

The means of 20 of the 45 participating countries were significantly higher than the New Zealand mean and the means of 17 countries were significantly lower. This was the second time since New Zealand began participating in studies of reading achievement by the IEA that the number of countries that significantly outperformed New Zealand exceeded the number of countries that New Zealand significantly outperformed. The first time was in the PIRLS 2006 study, when 21 of the 45 participating countries scored significantly higher than New Zealand and 19 countries scored significantly lower.

Given New Zealand's relatively high level of economic development (ranked 30th in the world in GDP per capita by the World Bank), New Zealand would be expected to perform better than countries that are underdeveloped and/or have populations with large differences in material wealth, such as the lowest performing countries in the PIRLS 2011 study (Malta, Trinidad and Tobago, Azerbaijan, Iran, Colombia, United Arab Emirates, Saudi Arabia, Indonesia, Qatar, Oman and Morocco). A more useful comparison would be to consider countries that are more similar to New Zealand in respect of economic development, language of instruction, linguistic homogeneity and complexity of orthography. Six countries satisfied these criteria: Northern Ireland, the USA, Ireland, England, Canada and Australia. Although the mean score for Australia did not differ significantly from New Zealand's mean score, the mean of each of the five remaining countries was significantly higher than the New Zealand mean. Overall, Northern Ireland was ranked 5th, the USA 6th, Ireland 10th, England 11th and Canada 12th.

More important than the comparisons with other countries is the fact that the mean score for New Zealand on the PIRLS surveys for 2001, 2006, and 2011 remained almost identical (529, 532, 531 respectively). And the spread of scores between good and poor readers together with differences between Pākehā children and Māori/Pasifika children have remained relatively constant over the three PIRLS surveys.

In summary, the New Zealand government has made attempts over the past decade to reduce the relatively large disparity between good and poor readers. However, an examination of the PIRLS 2011 results has revealed that these efforts have largely failed. Virtually no changes in educational outcomes have occurred (Tunmer, Chapman, Greaney, Prochnow & Arrow, 2013).

The Predominant Approach to Literacy Instruction Has Contributed to the Literacy Problem

For the past 25 years New Zealand has followed a predominantly constructivist approach to literacy education that assumes that learning to read is essentially like learning to speak, where both abilities are thought to develop "naturally" (Smith & Elley, 1994, p.

81). A review of Australian and New Zealand reading research noted that "New Zealand's literacy practices have a long history of association with a developmental constructivist bias in teaching and learning" and "direct instruction of specific knowledge and skills according to prespecified routines finds little favor" (Wilkinson, Freebody & Elkins, 2000, p. 12).

Two leading proponents of the constructivist approach to teaching reading in New Zealand claimed that "children learn to read themselves; direct teaching plays only a minor role" (Smith & Elley, 1994, p. 87). Literacy learning is largely seen as the by-product of active mental engagement with little or no explicit, systematic teaching of phonemic awareness (the ability to reflect on and manipulate the phonemic segments of spoken words) and alphabetic coding skills (the ability to translate letters and letter patterns into phonological forms). Smith and Elley (1994) argued that teaching beginning readers orthographic patterns "is a difficult, unnecessary and largely fruitless activity, creating distorted ideas about the nature and purpose of reading" (p. 143). Explicit instruction in word-level skills and strategies is therefore downplayed or discouraged. Word analysis activities, if any, arise primarily from the child's responses during text reading and focus mainly on initial letter sounds.

The theoretical assumptions about the nature of skilled reading, reading acquisition and the role of pedagogical constructivism in literacy education emerged in New Zealand during the 1980s. As Connelly, Johnston and Thompson (2001) noted, the shift from emphasis on words in teaching reading in New Zealand to an emphasis on the story and book "has become more prevalent in the last twenty years and there has been increasing concern that children are able to predict reading responses from story and sentence context" (p. 433).

This perspective was adopted and strongly promoted by the MoE through its various publications. *Reading in Junior Classes* (Ministry of Education, 1991), the guidebook used by beginning reading teachers in New Zealand until it was replaced in 2003, explicitly stated that "It is better that children predict meaning from other cues at the outset and use their knowledge of letters and sounds for confirmation" (p. 48). Similarly, *The Learner as a Reader* (Ministry of Education, 1996) stated that the first strategy children should be encouraged to use when confronted with an unknown word in text is to "try reading from the beginning of the sentence again and think what would fit" (p. 50). In *Reading and Beyond* (Ministry of Education, 1997b), the introduction to the *Ready to Read* series used in New Zealand schools, reading is described as "a constantly repeated process of sampling, predicting, checking, confirming, and self-correcting" (p. 7).

Reading in Junior Classes was replaced by the guidebook*, Effective Literacy Practice in Years 1 to 4* (Ministry of Education, 2003). Copies were distributed to every teacher of Years 1 to 4 throughout the country. *Effective Literacy Practice* was the cornerstone of the MoE's literacy strategy during this period (2003–2006) and the key resource for a large-scale, in-service professional development program. It stated that "fluent readers . . . draw on their prior knowledge and use all available sources of information simultaneously and usually unconsciously" (p. 30) and that "in skilled reading, predictions are usually checked

swiftly and automatically" (p. 130). Based on these (invalid) assumptions about skilled reading, *Effective Literacy Practice* stated that teachers need to show beginning readers how to "cross-check *predictions* to ensure that they make sense and fit with other information already processed" and that "for beginning readers, cross-checking usually involves checking that their *prediction* of an individual word fits and makes sense" (p. 130, emphasis added).

The MoE's rigid adherence to this instructional approach to literacy teaching has contributed greatly to the continuing inability to reduce the literacy achievement gap (Tunmer & Chapman, 2015; Tunmer et al., 2013). Following thorough reviews of the scientific literature on learning to read, countries throughout the world have abandoned this model of reading. The major shortcoming of the instructional philosophy still predominant in New Zealand is that it stresses the importance of using information from many sources in identifying unfamiliar words in text without recognizing that skills and strategies involving phonological information are of primary importance in beginning literacy development. As Pressley (2006) pointed out, "the scientific evidence is simply overwhelming that letter-sound cues are more important in recognizing words . . . than either semantic or syntactic cues" (p. 21) and that "teaching children to decode by giving primacy to semantic-contextual and syntactic-contextual cues over graphemic-phonemic cues is equivalent to teaching them to read the way weak readers read!" (p. 164). One of the major distinguishing characteristics of struggling readers is their tendency to rely heavily on sentence context cues to compensate for their deficient alphabetic coding skills (Stanovich, 1986).

Research on how children learn to read indicates that achievement in reading comprehension performance depends on the ability to recognise 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). 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 from 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.

The Purpose of the Current Study

The purpose of the current study was to examine the effectiveness of an explicit literacy teaching programme, *Quick60 Foundation* (Iversen, 2013), for young children in low decile schools, and to gauge the effectiveness of assessment tools not normally used in schools for monitoring outcomes of literacy instruction. Specifically, the *Quick 60 Foundation* programme was designed for use with New Entrants/Year 1 children, especially those who start school with few literacy skills, deficient vocabularies and limited world knowledge. These students may or may not have English as their first language. The programme is designed to teach all of the necessary early literacy skills in an explicit and systematic way, including alphabet letter names, sounds, and formation, and a bank of high-frequency words. Early phonemic awareness skills and comprehension strategies are taught alongside a progression of phonic skills for use in both reading and writing.

Specifically, the following research questions for the focus for the study:

1. To what extent do assessment tools not normally used in schools for monitoring literacy instruction predict and relate to literacy learning outcomes?
2. Does the *Quick 60 Foundation* programme lead to improved literacy learning outcomes of New Entrant/Year 1 children when compared with outcomes for children who receive the “normal” literacy instruction?

Method

Selection of Schools

A number of low decile schools with significant populations of Māori and Pasifika students were approached at the end of 2013 to invite them to participate in this research project. The intervention was outlined to them and they were asked to commit to the New

Entrant/Year 1 teacher following the programme for the 90-minute literacy block each day throughout 2014. Two schools in South Auckland and two in the Coromandel area agreed to participate. At the request of a Resource Teacher: Learning and Behaviour, a needy school north of metropolitan Auckland was also included.

The Students

Many of the students in the Intervention group had started school in the last two terms of 2013 and allowing for school holidays – two weeks in September/October and eight weeks for the summer break had anywhere between 20 and two weeks of instruction. The students who had been at school longer were not promoted because they had failed to make satisfactory progress by the end of the year. Typically these students would be promoted mid-year when the composite New Entrant/Year 1 classes they are in exceed their capacity.

The Intervention teachers reported that most of their students started school with the vocabulary and world knowledge they would typically ascribe to three year olds. Teachers also reported that more than 50% of their children had exceptional home circumstances that were not conducive to learning.

At the start of the project in February 2014 the sample comprised 104 students from eight schools. Seventy-five students were in the *Quick 60* Intervention group and 29 in the Comparison group. In terms of gender, 40 boys and 35 girls were in the Intervention group. Boys also outnumbered girls in the Comparison group: 17 and 12 respectively.

Disparities in age were identified during preliminary analyses of data. The mean age of the total sample at the start of the project was 64.3 months (SD = 4.00), which is 5 years 4 months, and the modal age was 63 months (5 years 3 months). For the Intervention group, the mean age at the start of the project was 65.25 months (SD = 4.25), and for the Comparison group, 62.31 (SD = 2.11). This difference of 3 months is statistically significant, $t(102) = 3.55$, $p < .01$. An examination of the distribution of ages revealed that 67% of the children in the project were younger than 5 years 5 months. The remainder were older, with the oldest student 6 years, 8 months. More students 5 years 5 months or older were in the Intervention group than the Comparison group: 41% (n = 31) versus 10% (n = 3). The effects of this disparity in age are discussed in the Results section of this report.

Regarding ethnic background, the majority of students in the Intervention group were Māori (56%), with Pasifika (25%), Pākehā (13%), and Asian (4%) representing other ethnicities. For the Comparison group, the majority of students were Pasifika (59%), followed by Māori (31%), Asian (3%) and “Other” (7%). No Pākehā students were in the Comparison group.

All students in the project were in low decile schools. Fifty percent of students were in Decile 1 schools, 24% in Decile 2 schools, and 26% in Decile 3 schools. Intervention group students were spread across the three Decile rankings: 1 = 39%; 2 = 25%; 3 = 36%. On the

other hand, students in the Comparison group were mainly from Decile 1 (79%) and Decile 2 (21%) schools.

The Teachers

Three of the teachers held senior positions in their schools and were currently teaching New Entrant/Year 1 composite classes, one teacher was an experienced Year 1 teacher and one was inexperienced and new to teaching New Entrants. The teachers were supplied with all the materials they needed to implement the programme, including detailed daily lesson plans. However, they were not provided with any additional professional development. The teachers started teaching the *Quick60 Foundation* programme as soon as school started in 2014 and before the initial testing took place. An initial emphasis at the outset of teaching the programme was focussed on alphabet letter knowledge and phonemic awareness.

Intervention Programme

The *Quick60 Foundation* programme is underpinned by the Vygotskian concept of the Zone of Proximal Development (Wood et al., 1976). Both the instructional sequence within and across lessons and the *Foundation* materials are designed to move learners from where they can achieve with assistance to where they can function independently, continually raising the baseline bar. The student reading books steadily increase in difficulty. Scaffolding of skills is provided by lesson demonstrations followed by joint participation, guided practice and independent learning, leading to internalization. Multiple opportunities are provided to promote overlearning within and across the instructional strands.

The *Quick60 Foundation* Intervention is a 32 week whole-class literacy curriculum that systematically teaches all the necessary early literacy skills in an explicit way. Students learn the vocabulary for basic science, social studies and maths concepts and how to compare, contrast and group objects with similar attributes. They also learn alphabet letter names, sounds, and formation, and a bank of high-frequency words. Eight early phonemic awareness skills and eight early comprehension strategies are taught alongside a progression of phonic skills for use in both reading and writing. Students learn simple sentence writing including print conventions, how to hear and record the sounds in words in order and how to generate new words from known spellings. In addition, they learn how to write short passages covering a variety of factual and narrative genres.

The *Quick60 Foundation* was designed for teaching in the 90-minute literacy block. Components can be taught in any order. While teachers are working with groups for guided reading, other students work independently at learning centres.

During the first 16 weeks lessons are sequenced as follows:

- 10 minutes oral language/vocabulary building
- 20 minutes phonemic awareness/phonics activities, comprehension strategies
- 50 minutes guided reading and writing
- 10 minutes comparing/contrasting/spelling patterns

During the second 16 weeks there are two components daily:

- 60 minutes guided reading
- 30 minutes interactive and guided writing

The *Quick60 Foundation* Intervention incorporates a variety of teaching methodologies. These include oral language through language experiences, shared reading using "Big Books", guided reading and interactive and guided writing. Time is provided for independent practice, consolidation, revision and extension.

Shared reading uses "Big Books" especially written to teach early phonemic awareness and comprehension skills. One character in each book teaches other characters the prescribed skills. The shared reading component follows a 10-day lesson series in the following order: 1, background knowledge; 2 - 3, comprehension strategy; 4, exploring the setting; 5, exploring characters; 6 - 7, phonemic awareness skill; 8 - 9, innovations; 10, revision, consolidation, extension and checking.

The guided reading lesson follows the same format each day and is based on previous research (Iversen & Tunmer, 1993; Iversen, Tunmer & Chapman, 2005). Both these studies adapted the Reading Recovery format by including phonemic awareness activities into the daily lesson (Iversen & Tunmer, 1993), and by teaching this adapted lesson to two students at a time rather than one (Iversen et al., 2005). The *Quick60* guided reading lesson has been modified further for use with groups up to six students and the in-class model has two 20 minute sessions rather than one 40 minute lesson.

Intervention Resources

The *Quick60 Foundation* Intervention uses a variety of resources in print and digital form specifically written to ensure that all areas of literacy are taught. Each resource is based on a rationale for its inclusion.

Concept Cards

The Concept Cards are photographed and designed to teach the basic social studies, science and maths vocabulary and concepts. They are included because they:

• provide a context for oral language development.

• reinforce the strong correlation between vocabulary and comprehension. This ensures that when students are able to decode they understand what they have read.
• provide prior knowledge and vocabulary for student writing.
• provide a foundation for future Science, Technology, Engineering and Maths (STEM) education.

Big Books

The Big Books are fictional and illustrated and included for the following reasons:

• characters in each book teach other characters eight essential phonemic awareness, phonics, and concepts of print skills, that is – word awareness, syllable awareness, rhyme awareness, alliteration, onset/rime awareness, concepts of print, phoneme segmenting and phoneme blending.
• they provide for the teaching of eight early comprehension strategies – making connections to self and text, making, confirming, and revising predictions, visualizing, applying knowledge, making connections to the world, recognizing text structure, summarizing and recognizing fantasy genre.
• vocabulary is enhanced by discussing the characters and the setting in relation to the plot.
• the books are written in such a way as to encourage student participation in the reading thereby increasing motivation.
• there are opportunities for innovations on text so students learn how to use language flexibly.

Alphabet Books

The Alphabet Books are all factual and illustrated. They are included because alphabet knowledge is highly correlated with reading acquisition and development. The Alphabet Books teach:
• alphabet letter names and sounds.
• alphabetical order.
• the first 26 high-frequency words.
• vocabulary.
• straightforward English language structures.
• models for sentence writing.

Alphabet Poem Cards

The Alphabet Poem Cards are fictional and illustrated and are included to reinforce and consolidate the alphabet skills learned from reading the Alphabet Books. They also introduce rhyme and reinforce the corresponding high-frequency words. The rhymes are short, entertaining and easily remembered providing further motivation for learning.

Spelling and Vocabulary Cards

The Spelling and Vocabulary Cards are photographed and included because they provide:

- vocabulary extension.
- opportunities for students to compare, contrast and categorize by groups.
- spelling patterns from which students can generate over 600 new words.

Student Guided Reading Books

The Student Reading Books are included because they:

- provide a gradient of difficulty so students can be grouped for instruction with students of similar ability. This grouping is flexible and allows students to progress through the lessons at different rates.
- are written so that targeted skills for the lesson, that is, a new high-frequency word and phonic skill, appear multiple times in the text that the students read providing instant reinforcement in connected text.
- are all factual with photographic illustrations. Factual books were chosen over fiction because:
    * they do not rely on students being able to predict outcomes beyond their world experience
    * they provide for more straightforward language structures for English language learners and struggling readers
    * the photos provide not only support for the text but extension to the students' knowledge
    * captions indicate and reinforce vocabulary
    * factual material underpins most Internet searches
    * factual material is more likely than fiction to lead to exam passes and subsequent career readiness.

School - Home Connection Booklets

The School - Home Connection Booklets are included because they provide:

- revision, consolidation and extension of what has been taught.
- opportunities for parents to work alongside their children in their literacy endeavours.
- a mechanism for parents with few literacy skills to become more competent as they work alongside their children
- another evaluation tool for the teacher to monitor ongoing progress.

Teacher Resources

Teacher resources include a programme overview, daily lesson plans that include daily and weekly ongoing assessments, colour-coded check sheets to record oral reading behaviour, data point sheets to summarize data, various blacklines to copy for teaching and independent student work.

Assessments

A number of assessments were administered to students on five occasions during the course of the two-year study: Time 1 (February/March, 2014); Time 2 (June/July 2014); Time 3 (November/December 2014); Time 4 (February/March 2015; Time 5; November/ December 2015).

Letter Identification. Research indicates that letter name knowledge and letter sound knowledge are important aspects of initial literacy acquisition. Letter name and letter sound knowledge were assessed at Times 1, 2, and 3, for 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.

Invented Spelling. Children's ability to produce preconventional spellings of words was assessed by an invented spelling task (Tunmer, Chapman, & Prochnow, 2003) at the end of Year 1, and at the middle and end of Year 2, that is at Times 1, 2, and 3. The children were asked to write 18 words that were read aloud by the experimenter, first in isolation and then in a sentence. The 26 letters of the alphabet were displayed across the top of the children's response sheet. Each word that children wrote down received a score from one to four. Maximum points were awarded for correct conventional spellings. Three 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). The total number of possible points was 72.

Spelling. Spelling demonstrates the knowledge children have of how words are constructed. Spelling ability provides a window into children's ability to hear sounds in words and into their knowledge of orthographic patterns (Ehri, 2000). The time one, two and three spelling task uses a small number of short words that have high frequency in oral language. For time

four and five, spelling assessments were carried out with a standardised measure of spelling, the Wide Range Achievement Test-4—Spelling (Wilkinson & Roberston, 2006)

Vocabulary. The British Picture Vocabulary Scale (BPVS: Dunn, et al., 2009) was used to asses receptive language abilities at time one and at time five. Receptive language ability refers to understanding the meanings of words, necessary for the production of functional language. Vocabulary was assessed again at time five to examine the possible vocabulary added-value gain of children through increased reading and an emphasis on vocabulary as they most important predictor of literacy development (Hart & Risley, 2003).

Analogical Transfer. An analogical transfer task was devised by Greaney, Tunmer and Chapman (1997) to measure the children's ability to take advantage of orthographic analogies when reading words containing common rime spelling units. This task was administered at Time 3 (end of 2014) and Time 4 (early 2015). The children were simply asked to read 72 monosyllabic words that were presented in 18 rows of four words each. Each of the 18 groups contained a common rime spelling unit (e.g., at in cat, bat, fat). Half the words were presented contiguously (e.g., tail, mail, sail, jail), and half were presented noncontiguously such that no two words containing a common rime spelling unit appeared in any one row (e.g., bank, side, may, meat). The words presented contiguously and noncontiguously were counterbalanced across subjects.

Mispronunciation Task. The mispronunciation correction task comprised 80 regularized pronunciations of exception words that were presented in isolation. Half the words were the first 40 words of the list of 50 irregularly spelled words used by Adams and Huggins (1985). The remaining 40 words were selected from a word frequency count based on materials developed by Elley and Croft (1971). Students were asked to correct the mispronunciation of words. For example, *money* was pronounced as mo/nee. Each child was asked to correct the pronunciation.

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, 2010). The Burt Word Reading Test (Gilmore, Croft, & Reid, 1981) for single word reading was used at Times 2 through to 5. This test can capture word recognition abilities up to the age of 12.

Phoneme Segmentation. At the end of Year 1 and early in Year 2 children's ability to segment spoken words into phonemic elements was assessed using a modified version of a phoneme counting task developed by Tunmer, Herriman, and Nesdale (1988). Scoring was based on the number of items correctly segmented, giving a total possible score of 24.

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 at the end of Year 1, and the beginning and end of Year 2, that is, Times 3 through 5. 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. In support of this decision, at the end of Year 1 the children tended to perform at floor levels when their scores were based on the total number of items pronounced correctly, averaging only 2.7 out of 30 (compared to an average of 39 points out of 101.

Phonological Awareness. On the three Year 1 and the first Year 2 testing occasions, phonological awareness was assessed using onset-rime segmentation (Calfee, 1977) and sound-matching tasks (Bryant, Bradley MacLean, & Crossland, 1989). In the onset-rime segmentation task, the child was asked to delete the initial consonant onset from a presented word and to say aloud the vowel– consonant rime that remained, where "onset" is the initial consonant or consonant cluster of a syllable, and "rime" is the vowel and any following consonants. For example, to the word mice, the correct response was "ice"; to the word rope, the correct answer was "ope". The task comprised four training lists and six transfer lists, with level of difficulty increasing through the lists. Scoring was based on the number of correct responses, giving a maximum possible score of 102.

Reading Book Level. Book level assessments are the most frequently literacy assessments undertaken by New Zealand teachers. Book reading level was assessed at the end of Year 1 and early in Year 2 by the children's teachers and independently at the end of Year 2, that is Time 5. 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. The books used for the independent testing at Time 5 were taken from the PM Benchmark Kit which is often used by schools for reporting book level to the MoE. There are a total of 30 book levels, the characteristics of which are more fully described in Iversen and Tunmer (1993). The students were asked to read the text *unseen* after being told the title. They were then asked to answer the four questions that are prescribed for each book. The students' reading level was assessed on both accuracy and comprehension. To be accredited a proficiency level the student had to read the text with 90% or above accuracy and answer at least 2 of the comprehension questions completely accurately.

Reading Comprehension. The Comprehension Subtest of the Neale Analysis of Reading Ability, Revised (Neale, 1988) provided a measure of reading comprehension ability, and was administered at Time 5 (November/December, 2015). The children were asked to read aloud a series of short passages that were graded in difficulty. After completing each passage the children were presented with a series of questions relating to the passage.

Reading Accuracy. Word recognition accuracy in connected text was assessed at Time 5 by the Accuracy subtest of the Neale Analysis of Reading Ability—Revised (Neale, 1988). The children were asked to read aloud a series of short passages that were graded in difficulty.

Reading Self-Concept. The Reading Self-Concept Scale (RSCS: Chapman & Tunmer, 1993) was used to assess students' self-perceptions of their ability in reading as well as their attitudes towards reading. The RSCS comprises 30 items, all worded in question format (e.g., 'Are you a good reader?'), rather than the usual declarative format (e.g., 'I am a good reader'). This interrogative wording was chosen in order to reduce the linguistic complexity that young children face when they are required to verify declarative statements (Chapman & Tunmer, 1995). Children responded to each item along a five-point scale, which included 'Yes, always'; 'Yes, usually'; 'Undecided or unsure'; 'No, not usually'; 'No, never'. The 'undecided or unsure' response was represented by an indication that the child understood the item but was unable to select a definite response. The mid-point of the scale was selected for the 'unsure' responses in order to prevent the weighting bias that would result if these responses were recorded as missing, or allocated a value of zero. In other words, 'unsure' responses were given a neutral numeric weighting. The RSCS was administered on one occasion, at the end of Year 1.

Reading Self-Efficacy. A measure of reading self-efficacy used in previous research (Prochnow, Tunmer & Chapman, 2013) was administered as part of the end of Year 2 assessments. The Reading Self-Efficacy Scale assessed children's perceptions of agency and control in reading. The items of the scale asked children to indicate whether or not they typically engaged in strategic behaviours to solve problems that occur in reading. For example, the children were asked, "What do you do when you are reading and come to a word you don't know? Do you try to work out what the word is, or do you wait for someone to tell you?" Items were scored so that a one-point credit was given for responses that indicated a feeling of agency and control in solving each situation (maximum = 6). The internal reliability estimate was 0.72, which is acceptable for a scale with relatively few items.

Results

Time 1 Baseline Data

Analyses of Time 1 baseline data from children's assessments carried out during February and March of 2014 were performed for letter name/sound knowledge, receptive

vocabulary, onset/rime, and phonemic awareness. Of considerable importance was the finding that there were no significant differences between the Intervention and Comparison groups in regards to receptive vocabulary. BPVS data were available for 67 children. Based on raw scores for the BPVS, the Intervention group mean was 57.08 (SD = 15.20) and the Comparison mean was 58.69 (SD = 15.13); $t(65)=0.43$, $p=.67$. This finding indicates that the general language knowledge of the two groups was similar at the start of the study.

Because the Intervention group included a larger number of older students who had received more schooling than the younger students, I treated the baseline data by means of a one-way analysis of variance to compare the effects of the Older Intervention, Younger Intervention, and Comparison students.

The results for receptive vocabulary, rime awareness, and onset awareness were not statistically significant. However, it is interesting to note in regards to receptive vocabulary, the older Intervention students had the highest score and the younger Intervention students the lowest. Summary data are presented in Table 1.

Statistically significant results were found for Letter Knowledge ($F(2,96)=11.38$, $p<.001$) and Phonemic Awareness ($F(2,88)=6.33$, $p=.003$). For Letter Knowledge, the older Intervention students had higher scores than both the younger Intervention and the Comparison students, and the young Intervention students had higher scores than the Comparison students. The higher scores for the older students is more than likely a function of having been in school longer. In addition, the higher score for the Intervention students in contrast to the Comparison students is likely due to teachers working with the Quick 60 programme from the start of school in February 2014, which was before the completion of the baseline assessments.

Table 1. Summary Data for Baseline Variables.

	Younger Intervention		Older Intervention		Comparison	
Variables	Mean	SD	Mean	SD	Mean	SD
Letter knowledge	39.23	31.34	63.24	38.02	22.77	24.03
Receptive vocabulary	53.64	13.58	61.81	16.44	57.04	14.93
Onset	3.09	3.61	4.19	3.95	2.96	4.12
Rime	2.75	3.59	3.90	3.90	2.27	3.58
Phonemic awareness	4.02	7.15	13.39	22.58	1.12	5.49

Time 2 Data

Assessments at Time 2 included the Burt Word Test, Letter Knowledge, Onset, Rime, Phonemic Awareness, Analogical Transfer, Spelling and Spelling Phonemes. A series of one-way ANOVAs was run on these data. Statistically significant effects were found for all variables, except Rime and Onset. Summary data are presented in Table 2.

The significant effect for Letter Knowledge (F(2,82)=6.96, p=.002) was due to the Comparison students obtaining lower scores than both the older and younger Intervention students. Although the younger Interventions students obtained a higher mean score than the older Intervention students, this difference was not statistically significant.

Phonemic awareness (F(2,73)=6.02, p = .004) produced a strong result for the younger Intervention students, who obtained a mean that was statistically significantly higher than the older Intervention and the Comparison students. The significant effect for the Analogical Transfer Task (F(2,64)=8.91, p<.001) was due to both Intervention groups obtaining higher scores than the Comparison students. Spelling phonemes (F(2,73)=6.02, p = .004) was statistically significant due to the younger Intervention students obtaining higher scores than the Comparison students. Spelling was also statistically significant (F(2,73)=4.33, p = .017), with both younger and older Intervention students obtaining higher scores than the Comparison students.

For the Burt word test, the significant effect (F(2,81)=11.74, p<.000) was due to the Intervention students obtaining higher scores that the Comparison students.

Table 2. Summary Data for Time 2 Variables.

	Younger Intervention		Older Intervention		Comparison	
Variables	Mean	SD	Mean	SD	Mean	SD
Letter knowledge	92.89	18.22	85.65	30.48	66.67	32.58
Analogical transfer	11.85	10.98	11.41	12.64	1.08	5.31
Onset	8.09	2.78	7.50	3.24	7.37	3.08
Rime	5.57	3.74	5.15	4.04	3.75	3.97
Phonemic awareness	30.04	19.21	22.28	21.40	12.88	15.65
Spelling	2.24	2.33	2.00	3.85	0.40	0.82
Burt word test	10.29	5.96	12.92	9.31	4.21	2.15

Time 3 Data

Assessments at Time 3 (November 2014) included the Burt Word Test, Reading Book Level, Rime, Onset, Mispronunciation Task, Phoneme Segmentation, Pseudoword Pronunciation, Pseudoword Spelling, Spelling, Phonemic Awareness, Analogical Transfer, and Reading Self-Concept. As with the other testing occasion variables, a series of one-way ANOVAs was run to examine Group by Age effects. There were no statistically significant effects for Phoneme Segmentation, Pseudoword Pronunciation, Spelling, Phonemic Awareness, and Reading Self-Concept. However, for Phoneme Segmentation, Pseudoword

Pronunciation and Spelling, there was a tendency for the younger Interventions students to obtain higher scores than the Comparison students. Summary data are presented in Table 3.

Two "process" variables showed statistically significant effects. For Pseudoword Phonemes ($F(2,70)=3.66$, $p = .031$), both Intervention groups scored significantly higher than the Comparison students. The result for Analogical Transfer was also statistically significant, $F(2,65)=6.48$, $p = .003$. In this case, the younger Intervention students performed significantly better than the Comparison students, and marginally ($p=.06$) better than the older Intervention students.

The two reading outcome variables resulted in statistically significant effects. Reading Book Level was highly significant, $F(2,69)=12.63$, $p = <.001$, with the younger Intervention students significantly outperforming both the older Intervention and the Comparison students. The older Intervention students also significantly outperformed the Comparison students. For the Burt Word test, the significant effect was on the margins, $F(2,80)=2.98$, $p = .056$. Both Intervention groups performed significantly better than the Comparison students. It is notable that the younger Intervention students are reading at a level that is on average equivalent to 6-year old students; that is, they are close to the average reading age of students their age.

Table 3. Summary Data for Time 3 Variables.

	Younger Intervention		Older Intervention		Comparison	
Variables	Mean	SD	Mean	SD	Mean	SD
Letter knowledge	99.05	17.36	96.38	21.45	91.09	22.04
Analogical transfer	23.36	13.31	15.27	14.55	9.91	12.29
Onset	8.14	2.88	7.63	3.00	7.95	2.32
Rime	6.38	3.27	6.33	3.21	6.36	3.49
Phoneme segment	10.51	9.22	8.96	8.12	6.45	9.52
Mispronunciation	5.75	5.75[a]	2.40	4.47	3.50	5.54
Pseudo pronunciation	3.71	5.71	3.94	9.24	0.73	1.80
Pseudo phonemes	22.83	29.01	17.13	36.23	3.23	9.27
Phonemic awareness	40.46	16.14	35.25	21.97	36.59	18.83
Burt word test	19.14	9.89	18.75	15.42	12.23	6.54
Reading book level	11.73	4.07	9.19	5.68	6.04	2.88
Spelling	4.11	2.93	4.06	4.64	2.73	2.16
Reading self-concept	3.30	0.46	3.33	1.08	3.30	0.49

[a] It is correct that the mean and standard deviation are the same in this case.

Time 4 Data

Data for Time 4 are particularly important because most of the children in the project for 1 year, and the testing period followed after the Christmas holiday break, which can often lead to a decrease in reading achievement scores. Assessments at this time included the Burt Word Test, Reading Book Level, the Wide Range Achievement Test (WRAT) for Spelling, Pseudoword Pronunciation, Pseudoword Phonemes, Phoneme Segmentation, Phonemic Awareness, a Mispronunciation task, and an Analogical Transfer task. Summary data are presented in Table 4.

The Phoneme Segmentation, Phonemic Awareness and Mispronunciation tasks did not result in statistically significant effects. All other assessments showed statistically significant results.

In regard to the process variables, both pseudoword tasks were statistically significant: pseudoword pronunciation, $F(2,85)=4.37$, $p = .016$, and pseudoword phonemes, $F(2, 85)=6.92$, $p = .002$. For the pronunciation task, both Intervention groups obtained higher scores than the Comparison students. For the phoneme task, both Intervention groups also outperformed the Comparison students. The very large standard deviations for the Intervention groups indicates that the spread of scores on this task is very large, whereas the smaller standard deviation for the Comparison students suggests that their overall low scores are fairly tightly clustered around the mean.

The other process variable that resulted in a statistically significant effect was the analogical transfer task, $F(2, 67)=5.03$, $p=.009$. The effect was due to the younger Intervention students obtaining significantly higher scores than the older Intervention students and the Comparison students.

All three outcome measures were statistically significant. Whereas prior to the Christmas break the Burt word test assessment yielded a marginally significant effect, on this occasion the effect was stronger, $F(2,85)=3.34$, $p = .04$. Both Intervention groups outperformed the Comparison students. It is interesting to note that all scores increased in contrast to the pre-Christmas assessment of the Burt word test. This finding indicates that there was not a decline in word knowledge as a function of the longer summer holiday break.

In terms of Reading Book Level, the finding was highly statistically significant, $F(2, 85)=10.15$, $p <.001$. Both Intervention groups significantly outperformed the Comparison students. All Reading Book Level scores were slightly higher than for the pre-Christmas assessment, suggesting again that there is no apparent “holiday” effect on this measure of reading.

The other outcome measure was for spelling, using the WRAT, $F(2,67)=3.97$, $p =.024$. This effect was due to the younger Intervention students obtaining scores that were significantly higher than the Comparison students.

Table 4. Summary Data for Time 4 Variables.

	Younger Intervention		Older Intervention		Comparison	
Variables	Mean	SD	Mean	SD	Mean	SD
Analogical transfer	25.51	13.42	16.59	14.34	14.50	12.55
Onset	8.97	1.59	8.50	2.73	8.38	2.08
Rime	8.03	2.49	7.15	3.37	6.96	3.22
Phoneme segment	14.42	8.84	11.19	8.40	11.13	10.40
Phonemic awareness	40.46	16.14	35.25	21.97	36.59	18.73
Mispronunciation	12.21	8.01	7.59	7.91	10.50	6.64
Pseudo pronunciation	5.21	7.04	7.62	11.35	1.17	2.14
Pseudo sounds	31.47	31.83	46.88	57.20	7.21	11.84
Reading book level	12.14	5.33	11.88	7.14	6.04	3.65
Burt word test	22.97	10.68	22.04	16.54	15.17	7.74
Spelling	16.69	2.30	15.76	5.06	14.04	3.16

Time 5 Data

The final assessment phase of the project occurred in November and December 2015. Students had been in the *Quick60 Foundation* programme during their first year in school, and the collection of further data at the end of Year 2 was designed to determine whether positive effects related to the programme continued. Data were available for a maximum of 58 Intervention children and 26 Comparison children. As mentioned earlier, low decile schools often have more transient student populations than other schools. In the case of this 2-year study, the attrition rate between the Time 1 and Time 5 data collection points was 23% for the Intervention group and 11% for the Comparison group.

The following assessments were conducted: Burt word test, Reading Book Level, WRAT Spelling, the Neale tests of Accuracy and Comprehension, Spelling, Reading Self-Efficacy, Pseudoword Pronunciation and Phonemes, and a word identification strategy task. Summary data are presented in Table 5 (with the exception of the word identification task).

Assessments that did not result in statistically significant effects included Pseudoword Phonemes, Spelling, Comprehension, Reading Self-Efficacy, and the Word Identification Strategy task (most students on this task responded that they used a word level strategy when attempting to identify an unfamiliar word in text).

The one significant effect for a process variable was for Pseudoword Pronunciation, $F(2,76)=3.67$, $p = .03$. Both Intervention groups outperformed the Comparison students.

For the significant outcome variables, the Burt word test again resulted in a statistically significant effect, $F(2,78)=3.15$, $p = .048$. This effect was due to the younger Intervention students obtaining significantly higher scores than the Comparison students. The difference between the younger Intervention students and the Comparison students is equivalent to a large effect size of 0.79.

Similarly, Reading Book Level also resulted in a higher significant effect, $F(2,78)=9.28$, $p < .001$. Both Intervention groups of students obtained higher book level scores than the Comparison students, and the younger Intervention students obtained marginally ($p=.06$) higher levels than the older Interventions students. The effect size for the difference between the young Intervention students and the Comparison students was approximately 1.5, which is very large.

The Neale measure of reading accuracy also produced a significant effect, $F(2,76)=3.80$, $p=.027$. On this measure, both Intervention groups significantly outperformed the Comparison students. The effect size for the younger Intervention students contrasted with the Comparison students was approximately .84.

Table 5. Summary Data for Time 5 Variables.

	Younger Intervention		Older Intervention		Comparison	
Variables	Mean	SD	Mean	SD	Mean	SD
Receptive vocabulary	83.30	11.33	84.60	14.99	82.48	9.77
Pseudo pronunciation	12.79	8.14	12.87	11.33	6.96	6.23
Pseudo sounds	74.55	25.41	67.26	33.12	58.65	29.52
Reading book level	20.42	4.58	17.28	7.97	13.04	6.43
Burt word test	37.58	11.08	32.96	16.44	28.70	11.71
Reading comp	10.34	5.42	9.35	5.84	6.52	3.65
Reading accuracy	31.48	12.91	29.30	19.10	20.52	13.13
Spelling	20.97	2.63	20.32	4.34	18.96	2.55
Reading self-efficacy	3.81	1.42	3.64	1.08	3.65	1.19

I also examined the Time 5 outcome variables in relation to home circumstances by means of a two-way (Group x Circumstances) ANOVA. There were considerably more children in the Intervention group rated by teachers as having difficult home circumstances (58%) than in the Comparison group (19%). These differences are consistent when considering the differential attrition rate of the two groups, indicating that children in the Intervention group tended to come from more challenging backgrounds than those in the Comparison group.

Statistically significant differences were observed between the "Normal" and "Challenging" background groups for the Burt Word Test and Reading Book Level, but not for the WRAT Spelling tests or the Neale tests of comprehension and accuracy. None of the Group (Intervention vs Comparison) by Circumstances (Normal vs Challenging) interaction effects were statistically significant, though this is likely due in part to the small number (n = 5) of children from challenging backgrounds in the Comparison group. An examination of the means indicates that although children from challenging home backgrounds in the Intervention group tended to lag behind those from more normal backgrounds, the differences are very small (see Table 6). When considered with the significant results for outcome variables in favour of the Intervention students, the home circumstances finding suggests that the *Quick60* programme is likely to have had a positive effect for those from more difficult backgrounds.

Table 6. Summary Data for Students as a Function of Home Circumstances.

	Normal Circumstances		Challenging Circumstances	
Variables	Mean	SD	Mean	SD
Reading book level	18.09	6.15	16.33	7.59
Burt word test	35.64	11.82	31.31	14.65
Reading comp	9.45	5.58	8.27	4.71
Reading accuracy	29.13	15.33	25.76	15.31
Spelling	20.42	2.90	20.05	3.66

Correlational Data

Correlations were computed between the Time 1 variables and the five Time 5 outcome variables (see Table 7). The strongest correlation was for Spelling Phonemes at Time 1 and Neale Reading Accuracy at Time 5 (r = .56). Letter Knowledge was a strong predictor of Reading Book Level (r = .55). The strongest predictor of Neale Reading Comprehension was Phonemic Awareness (r = .48). For Spelling, the strongest predictor was Time 1 Phonemic Awareness (r = .46), and for the Burt Word Test, time 1 Phonemic Awareness was also the strongest predictor (r = .51).

Table 7. Correlations of Time 1 Variables with Time 5 Reading Outcome Variables.

	Time 5 (End of Year 2) Variables				
Time 1 Variables	Burt	Book Level	Comprehension	Accuracy	Spelling
Letter knowledge	.46	.55	.38	.45	.50
Receptive vocab	.21	.18	.34	.26	.15
Onset	.26	.19	.26	.26	.20
Rime	.27	.28	.31	.32	.22
Phonemic awareness	.51	.44	.48	.56	.46

Multiple stepwise regressions were performed to determine which variable or combination of variables at Time 1 best predicted Neale Reading Comprehension and Reading Book Level at Time 5. For Time 1 variables predicting Neale Reading Comprehension, Letter Knowledge was the only variable entered to reach statistical significance: Beta = .35, t = 2.66, p = .01. For the prediction of Reading Book Level, Letter Knowledge was also the only variable to reach statistical significance in the regression equation: Beta = .51, t = 4.40, $p < .001$. These results suggest that Letter Knowledge on school entry is a strong predictor of reading at the end of Year 2.

Teacher Variables

Eight teachers participated in the teacher survey, four in each of the Intervention and Comparison groups. Although these numbers are very low, I proceeded with computation of t-tests. Only one of the teacher variables was statistically significant, namely teachers' knowledge of phonics: Intervention M = 6.00, SD = 1.41; Comparison M = 3.25, SD = 0.50; $t(6) = 3.67$, p = .01. An examination of the means for the other variables indicated a difference of 20.75 in mean scores for the Teaching Literacy Efficacy Scale: Intervention M = 143.75, SD = 27.17; Comparison M = 123.00, SD = 13.37. The differences in variances for these two groups, together with the small sample size, have contributed to the non-significant result. For the other variables, Intervention teachers tended to rate their self-knowledge of reading-related factors slightly more positively than Comparison teachers: Intervention M = 25.25, SD = 3.86; Comparison M = 21.25, SD = 2.06. The other variables (phonemic, phonological and morphological knowledge showed minimal differences between the two groups.

Scores for both groups on each of the teacher knowledge variables tended to be moderate to low. The mean percentages of correct items for the total of eight teachers for each of the knowledge domains were as follows: phonemic = 66.38%; phonics = 51.44%; morphological = 43.75%; phonological = 32.88%. Given the importance of teacher knowledge of underlying language constructs related to literacy learning, higher knowledge

may have resulted in generally better literacy learning outcomes for the children in the study.

School Case Study

In addition to the quantitative data for this study, a case study was done involving one of the Intervention schools. This school is in the Decile 1 ranking, with almost all students of Māori or Pasifika descent. Of the five year olds entering this school, 95% typically function at least two years behind their chronological age, their vocabularies are limited, most have received no preschool education and their attendance in the first two years is generally poor. A senior teacher commented that it typically takes these children up to three years before they benefit from formal school learning.

There were 19 students in the New Entrant/Year 1 class who formed the sample from this school. Of these, 13 were Māori, 5 Pasifika and 1 Pākehā (European). Of the 19, 15 came from backgrounds that the teachers considered to be extremely complex and challenging. Only two parents were employed and the remainder were beneficiaries.

Nine students were older than 5.5 at the beginning of the study. Six of these had very poor attendance since enrolling at school; one had adequate attendance and just two attended regularly. The teacher involved in the research was inexperienced.

The end of 2015 results showed that of the students who remained at the school throughout the two years, all but three had reached the MoE's benchmark of Turquoise (reading level 17-18). Seven exceeded this level. Of those who failed to reach the standard, one was the youngest of 17 and seldom at school. Another had a learning disability and was making progress albeit more slowly than his peers. The third lived in extreme poverty with a severely dysfunctional family and was also often absent.

Discussion

The results of this study suggest that the *Quick60 Foundation* programme is effective with students in low decile schools, particularly those from Māori or Pasifika home backgrounds. By the end of the second year in school, Intervention students significantly outperformed Comparison students on outcome measures of reading, such as Reading Book Level, the Burt word test, and reading accuracy. Although the measure of reading comprehension did not result in a statistically significant outcome, results were in the right direction with younger Intervention students obtaining a mean score that was considerably higher than the mean score for the Comparison students. The reading outcome results were especially strong for those younger Intervention students. By the end of Year 2, they were reading on average at their appropriate age level of 7 years, whereas the Comparison students were close to one year behind in terms of Reading Book Level, and around 6 months behind in terms of word knowledge as assessed by the Burt test. Given the

unfortunate but fairly typical findings that low decile students, including many Māori and Pasifika students, tend to lag behind their Pākehā counterparts from the start of schooling and beyond (Tunmer & Chapman, 2015), these results are very promising.

The results over the various assessment periods show developing competence among the Intervention students in key aspects of phonological and phonemic awareness. These are crucial language elements for reading acquisition that are seldom explicitly taught in New Zealand schools (Tunmer & Chapman, 2015). Rather, the framework for literacy instruction in junior primary school classrooms stresses the importance of using information from many sources in identifying unfamiliar words in text (e.g., Ministry of Education, 2003a; Smith & Elley, 1994, 1997). Thirty years ago the scientific community discredited this approach to the development of word identification skills (Tunmer & Chapman, 2015). As Pressley (2006) noted, teaching children to figure out unknown words by relying on "semantic-contextual and syntactic-contextual cues over grapheme-phonemic cues is equivalent to teaching them to read the way weak readers read (p. 164). The *Quick60* programme emphasises the explicit teaching of these important foundational skills that are necessary for effective literacy acquisition, based on an abundance of local and international research (e.g., Brady, 2011; Hattie, 2009; National Reading Panel, 2000; Snow & Juel, 2005; Tunmer & Arrow, 2013).

The significance of the overall results comes with a note of caution. Students in the Intervention group had higher scores than those in the Comparison group on a number of key variables at the start of the project. These differences were partly (but not totally) due to there being a group of older students in the Intervention group who had already received more schooling during the previous year than the other Intervention and Comparison students in the study. However, there are two factors that address this issue.

Teachers of students in the Intervention group began using the *Quick60* programme at the very start of the school year. In many cases, the programme was underway before the baseline assessments were completed. The *Quick60* programme provides explicit and systematic exposure to the basic language skills required for reading acquisition, together with the rapid development of alphabet letter knowledge, from the outset of schooling. This approach is likely to result in reasonably rapid foundational literacy learning outcomes. As Snow and Juel (2005) concluded from their examination of findings from a wide range of studies of reading development and instructional strategies, explicit attention to alphabetic coding skills in early reading instruction is helpful for all children, and crucial for some. Such approaches are especially likely to be beneficial for students who enter school with limited literate cultural capital, which is frequently the case for students in low decile schools (Tunmer & Chapman, 2015).

The second factor relates to the different age distribution of students in the Intervention group. Adoption of an analysis design that controlled for age showed an interesting and compelling overall result. The younger Intervention students started at the beginning of Year 1 with lower scores than the older Intervention students on the key variables of letter knowledge and phonemic awareness. The correlational data in this study,

and in other studies (e.g., Prochnow et al., 2013) show that both variables are strong predictors of reading outcome measures at the end of Year 2. However, during the course of the project, the younger Intervention students "caught up" to the older Intervention students on most variables. This finding suggests that explicit and systematic teaching of key language-related reading skills from the time of school entry is associated with significant reading development outcomes over at least the first two years of schooling. These outcomes are uncharacteristically superior to those normally achieved by students in low decile schools and those from Māori and Pasifika backgrounds.

There were two somewhat surprising findings. Home circumstances have an impact on schooling. Students from complex and challenging home backgrounds, often involving poverty, poor housing and health, parental unemployment, crime and substance abuse are said to suffer in terms of "normal" learning outcomes (Boston, 2013; Gibb, Fergusson & Horwood, 2012). There was only a relatively small degree of evidence in this study for a negative impact of poor home circumstances on literacy learning. Over half of the Intervention students in this study were rated by their teachers as having complex and challenging home circumstances. Although there were statistically significant effects for word knowledge, reading level, and spelling, the differences in means were relatively small. Further, the means for Intervention students from difficult home backgrounds were higher than the means for Comparison students from "normal" home backgrounds. These differences were not statistically significant, but they suggest that participating in the *Quick60* programme has been beneficial and may have helped to offset the disadvantages associated with challenging family circumstances.

The second surprising result was in regard to the lack of a "summer reading loss" effect at the start of Year 2. There is a considerable body of research indicating that it is common for many children to record lower scores on standardised tests following a summer holiday break, especially for children from more impoverished home backgrounds (Mraz & Risinski, 2007; Turner, 2013). However, in this study there was no evidence of a decline in the performance on any of the tasks administered early in 2015 that had previously been administered towards the end of 2014. This result was for students in both the Intervention and Comparison groups. Further research may be needed to examine whether the finding is unusual, or whether the notion of the "summer learning loss" is indeed enduring and pervasive.

Also of interest are the findings from the teacher survey. There were no significant differences between the Intervention and Comparison teachers in terms of assessments of their knowledge of basic language constructs associated with literacy learning. Acquisition of such knowledge is considered to be a necessary, though not sufficient requirement for defective literacy teaching (Carroll, Gillon & McNeil, 2012; Piasta, Connor, Fishman & Morrison (2009); Spear-Swerling & Zibulsky, 2014). While this is generally the case, especially in the context of the predominant pedagogical constructivist approach in New Zealand, a well-structured programme, such as *Quick60,* appears to compensate for a lack of knowledge by teachers of basic language constructs. This is likely due to the provision of

clear and explicit guidelines for teachers, together with carefully developed, teacher-friendly resource materials.

Finally, a key finding relates to the predictive abilities of school entry variables. Consistent with other studies (e.g., Muter & Diethelm, 2002; Prochnow et al., 2013), letter knowledge and phonemic awareness strongly predict reading outcome measures two years or more later. Teachers could use such information to provide more explicit and systematic code-focused instruction to those students who start school with limited or no knowledge in these two crucial areas (Arrow, Chapman & Greaney, 2015). Similarly, a range of easy-to-administer language-related literacy measures could be used throughout the first two or three years of schooling to assess the development of phonological and phonemic awareness. Inadequate development in these areas is almost invariably associated with poor literacy learning outcomes.

Conclusion

Despite questions of pre-reading skills equivalence between Intervention and Comparison students at the start of this study, there is evidence to strongly suggest that the *Quick60* programme has contributed to important literacy learning outcome benefits for Intervention students, especially the "younger" students who at the start of this project commenced school as New Entrants. The programme materials used by teachers from "Day 1" are consistent with scientific views about the need for explicit and systematic instruction in foundational skills known to be related to and predictive of literacy acquisition. Further, the programme was in place only during the students' first year of schooling. This appears to have set the foundation for gains that were made during the second year of schooling, a finding that is consistent with other studies (e.g., Kimmel & Griffith, 2010; Porche, Pallante, & Snow, 2012; Stahl, Keane, & Simic, 2013; Tunmer, Chapman, Ryan & Prochnow, 1998).

These results are impressive in the context of low decile schools with large numbers of Māori and Pasifika students. Such students often start school with limited amounts of literate cultural capital (Tunmer & Chapman, 2015). The predominant "one-size-fits-all" approach embodied in the constructivist pedagogy adopted in many schools across New Zealand, and supported by literacy instructional materials provided to teachers by the Ministry of Education (2003), is counterproductive for many students who do not have the literacy-related language skills on school entry (Tunmer & Prochnow, 2009; Tunmer et al., 2013). Programmes, such as *Quick60*, that are based on scientific evidence and that emphasise the importance of developing appropriate language and code skills for reading acquisition, provide an alternative to the *status quo*.

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