

Teaching High Frequency Words (HFWs) To Early Learners

Nikita Amy Ericksen

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Abstract

Achievement in literacy is crucial to success in schooling. An ability to read is an essential skill for many jobs and fundamental to lifelong learning. International studies continue to show a large degree of disparity between high and low achieving readers in New Zealand. Given the significance of literacy, there needs to be a closing of the gap in literacy achievement.

Fluency is generally recognised as a vital component of reading. Disfluency leads to little attention being placed on the processing and comprehension of a text as focus will primarily be on decoding individual words. A key element of fluency is automaticity, the ability to quickly recognise words in isolation. Being able to read words instantly is important to skilled reading. High frequency words (HFWs) repeatedly appear in books and other written or printed works. The frequency of these words means it is beneficial for early learners to be able to instantly identify them.

This study examines the effectiveness of a HFW flashcard intervention on HFW acquisition for struggling early readers. Additionally, the impact increased HFW knowledge has on reading progression, fluency, and comprehension is investigated. This study was conducted using a small-scale pilot design with quantitative and qualitative elements. A quasi-experimental design was used to see if the HFW intervention was effective. Qualitative features examined the impact of the intervention on literacy growth and exploration of participants' experiences.

Study participants included selected students and their teachers from an Auckland primary school. The researcher and teachers collaborated to select students following initial profiling. The intervention was implemented for ten minutes a day over four weeks. Group One participated first whilst Group Two acted as a comparison group, Group Two subsequently took part in the intervention. Teachers implemented the sessions, and the intervention combined the 'look/say' method with constant time delay procedures.

Results show the intervention was effective at increasing acquisition rates of HFWs to varying degrees. Progression in reading, fluency and, to some extent, comprehension was evident. Findings support early identification of struggling learners being critical due to the *Matthew effect*. This study highlighted that struggling early learners have diverse needs and it is essential teachers understand these needs and have instructional knowledge to meet those needs.

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1. Introduction

The purpose of this study was to investigate the effectiveness of a high frequency word (HFW) flashcard intervention on HFW acquisition for struggling early readers. A further aim of this study was to explore the impact this HFW intervention had on reading progress, fluency, and comprehension. The hypothesis being that increased HFW knowledge in struggling early learners would accelerate progress in reading.

Research Questions –

1. What are the effects of a HFW flashcard intervention on HFW knowledge and rate of word acquisition of struggling early readers?
2. What relationships are there, if any, between changes in HFW knowledge and reading progress, fluency, and comprehension?

HFWs are words that appear repeatedly in written material, such as ‘and’, ‘the’ and ‘it’. Fry and Kress (2012) assert that around half of all text we read is comprised of the 100 most common words. HFWs often hold little meaning by themselves but they do provide a considerable amount of meaning to a sentence. Broz et al. (2016) note that HFWs play an essential role in “holding together the general coherence of texts” (p. 39). HFWs like ‘the’ can be difficult to learn as they have no point of reference, unlike the word ‘cat’ that can easily be associated with an object or picture. As all written text contains a large proportion of HFWs, the prevalence of these words means it is advantageous for beginning readers to be able to instantly read them (Strauber et al., 2020). Sound HFW knowledge can support readers in developing fluency and accuracy in reading at an early age (Broz et al., 2016).

A child’s ability to successfully comprehend text is reliant on foundational word-reading and bridging skills (Duke et al., 2021). Duke et al. (2021) argue that the ability to read the majority of, or all the words in a text is necessary for comprehension. For the comprehension of text to occur, word reading, or decoding, is “a necessary, although not sufficient, condition” (Duke et al., 2021, p. 664). The development of foundational word-reading skills, such as phonological awareness, phonics, print awareness, and word recognition, is essential to improving reading comprehension. Children’s development in literacy is dependent on a progression from word reading (decoding) to fluency to comprehension. Fluency, that is reading with accuracy, automaticity, and prosody (expression) has been referred to as the ‘bridge between decoding and reading comprehension’ (Pikulski & Chard, 2003; Duke et al., 2021). Reading with accuracy helps readers develop an accurate foundational knowledge of the text and therefore supports comprehension. Whilst Duke et al. (2021) notes that automaticity allows the reader to focus cognitive attention to comprehension, reading with prosody equally reflects and assists comprehension.

It is generally understood that fluency is a critical component of reading (Torgesen, 2002; Pikulski & Chard, 2003). Disfluency in reading leads to little attention being focused on processing and comprehending the text as the primary focus will be on decoding individual words (Torgesen, 2002; Pikulski & Chard, 2003; Fasko & Fasko, 2010; Watts & Gardner, 2013). A key element of fluency previously noted is *automaticity*, that is, the ability to quickly recognise words in isolation (Torgesen, 2002). Ehri (2005) states that being

able to read words instantly is vital to skilled reading. Automaticity allows children to quickly process words in text without attention being directed to the individual word. Simply put, automaticity is the ability to execute a task quickly and without effort by means of repeated practice (Samuels & Flor, 1997). Pikilski and Chard (2003) argue that automaticity is crucial for high levels of reading achievement.

Fasko & Fasko (2010) notes that a number of reading interventions focused on fluency use flashcard drills to develop automaticity. The underlying premise is that a flashcard drill method will increase automaticity and may also impact oral reading fluency. A frequently used drill method is the 'look, say' method (Sullivan et al., 2013, Watts & Gardner, 2013, Griffin & Murtagh, 2015). Joseph and Schisler (2007) assert that through the method of drilling, word recognition skills can improve at a rapid pace.

The findings of this study will add to the body of research that examines the value of HFW instruction. Specifically, it will contribute to the advancement of knowledge regarding the effectiveness of the flashcard drill method 'look, say' combined with constant time delay procedures on struggling learners. It will provide evidence regarding both the increase in HFW knowledge associated with the intervention as well as what impact this has on progression in reading, fluency, and comprehension. Of particular interest in this study is context, that is, New Zealand (NZ) early learners who are struggling with reading. Though there have been numerous studies examining different instructional strategies used to promote HFW knowledge there do not appear to be any published studies carried out in the NZ context. This study is aimed at beginning to understand whether the flashcard drill method of 'look, say' combined with constant time delay procedures is effective with NZ learners for significantly improving HFW knowledge and impacting on other areas of reading progress.

Research shows that children who struggle with reading skills in the early years face increasing barriers to literacy progression each year (Bos et al., 1999, Sullivan et al., 2013). This can be likened to Stanovich's (1986) 'Matthew effect' notion in which the rich get richer, and the poor get poorer. Early learners who struggle in reading find it difficult to catch up to their peers, therefore early identification and intervention is needed to ensure these children do not continue to fall behind. The critical importance of the first years at school makes this a crucial area for in-depth research.

Another contribution that this study will make to current research is its relevance to classroom practice. Among OECD countries NZ has one of the biggest gaps in reading achievement between higher and lower achieving learners (Chamberlain, 2013, Tunmer & Chapman, 2015). It is vital that the education system works to support struggling readers in catching up with their peers and to meet increasing curriculum expectations. Research has shown that fluency is a common area of difficulty for struggling readers (Torgesen, 2002, Pikulski & Chard, 2003, Valencia & Buly, 2004). HFW instruction is already commonplace in many NZ classrooms, and previous NZ National Standards for Literacy Achievement required children to be able to recognise many (100 – 200) HFWs after their first year at school (Ministry of Education, 2009). It is therefore important to understand what methods are effective and their impact on reading.

This study used a small-scale pilot design with both quantitative and qualitative elements. To determine if the HFW intervention was effective, a quasi-experimental design was utilised. Qualitative features allowed for the impact the intervention had on literacy growth to be examined, along with the exploration of participants' experiences. Chapter Three explains the design in detail. The setting of this study was a Decile 7 state-integrated Catholic primary school, in Auckland. Chapter Three also provides detailed information about the research setting and the HFW intervention that was implemented. It sets out the procedures for collecting and analysing data.

Chapter Four presents the results from the intervention; the quantitative results and statistical analysis determine how effective the HFW intervention was at improving HFW knowledge. The impact of increased HFW knowledge on reading progression, reading fluency and comprehension is also examined in Chapter Four. Qualitative data including thematic analysis of teacher interviews, student observations and student interviews are included in this chapter along with summarised individual case study findings.

Chapter Five discusses the findings that emerged from the study, along with the implications of these findings for teaching and learning. Lastly, Chapter Five examines the limitations of this study as well as recommendations for further research.

2. Literature Review

There is ongoing debate amongst teachers and academics about the “best” strategy for teaching reading to children. This debate is generally characterised as whole language vs phonics (Stanovich & Stanovich, 1995; Watts & Gardner, 2013; Wong, 2021). Irrespective of preferences regarding instructional strategies, the shared goal is to ensure that the teaching provided supports children in acquiring the skills needed to be able to make meaning from text (Torgesen, 2002). As Wong (2021) notes, advocates from both sides tend to argue for the benefit of one approach, and the perils of the other. Despite the conflicting discourse about how decoding and other foundational knowledge and skills should best be developed it is still generally agreed that developing these skills is vital. This study positions itself in neither camp, reading is a complex process that requires the development of many different skills. Being fluent in HFWs is just one strategy that can assist children in moving towards fluency in reading and supporting the comprehension of text. Provided that HFW flashcards are used in a targeted way for students with an identified need, they can be powerful.

This literature review is presented in four parts and begins by examining literature from NZ and internationally which seek to identify the critical elements that facilitate or hinder achievement for struggling early readers. Part Two will provide a brief overview of Ehri’s four phases of reading development. Part Three of this review will then address theories of fluency in reading, with a discussion of the role of automaticity of HFWs in reading fluency presented. The chapter concludes with a review of empirical HFW flashcard interventions in Part Four.

Struggling early readers

Importance of Literacy

There is a worldwide understanding that becoming literate is a fundamental goal of education. Being able to read is central to success in nearly every area of the school curriculum and, beyond that, is a necessary skill for almost all jobs, as well as being the major key to lifelong learning (Tunmer & Chapman, 2015). The global world in which we live is complex, Tunmer and Chapman (2015) argue that strong literacy skills are becoming ever more important due to the economic, political, and social challenges the world is encountering. Adams (1990) notes that children who are skilled readers are more likely to be successful in an educational setting and become productive members of society. Research clearly shows that success in literacy has an outward ripple effect on education and life outcomes, therefore it is unsurprising that achievement in literacy is a focus of education systems around the world.

Factors that attribute to low levels of literacy achievement

Literate Cultural Capital.

Research indicates that children begin school with extensive individual differences in their ‘literate cultural capital’ (Tunmer & Chapman, 2015). Tunmer and Nicholson (2011) define ‘literate cultural capital’ as a

generic term pertaining to the literacy-based knowledge and skills children have when starting school. Literate cultural capital refers to knowledge, experiences and skills needed for acquiring literacy. Generally, the higher a child's level of literate cultural capital when starting school, the more they benefit from literacy teaching. These children begin to read earlier and see higher levels of achievement than children who have less literate cultural capital (Tunmer & Chapman, 2015). When education systems fail to effectively respond to differences in literate cultural capital when children begin school this contributes to the notion of Matthew effect in reading.

Matthew effect in reading.

Research shows that children who struggle with reading skills in their early years experience more barriers to reading progression each year (Bos et al., 1999, Sullivan et al., 2013). This can be likened to Stanovich's (1986) 'Matthew effect' notion in which the rich get richer, and the poor get poorer. What may begin as comparatively minor differences in fundamental reading skills during the start of schooling can quickly evolve into a downward spiral of deficits in success and achievement that lead to negative self-efficacy and behavioural side effects (Stanovich, 1986). Stanovich's (1986) framework of the Matthew effect in reading is not only about the continual decline in achievement of struggling early readers but also concerns the widening gap between poor readers and good readers. Bos et al. (1999) explain that the difficulties amplify as students move through each year. It is argued that difficulties identifying words quickly and easily means students with difficulties in reading are unable to employ reading to learn new information and broaden their knowledge. Adams (1990) argues that critically, issues in reading threaten a child's whole education as reading difficulties are inclined to follow children throughout their schooling and beyond.

Waiting to fail.

Early learners who struggle in reading find it difficult to catch up to their peers, therefore early identification and intervention is needed to ensure these children do not continue to fall behind. McLachlan and Arrow (2015) argue that children who are identified at six years of age as needing extra support could have been identified at five years of age on school entry just as easily. The benefit of this being that they could have had a year of early intervention to support them with their reading difficulties. A 'wait to fail' approach links with what research has noted about the pitfalls of not effectively addressing literacy struggles early in a child's schooling. Lonigan and Phillips (2012) argue that a more effective strategy for improving achievement trajectories is to intervene at an earlier stage. This is consistent with Wagner's (2008) recommendations that an initial assessment should be conducted on new entrant children looking at emergent literacy skills that are considered important in early literacy development. A Literacy experts group in New Zealand noted that within the first year of school significant differences in achievement and learning can be seen and, therefore, support beyond what the teacher may be able to provide should be available when required during the first year of schooling. That is, a flexible approach should be taken to provide additional instruction without any restrictions placed on waiting to the end of a child's first year (Ministry of Education, 1999).

Constrained Skills Theory.

Tunmer et al. (2013) defines constrained skills as skills such as “phonological awareness, alphabetic coding and reading fluency (i.e., automaticity in word recognition)” (p. vi). These skills are mastered completely and in a short period of time by skilled readers. Unconstrained skills, in contrast, develop slower and are never fully mastered as they carry on developing over a lifetime. Unconstrained skills encompass vocabulary and comprehension skills. Tunmer et al. (2013) and Tunmer and Chapman (2015) identify a misunderstanding regarding Constrained Skills Theory (CST) as an aspect that contributes to the Matthew effect in reading. Tunmer and Chapman (2015) argue that some have used CST to contend that constrained skills are unimportant and should not be the focus of early literacy instruction. Tunmer et al. (2013) argues that more careful consideration of Paris (2005) CST notions is needed. Paris (2005) states that constrained skills must be mastered, and early readers need to be instructed on those skills “*early and persistently*” (p. 199). Furthermore, Paris (2005) said “constrained skills need to be mastered because they are necessary but not sufficient for other reading skills. They enable automatic decoding, deployment of attention, and application of comprehension strategies so they set the stage for reading development” (p.200). These remarks by Paris (2005) highlight that a greater focus on constrained skills through assessment and teaching is needed during the first year of schooling.

Continuing difficulties in critical constrained skills during early literacy development can be, according to Stanovich (1986), developmentally limiting. A negative Matthew effect denotes those children who lack adequate levels of constrained skills, and explicit instruction is not provided to develop these skills, are unlikely to wait for these skills to develop but rather will depend progressively more on ineffective strategies to identify unknown words in text. The persistent use of these ineffective strategies inevitably results in difficulties in literacy learning. These ineffective strategies may be used for such a long period and to such an extent that they become ingrained. Even though children may acquire the constrained skills necessary for developing more effective strategies in word identification over time, the already ingrained ineffective strategies are very difficult to unlearn (Tunmer and Chapman, 2015).

New Zealand Context.

The focus of this study is on struggling early learners in NZ, as NZ has a high level of disparity between high and low achieving readers (Chamberlain, 2013, Tunmer & Chapman, 2015). Greaney and Arrow (2012) state that data consistently shows NZ's top performing students achieve as well as other students from participating countries, however, NZ's levels of underachievement persistently result in a long tail. Given the significance of literacy, there needs to be a closing of the gap in literacy achievement between low and high performing readers. Worldwide leaders are focusing on lifting achievement in literacy for children most in need. Despite considerable investment being made by some of the world's wealthiest countries, children from minority groups, those raised in low-socioeconomic communities, and children with disabilities continue to lag well behind expected levels of achievement for reading throughout their schooling, this is also the case for NZ (Tunmer & Chapman, 2015).

Progress in International Reading Literacy Study (PIRLS).

The PIRLS is focused on the achievement and literacy learning experiences of children in over 35 countries worldwide in grades comparable to Year five in NZ. Assessments are carried out every five years with the first cycle being administered in 2001. The fifth cycle of assessments was due to take place in 2020/2021 however COVID disruptions have impacted this and caused delays. Successive PIRLS data has continued to highlight NZ's "long tail" of low achievers, with little to no improvement over the 15 years' worth of data currently available from the PIRLS. In fact, the last set of data available from the 2015/2016 PIRLS not only shows no improvement but also showed a small but statistically significant, 8-point decrease in the mean score from PIRLS 2011 (Ministry of Education, 2017). Tunmer and Chapman (2015) note that more than a decade of resources and policies focused on closing the gap and decreasing the large disparity between good and poor readers has failed, with almost no changes seen in educational outcomes. Results of PIRLS studies (Mullis et al., 2003, 2007, 2012) indicate that one in five children struggle with learning to read in NZ (as noted in Tunmer et al., 2013).

Critical elements of instruction for struggling readers.

Bos et al. (1999) state that many of the children struggling with reading and at risk of low achievement can be taught to read if *appropriate instruction* is given, a *range of effective instructional techniques* are utilised, and the *intensity and duration* of the instruction are determined by the child's needs. Similarly, Griffin & Murtagh (2015) also note that to close the gap between low and high achievers in reading it is vital that those most at risk of literacy failure get the appropriate type, as well as amount, of instruction focusing on reading acquisition and fluency. Torgesen (2002) also emphasises the importance of classroom instruction being delivered skilfully with word-level and reading comprehension skills being taught in balance. Torgesen (2002) also places emphasises the need for reading instruction to be more intensive, explicit, and supportive than normal classroom instruction.

Early identification.

As discussed previously, leaving the identification of struggling readers and subsequent intervention until later has a major impact on literacy achievement. Griffin and Murtagh (2015) highlight that it is critical for young children who are at risk to receive the necessary support. This is supported by Torgesen (2002) who notes that there must be procedures in place to identify children who are struggling in early reading and not progressing as expected. Greaney and Arrow (2012) argue that the longer it takes to identify students with reading difficulties and to redress these issues the costlier and more difficult it becomes. Therefore, Greaney and Arrow (2012) contend that it is essential that early identification procedures are in place, along with appropriate and effective intervention strategies. These need to be available soon after children begin school to prevent literacy learning difficulties.

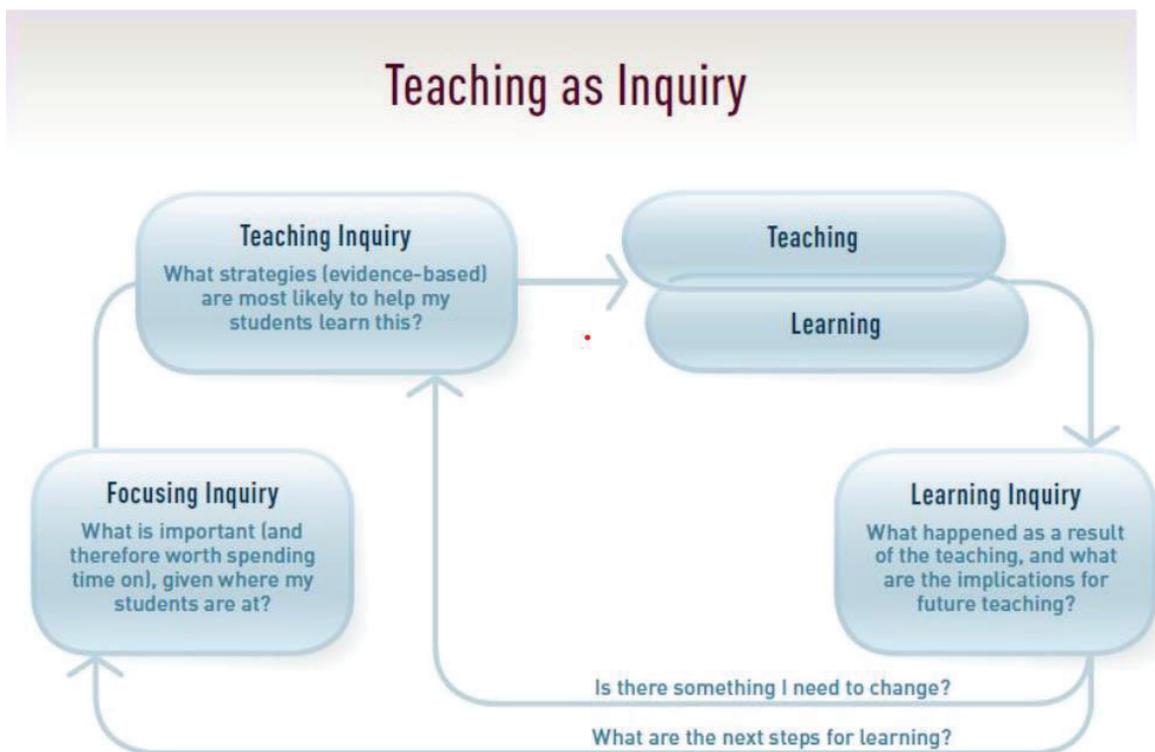
Teaching as inquiry.

There is a need for a variety of appropriate, effective instructional strategies along with a focus on appropriate intensity and duration. Bos et al. (1999) state this is challenging for teachers as they are

confronted with having to balance their teaching instruction to ensure that it supports comprehension whilst at the same time is intensive and systematic as research denotes is essential for students with difficulties in reading. Arrow et al. (2015) argue that effective differentiated instruction necessitates an adequate level of teacher knowledge to interpret assessment data and make pertinent instructional decisions. Lai and McNaughton (2009) contend that to raise children’s achievement the focus must not only be on what children need to know but also on what teachers need to learn to be able to support these struggling learners. This is described as an iterative process involving the development, testing, and refining of hypotheses regarding the instructional practices that are best suited to addressing specific student needs. Teachers know their children best, and it is important that they are supported in profiling their struggling readers and then utilising techniques most effective for a specific child, this may require learning and inquiry from the teacher. Buly and Valencia (2002) caution against relying on assumptions about the needs of children and beliefs around what instruction should look like. It is essential that any intervention is based on profiles that are specific to the target children in order to not miss the needs of these children.

The New Zealand Curriculum (Ministry of Education, 2007) states that as teaching strategies work differently depending on the context and the students, effective pedagogy necessitates that teachers inquire into the effectiveness of their teaching on their students. Teaching as inquiry is seen as a cyclical process, as illustrated in *Figure 1*.

Figure 1: The New Zealand Curriculum – Teaching as Inquiry



Ehri's phases of reading development and fluency

Whilst there are many theories posited regarding reading development, the theory that will be focused on in this discussion is Ehri's Four Phases of Reading Development. Ehri (1995, 2005) developed a theory of how readers progress from being non-readers to being able to recognise words fluently. The first phase is the *Pre-Alphabetic Phase*, here the reader does not hold an understanding of the alphabetic principle, that is the relationships between written letters and spoken sounds. Visual clues in the written word are used to identify the word. An example given by Pikulski and Chard (2003) is where a child may remember the word *monkey* as the *y* can be associated with the shape of a monkey's tail. This is not an effective method and leads to confusion with other words that end with *y*, such as *my*. In the *Partial Alphabetic Phase*, the readers now recognise the relationship between letters and sounds. They tend, however, to focus on the easier parts of the word and therefore rely on initial letter sounds to begin and later endings as clues to what the word is. This again can cause confusion, for instance, if they are taught the word *go* through the letter sequence *g – o*, they may focus on the initial letter *g*. When reading they may then read words such as *get*, *got*, *give*, incorrectly as the word *go* (Pikulski & Chard, 2003). The next phase of development is the *Fully Alphabetic Phase*, children move into this phase when they recognise that sounds correspond to letters. Children can blend sounds to read words. Over time these words are memorised and read as a unit rather than individual letters. The last phase is the *Consolidated Alphabetic Phase of Development*. At this phase, Ehri (1995, 2005) argues that alongside storing words as units, readers are able to store letter patterns across different words through repeated encounters.

Fluency

Fluency is widely recognised as being an essential component of reading (Torgesen, 2002, Pikulski & Chard, 2003). Griffin and Murtagh (2015) highlight fluency as a crucial component in the reading process. Duke et al. (2021) define reading fluency as "reading with accuracy, automaticity, and prosody" (p. 665). Whereas Wexler et al. (2007) define fluency as the "ability to read text with speed and accuracy" (p. 318). The definition from Wexler et al. (2007) does not place an emphasis on prosody as an important factor in reading fluency. Hudson et al. (2009) highlight that variability in the definition of fluency illustrates how complex reading fluency is, it is a multifaceted construct. Morris and Perney (2018) also draw attention to how researchers disagree on the best definition of reading fluency. The debate stems from what should be included in this definition; accuracy, rate, prosody, comprehension, or a combination of these components.

What is generally agreed on however is that a lack of fluency in reading results in little attention being focused on the processing and comprehension of a text as the readers focus will primarily be on decoding individual words (Torgesen, 2002, Pikulski & Chard, 2003, Fasko & Fasko, 2010, Watts & Gardner, 2013). Samuels (2002) and Ehri (2014) argue that for thorough comprehension to occur the reader needs to be able to read the words by sight, that is quickly and easily. Griffin and Murtagh (2015) note that research has shown that for many struggling readers, fluency is not a skill that is gained automatically. Rather for those children, intensive practice focused on fluency is needed to make certain of its development.

Several researchers have conceptualised fluency as a bridge between word recognition and comprehension (Pikulski & Chard, 2005; Rasinski, 2004; Sullivan et al., 2013). Rasinski (2004) suggests that it is helpful to view reading fluency as a bridge between two vital elements of reading, word decoding and comprehension. Rasinski (2004) views one end of the bridge as accuracy and automaticity in decoding and at the other end comprehension through prosody, with fluency connecting the two. Duke et al. (2021) also describes reading fluency as a bridge between decoding and comprehension. Sullivan et al. (2013) argue that fluency must not be overlooked given the role it serves as the bridge between word reading and comprehension. This notion argues that accurate reading of words aides comprehension as it supports readers in building a reliable foundational understanding of the text. Whilst reading words with automaticity allows readers to concentrate more attention on comprehension rather than decoding. Lastly reading with prosody, that is with expression and phrasing, both demonstrates and supports comprehension. Theory suggests that improving speed and accuracy so there is a high level of automaticity will lay a foundation for prosody and comprehension.

Automaticity.

A key element of fluency is *automaticity*, that is, the ability to quickly recognise words in isolation (Torgesen, 2002, Fasko & Fasko, 2010). LaBerge & Samuels (1974) theory of automaticity in reading offers a theoretical rationale for the importance of reading fluency. This theory posits that readers have a finite amount of attention they can give to cognitive tasks like reading. Readers need to execute at least two vital tasks, decoding words and comprehending the text. LaBerge & Samuels (1974) argue that given any reader has a limited amount of attentional resources available, attention that is directed to decoding words cannot be used for comprehending the text. Therefore, those readers who need to direct considerable effort to decoding, even if they can do this successfully, may impair their ability to comprehend as they are unable to focus sufficient attention to making sense of the text. For that reason, the one goal of fluency is to develop decoding skills to where it becomes an automatic process that needs minimal attention. Being able to read words accurately and automatically is an early literacy skill that is important in reading development as it allows children to focus on finding meaning in text (Samuels & Flor, 1997). Ehri (2005) notes that being able to read words instantly is vital to skilled reading. Ehri (2005) argues that being able to automatically read words from memory is the “most efficient, unobtrusive way to read words in text” (p.170). That is, recognizing words through instant recognition is best as it requires little attention and thereby contributes to fluency. Consequently, developing a sight word vocabulary is critical for reading achievement. Pikilski and Chard (2003) also argue that automaticity is needed for high levels of reading achievement. Automaticity allows children to quickly process words in text without attention being directed to the individual word. Simply put, automaticity is the ability to execute a task quickly and without effort by means of repeated practice (Samuels & Flor, 1997). In reading, Carnine et al. (2006) notes that automaticity enables the reader to group words in phrases or “chunks”, therefore accelerating the process and aiding comprehension. Torgesen (2002) notes that research has shown that a struggling early reader will typically show difficulties in two areas. Firstly, placing too much dependence on guessing an unknown word which leads to high levels of errors. Secondly, most children who are struggling to read will contend with many more words in the text that they cannot read automatically than average readers. When

compared to children of the same age who are achieving at expected levels, the children with reading difficulties can recognise far fewer words automatically.

HFWs.

Sullivan et al. (2013) argue that an essential component of reading instruction is teaching HFWs and irregular words, that is, words that cannot be decoded. The argument being that learning to read these words will support reading words fluently in connected text, which in turn will facilitate fluency. It is noted by Johns et al., (1977) that 50 – 60% of words children come across in their reading are HFWs (as cited in Broz et al., 2016). These words play a critical role in “holding together the general coherence of texts” (Broz et al., 2016, p. 39). Strauber et al. (2020) also highlights that all written material comprises of a high percentage of HFWs. Fry and Kress (2012) state that approximately half of all text we read is made up of the 100 most common words. HFWs are those words that occur frequently in written text, these words often hold little meaning by themselves, but they do provide a large amount of meaning to a sentence. Sound HFW knowledge in early readers assists in developing fluency and accuracy in reading. HFW lists are typically collated by statistically analysing the most frequently occurring words in text (Watts & Gardner, 2013). A diverse range of fictional and non-fictional texts, including stories, articles, and newspapers, are generally included to form a list of most frequently occurring words (Dolch, 1936; Fry, 1980). Specifically, Fry (2000) *1000 Instant Words List* consists of 65% of words in any written text in the first 300 words on the list. Fry (1980) describes the frequency curve as long and steep in word usage. Fry (1980) argues that 24% of all written text is made up of the first 10 words on his list, his argument being that to find a written sentence that did not contain at least one of the first ten words from the *1000 Instant Words List* is almost entirely impossible. Fry (1980) further states that the first 100 words account for 50% and the first 300 words account for 65% of all written words. Given all written text consists of a large percentage of HFWs, the prevalence of these words means it is beneficial for beginning readers to be able to automatically read them (Strauber et al., 2020). It is beneficial for beginning readers to be familiar with HFWs as it can assist in developing pace and accuracy in reading at an early age (Broz et al., 2016).

It is common practice to teach children to automatically identify HFWs by sight. Ehri (2005) states that identifying words by sight is how readers who are experienced process written words that they are familiar with. It is argued that the explicit teaching of HFWs to children can help bolster the process of reading. Strauber et al. (2020) contend that memorisation of HFWs is particularly valuable for words that are not easily decodable such as “one” or “are”. When children have HFWs that they can identify automatically reading fluency develops as the learner does not have to decode every word (Ehri, 2014). Fry & Kress, 2012 note that given the benefit of teaching high-frequency words to early learners, teachers are encouraged to promote mastery of these words to early readers.

Empirical HFW flashcard interventions

There are three main instructional approaches for teaching HFWs; in isolation, in context, or using mixed methods. The focus of this study is on HFW flashcard interventions, therefore only empirical studies focused on words taught in isolation, have been included. Torgesen (2002) argues that children who are

struggling in reading will progress at a more rapid pace when provided with opportunities of greater instructional intensity than occurs in normal classroom practice. For the participants, there is some, in context, HFW discussion that is occurring in their normal literacy lessons. Teaching words in isolation was selected as a very specific gap in knowledge was identified and this approach allowed for a deliberate focus on these gaps with an intervention that had minimal costs, both in terms of resources and time. Many of the studies that focus on HFW recognition are founded in similar theoretical frameworks and have a comparable rationale. The complexity of reading is a commonly noted theme in these studies, along with many researchers acknowledging the contention and debate regarding the best ways of developing reading skills in early readers. Another recurrent theme related to this is the ways in which National strategies and politics place emphasis on different aspects of reading at different times and the effect this has on the teaching of reading.

Joseph and Schisler (2007) state that there is an emphasis on implementing instructional methods and strategies that, as well as being effective, are efficient in supporting children in achieving desired academic outcomes. Instructional effectiveness is defined by Joseph and Schisler (2007) as “students achieving desired performance as a function of the instruction” (p. 70). Instructional efficiency represents the amount learnt in a specified instructional time period and can be defined as “the rate at which students are achieving desired performance as a function of the instruction” (Joseph & Schisler, 2007, p. 70). Time constraints are a common concern for educators along with an ever-present pressure to progress children to the expected levels within a given period. Joseph and Schisler (2007) argue that these factors are frequently considered when selecting instructional methods.

When focusing on teaching words in isolation, most studies look at some form of ‘drill’ method. Automaticity and the role this plays in fluency and reading achievement is frequently of interest in studies focused on “drill” methods. Fasko & Fasko (2010) note that a number of reading interventions focusing on fluency look at flashcard drills to develop automaticity. The underlying premise being that a flashcard drill method will increase automaticity and may also impact oral reading fluency. Joseph and Schisler (2007) argue that word recognition skills increase at a rapid pace through the method of ‘drilling’. Volpe et al. (2011) note that flashcard drill methods are designed to increase the opportunity to practice instructional targets, such as HFWs. A common instructional drill strategy is the ‘look, say’ method (Sullivan et al., 2013, Watts & Gardner, 2013, Griffin & Murtagh, 2015), sometimes referred to as traditional drill method. This method is a flashcard technique whereby students are presented with unknown words. In the initial trial a word is shown to the child, the teacher models reading the word, and the child reads the word aloud. Subsequent trials see the child attempt to read the word independently with the teacher providing feedback on words read incorrectly. Typically, this procedure continues until all unknown words targeted in that session are mastered (Volpe et al., 2011).

A study carried out in Britain by Watts and Gardner (2013) compared synthetic phonics, that is the blending of letter sounds to decode words, with the teaching of HFWs using the ‘look, say’ method. Until the point of the experiment synthetic phonics had been the exclusive method of teaching reading. Over five weeks

HFWs were intensively taught to eight year one students using the 'look and say' method for five minutes daily. Watts and Gardner (2013) found the 'look and say' approach improved word recognition for most pupils. The three-week period between data collection two and three showed significant improvement for three of the eight year one children. All eight participants showed improvements but the biggest impact of the HFW intervention was on the children who were considered less able readers. Watts and Gardner (2013) view phonics as the 'first wave approach' and see other methods as useful if phonics fails, such as a whole language approach.

A comparison study of two flashcard drill methods; traditional drill and incremental rehearsal was conducted by Volpe et al. (2011). As previously noted, traditional drill methods focus on unknown words, in comparison, incremental rehearsal intersperses unknown words with known words incrementally. It was noted by the researchers that traditional drill and practice and incremental rehearsal have previously been shown in studies to be effective in improving word recognition. Volpe et al. (2011) sought to compare the effectiveness of the two methods with four first-grade participants identified as having reading difficulties. Differences in the effectiveness between the two were found to be minimal. Volpe et al. (2011) argue that these findings suggest that it may be challenging to find a drill method that will consistently provide better outcomes across all children.

Reading racetracks were the subject of a sight word study by Rinaldi et al. (1997). In this study the focus was on the effectiveness of the racetrack "drill" method on word acquisition for 15 third and fourth grade children with learning difficulties. Reading racetracks have a game-like design in which a student reads aloud from a 'racetrack' word list that is comprised of HFWs for a set period of time, in this instance one minute. Their reading performance is recorded with the number of words read counted along with the number of errors. Each racetrack is repeated until a pre-set benchmark is reached. For this study there were two different racetracks, each with 28 words. The first type of racetrack included seven target words that were repeated randomly. Every fifth racetrack was a review racetrack that comprised 28 words introduced in previous racetracks. At the completion of a racetrack words that were missed or read incorrectly were reviewed using "model, lead, test, retest" (Rinaldi et al., 1997, p. 225) procedures. The researchers found that the racetrack procedure was effective in increasing word reading accuracy and decreasing word errors per minute. Rinaldi et al. (1997) found that the number of words read correctly doubled from initial baseline data to post data. However, the design of the study meant determining the role the racetrack played in improvement was difficult as the study included several other components including the teaching of words, repeated practice and self-recording.

A Sullivan et al. (2013) study also included reading racetracks in a comparison study of two sight word fluency drills; reading racetracks and list drills. This study showed improvement for children in both formats and neither was deemed significantly more effective than the other, though motivational factors showed a preference for the racetrack drill from children (Sullivan et al., 2013).

The quasi-experimental study using a mixed-method approach by Griffin and Murtagh (2015) is one of the few studies that included a control group. It was carried out over eight weeks with 40 Irish primary students

and examined the impact of a precision teaching (PT) intervention, using the 'look, say' method, on sight word knowledge, reading achievement and fluency. PT is defined here as a process of measuring and evaluating learning that focuses on both accuracy and speed as the distinguishing features that show mastery of a skill. The experimental group included 20 students attending Learning Support for reading. The control group were selected from students not receiving any additional support and reading at their chronological age, therefore placing no student at a disadvantage from the experiment. During the experiment the control group received normal teaching whilst the experimental group had daily one-to-one 10-minute sessions with a teacher following the five core PT steps outlined by previous researchers and using the 'see-say' method. The data showed that the experimental group had made significant increases in HFW acquisition compared to the control group. Griffin and Murtagh (2015) argue that reading instruction benefits from having a more holistic approach. Griffin and Murtagh (2015) note in their findings that whilst there was a significant improvement in HFW knowledge, reading accuracy and fluency, similar findings were not reached for reading rate. They question whether further contextualised reading activities with HFWs are needed to improve reading rate.

One study that varied slightly was Fasko and Fasko's (2010) study. While the focus is similar to the previously mentioned studies, the drilling method was different as a 'folding-in' approach was used. This involves the tutor working with a child and a set of ten cards, 70% of which are known words and 30% are unknown. The findings showed only a slight improvement in the rate of HFW acquisition which may have been due to the design as 70% of the words were already known words. The more substantial impact of this method was on fluency, reading rate and rate of errors. Fasko and Fasko (2010) found that an improvement in automaticity lead to progress in oral fluency.

Implications of the Empirical Studies.

These studies all supported the argument that the teaching of HFWs holds a place of value in reading instruction. Increased knowledge of HFWs was shown, to varying degrees, to impact on student's fluency and reading achievement. While these studies reinforce and advance previous studies further research is still needed, implications for further research need to be considered regarding methods used. As noted, many of these studies did not use a large group of participants which could help to ensure the reliability of the study. Another characteristic prevalent were the limited time frames. Studies that occur over longer periods of time and/or include data collection showing the longitudinal impact of HFW interventions would add to current understandings. Lastly, there was limited use of control groups in these studies with Griffin and Murtagh's (2015) study being the exception, Kuhn and Stahl (2003) argue that this is a problematic issue and control groups may have given the studies greater rigour.

Though there have been many studies that look at what instructional strategies are effective for promoting HFW knowledge, searches of *Education Research Complete*, *ERIC* and other educational databases do not show studies that have been carried out in NZ. Schaughency (2015) highlights, that differences in educational contexts may affect outcomes on early literacy measures. Within the NZ context, children generally start school as soon as they turn five, as opposed to at the beginning of the school year as is

the case in other countries. This results in variations in the amount of time children are exposed to schooling and reading instructions. Comparisons between contexts also need to be made carefully as linguistic differences need to be considered (Schaughency, 2015). Research needs to be undertaken specifically within NZ classrooms to see what instructional strategies prove to be effective in our context.

3. Methodology

In the last chapter, we established the need to identify children who are struggling in reading early and to provide effective instruction that is based on the needs of the learner. This study is therefore focused on improving the automaticity of HFWs and the impact this has on reading progression, fluency, and comprehension.

This chapter will provide a description of the research design and procedures for data collection and analysis. This chapter concludes with a consideration of ethical issues.

Overall Research Design

Research Approach.

This study was conducted using a small-scale pilot mixed methods design that had both quantitative and qualitative elements. A quasi-experimental design was used to examine the effectiveness of the HFW intervention. Qualitative features allowed for greater examination of the impact the intervention had on literacy growth and exploration of participants' experiences. Vellutino and Schatschneider (2011) state that the objective of an experiment is to establish whether a treatment caused an effect. It is further noted that an experimental paradigm can be thought of as having two components: experimental causes or treatments, and experimental effects. In a quasi-experimental design, Velluntino and Schatschneider (2011) state that units or groups are not randomly assigned to conditions, rather comparison is made between groups that already exist. As with control groups in experimental studies, the comparison group reflects outcomes of the other group(s) if they had not received the treatment. Onwuegbuzie and Mallette (2011) argue that quantitative research is extremely valuable for "describing, explaining, and predicting human phenomena (p. 301). Conversely, qualitative research, according to Onwuegbuzie and Mallette (2011), is very useful for obtaining "insights into experiences and the meaning(s) attached to these experiences of selected individuals and groups" (p. 302). The researcher concluded that for this study, using both quantitative and qualitative approaches would provide a greater understanding of the research than either approach alone.

A mixed method approach was selected as it enabled rich data to be collected and analysed in order to answer the research questions. The quasi-experimental design elements allowed for the collection of quantitative measures that could determine the effectiveness of the HFW intervention. Two groups of children were selected to participate, with one group acting as the comparison group. A case study design was selected for the qualitative aspect of the study as it allowed for the exploration of contributing factors that might affect literacy growth. Researchers (Bloodgood, 1999; Patton, 1990) have noted that whilst quantitative measures provide data that can be analysed for evidence of growth over time, qualitative data can help to answer the why and how behind the data. This study also featured delayed quasi-experimental design features. Group Two had a period of four weeks in which the participants acted as a comparison group; this was essentially a delayed start period. The delayed quasi-experimental design meant that implementation of the intervention was staggered across the two groups, therefore any changes seen are

attributable to the intervention rather than to other factors such as maturation (Neuman, 2011). This aspect of the design means that replication of data occurs as the same quasi-experiment is conducted with different participants and the body of replications helps to establish external validity (McCormick, 1995). Ethical concerns regarding the risk of harm to participants were also mitigated by incorporating delayed quasi-experimental design, as discussed later in the ethical consideration section.

Setting.

This study was carried out at a state-integrated primary school based in Auckland. State-integrated school programmes follow the New Zealand Curriculum however they maintain their own special character, in this context the primary school is a Catholic school. The Decile 7 school's predominant ethnicity is European/Pakeha (60%), Asian students represent 16% of the population, 15% are of Pacific origin, 5% Māori and 4% other. The school had a roll of 274 students, as of July 2021. The researcher chose this school as the location was convenient and there were no conflicts of interest present. The researcher is not an employee of the school and has not held a position of power at the school. Student participants were selected in partnership between the classroom teacher and the researcher and were previously unknown to the researcher.

Participants.

Teacher participants.

A meeting was held with the five teachers from the junior teaching team during which the study was explained, and questions were answered. Participation was voluntary and expressions of interest were taken, with two teachers putting their names forward. *Ada* (pseudonyms used for all names) was the classroom teacher for Group One and *May* was the classroom teacher for Group Two.

Student participants.

This study focused on struggling early readers, with the participants consisting of two groups of children. Group One included six children from a Year One class, three boys and three girls. Three of these children identified as New Zealand European, one as Samoan/New Zealand European, one as Tongan, and one participant chose not to specify their ethnicity. Group Two consisted of seven children from a Year Two class, all of these participants were boys. Three of these children identify as New Zealand European, two as New Zealand European/Brazilian, one as New Zealand European/Tongan and one child did not disclose their ethnicity. The student participants ranged in age from 5 years 9 months to 6 years 9 months old at the start of the intervention.

Students were selected for participation in collaboration between the researcher and their classroom teacher. Initial profiling was conducted through standard classroom assessment to identify students who would likely benefit from a HFW intervention. HFW knowledge was examined both through classroom

assessment and teacher observations. Current independent reading levels were considered and compared to expected reading levels; all children identified were reading below expected levels. Discussion occurred between the researcher and the classroom teachers regarding observed reading behaviours, of interest were children who were heavily reliant on decoding words. Lastly there was assessment and discussion regarding letter and sound knowledge. There were children in one class who were unable to read many letters of the alphabet and had little to no alphabetic sound knowledge. These children were not included in the study as they were identified as having needs in alphabetic knowledge that needed to be target before attention moved to HFWs.

Student participation was voluntary, and consent was required from the student's families along with assent from each child for data to be collected. It should be noted that Group Two had additional children selected during initial profiling as they meet the threshold of need for intervention, however, consent was not gained for them to participate in the research. For these children, their teacher included them in the intervention activity, as this was carried out during normal classroom teaching, however, no data were collected for these children.

Case study student participants.

One child from each group was randomly selected for observations and interviews. From Group One, *Dana* was a Year One female student who was 5 years, 11 months old at the beginning of the intervention. Dana's ethnicity is noted as Samoan/New Zealand European. At the start of the intervention, Dana had been at school for nearly one year, having started school in mid-2020. It is important to note however that, as with the rest of the world, New Zealand went through a series of lockdowns due to COVID. In New Zealand, Auckland was particularly affected, going through two lockdowns in 2020 and two more at the start of 2021 before this intervention began. Auckland again moved into an extended lockdown just after the second intervention was completed and data collected. All of this highlights the disruption teachers and children faced during 2020/2021 and this undoubtedly impacted on learning and progress.

From Group Two *Carlo* was a Year Two male student who was 6 years, 2 months old at the start of the intervention. Carlo's ethnicity is marked as New Zealand European/Brazilian. Carlo began school at the start of the 2020 school year, therefore had attended school for not quite 1.5 years.

Intervention Design.

Flashcard Drill Method.

Flashcards are commonly used in classrooms to promote quick recall of important facts. Generally, flashcards are used by the teacher, the teacher will present a flashcard, prompting a response, and then give feedback. A set of flashcards is often repeated until the cards have been successfully learnt, in most instances, this means the information can be recalled automatically.

The flashcards used in this study were small rectangle pieces of white paper with a single HFW on each,

for instance 'the' (see *Appendix A* for a full list of HFWs used). The flashcards were laminated to ensure durability over the course of the intervention. The HFW flashcard drill method that was used in this study combined the 'look/say' method with the addition of the constant time delay procedure. In this approach, children are taught to read whole words. The 'look/say' method is when the children are shown a HFW flashcard, the teacher says the word, and then the children repeat the word back to the teacher. Constant time delay procedures meant that during the initial trial the teacher said the word on the flashcard and then paused for three seconds before asking the children to say the word back. Subsequent trials saw the teacher show the HFW flashcard and then count to three seconds before the children responded. The three second time delay was incorporated into this intervention so that children had the opportunity to think about and retain the word presented to them before they responded.

Intervention.

The HFW intervention was carried out for ten minutes a day over four weeks. Due to COVID lockdowns in Auckland the start of the intervention was moved from Term One 2021 to Term Two 2021. Group One participated in the intervention during the first half of Term Two, with Group Two carrying out the intervention during the second half of Term Two. Each session was carried out in class by the classroom teacher before each group's guided reading session. Baseline measurements allowed for gaps in HFW knowledge to be identified and the subsequent intervention tailored to address the identified needs. For each group of participants, the words identified as unknown during the baseline measurements were placed into word sets of five unknown words. Each session focused on one set of five unknown words. Each session required several learning trials on the small set of new words. During the initial trial, the participants were shown a flashcard with one of the unknown HFWs on it. The teacher would say the word, pause for three seconds and then ask the participants to say the word, this occurred for each of the five words. On subsequent trials, the words were shuffled and in random order be shown to the participants one at a time. The participants were asked to look at the word, given three seconds to read the word, and then asked to say the word. If the group got stuck on a word the teacher would say the word, pause for three seconds and then the children repeated the word. This process repeated through the set of HFWs until the participants could read each word within three seconds. At the start of the next session, the set of cards learned from the previous session were probed to check for retention. If the word is read correctly then it was considered learnt otherwise it was added back into the words to learn pile for that day. No more than ten cards were used in any one session, five from that days set and any additional unlearnt cards from previous days.

Design for Teachers.

In line with the overall case study design with quasi-experimental elements, the study included two teachers who implemented the HFW intervention in their classroom with the selected student participants. Group One's teacher began the intervention first whilst Group Two acted as the comparison group. Group two participated in the intervention after Group One had completed the intervention.

Both teachers went through a training session with the researcher to train in administering the HFW

intervention. The intervention training took place one-on-one and went for approximately 1 hour. Each teacher then carried out the HFW intervention for ten minutes each day for four weeks with the group of selected students.

During the intervention, the teacher allowed the researcher access for four observations (20% of sessions) to check procedural reliability. At the completion of the intervention the teacher then participated in an interview with the researcher.

Design for Students.

The students participated in the HFW intervention under the conditions previously outlined. Baseline data were collected for all participants, HFW knowledge was assessed through a HFW assessment, Clay Word Reading (Clay, 2019), and Burt Word Reading Test – New Zealand Revision (Gilmore et al., 1981). Running records were conducted to assess independent reading levels, fluency and comprehension. The data collected are standard assessments used within NZ classrooms. These measures are collected regularly as part of normal classroom practise, a more detailed explanation of measures follow later in this chapter. Post intervention data were collected in the week following the completion of the four-week intervention, again using the previously mentioned measures.

It is important to note that at the completion of the intervention for Group One, the teacher requested that she be able to continue the intervention activity with the student participants from her class. This is notable as it affected the results at Time Three. Once the post intervention data were collected at Time Two, the teacher resumed the daily HFW activity with the group for another four weeks. Rather than introducing new HFWs however she reused words from the first four weeks. Therefore, rather than carrying out a maintenance period as originally designed by the researcher, in which classroom teaching would resume to normal practice, a period of sustainability was carried out for Group One. Data were again collected at the end of this period, and this will be referred to as Time Three.

In addition to the quantitative data collected, one participant from each group was randomly selected to be profiled through classroom observations and interviewed to gain qualitative data.

Measures used for data collection

Quantitative measures.

Quantitative data were collected at three points over the course of this study, as shown in the following table. Data collection began in May 2021 and concluded in July 2021. Repeated measures of quantitative data consisted of a HFW assessment, running records, Clay Word Reading Assessment (Clay, 2019) and Burt Word Reading Test: New Zealand Revision (Gilmore et al., 1981). These assessments are all standard classroom assessments and therefore all the children in the class have these administered at different points throughout the year by the classroom teacher. For this study the researcher administered these assessments to the participants.

Table 1: Data collection schedule

	Group One	Group Two
Time One May	Baseline data	Baseline data (comparison group)
Time Two June	Post intervention data	Baseline data
Time Three July	Sustainability data	Post intervention data

HFW assessment.

The HFW assessment consisted of 200 HFWs consolidated from the Dolch and Fry word lists (Dolch, 1936; Fry, 1980). These lists were both created based on the most commonly occurring words in the English language. Whilst both the Clay and Burt word reading assessments were used to give standardised data on word recognition, further data were needed on a broader range of words. The use of the HFW assessment gave a comprehensive overview of HFW knowledge and allowed for word acquisition rates to be examined.

Burt Word Reading Test: New Zealand Revision.

The Burt word reading test: New Zealand Revision (Gilmore et al., 1981) was also selected as a measure for data collection as it is another way to assess word recognition. The revised edition of this assessment has been standardised for NZ children. Gilmore et al. (1981) note that the data collected from this assessment, when used in conjunction with other data, will help to form a general estimate of a child's reading achievement.

Clay word reading assessment.

Clay (2019) *An observation survey of early literacy achievement (4th Edition)* was chosen to assess HFW knowledge. Clay (2002) notes that this assessment can be used to give an account of progress made by individual children between two specific points in time. Therefore, this assessment was appropriate for collecting data and gauging progress made by the individual student participants. This assessment has an additional benefit of being of NZ origin and a standardised assessment, therefore allowing comparisons to be made with the achievement of other children of the same age.

Running records.

Running records were carried out using the *PM Benchmark 1 Kit*. Running records provide a systematic framework for observing a child's reading behaviour. The *PM Benchmark* assessment allows for students' instructional and independent reading levels using unseen texts to be assessed. While running records can be carried out with any text (Clay, 2002) the *PM Benchmark kit* was used as it provides leveled texts with preestablished comprehension questions and a marking schedule for each text. This ensured comparability and reliability of the data. This assessment also places an emphasis on ensuring that

students are comprehending the texts that they are reading. Ministry of Education (2003) states that insight gained from carrying out running records includes strategies the child is using to solve unknown words, their ability to draw together the different sources of information, self-monitoring and self-correction strategies, and the child's willingness to take a risk. Running records are a useful tool for capturing progress in reading. It should be noted that while running records provide quantitative data in terms of reading levels, self-correction ratios and accuracy, qualitative data can also be gained from this form of assessment as the assessor observes and records the reading behaviours of the participants. The administration and analysis of running records in this study allowed triangulation with other data sources and assisted in establishing credibility for this research.

Procedural Reliability.

During the intervention, each teacher allowed the researcher access for four observations (20% of sessions) to check procedural reliability. These were short observations, carried out during an intervention session to check that the intervention was being implemented according to the design procedures. In each observation 14 procedural checks could be confirmed as occurring or not (see Appendix B for Procedural Reliability Observation Template). The total number of procedures followed is totalled and a percentage of procedures followed was then calculated and any notes taken were given as feedback to the teacher. For seven of the eight observations there was a procedural reliability score of 100%. For one observation there was a procedural reliability score of 92% with one of the 14 procedures not being followed, this feedback was given to the teacher and subsequent observations showed all procedures being followed.

Qualitative measures.

Semi-structured interviews.

A semi-structured interview was conducted with both teachers and one student participant from each group. These interviews were based on open-ended questions prepared in advance. The advantage of semi-structured interviews is that they allow for questions to be prepared ahead of time to help guide the discussion. The nature of the open-ended questions allows for the participants to give broader answers. They also help to provide better insights into the thoughts and experiences of the participants. The purpose of the interviews was to have the participants share their views on literacy. Of particular interest was gaining an understanding, both from the teacher's perspective and the child's, about areas of struggle in reading and the ways in which this intervention impacted their teaching and/or learning. Examples of interview topics and questions can be seen in Appendix C.

Student observations.

Three 30-minute timed observations were conducted for the two children randomly selected for profiling. One observation was conducted prior to the intervention, one during the intervention and one post intervention. These observations took place during the participants normal reading lesson, they covered the participants guided reading session with the teacher and a follow-up activity. Observations were recorded in the form of written notes once every minute with the focus being on the student participant's

levels of engagement and participation in the guided reading sessions and follow up activities. No audio or visual recordings were taken as part of these observations.

Procedures for data collection

HFW assessment, Burt Word Reading Test (New Zealand Revision), and Clay Word Reading Assessment.

These assessments were carried out by the researcher, one-on-one with each student participant in a quiet place with as few distractions as possible. These three assessments were carried out at the same time and always in the same order. The Clay Word Reading assessment was administered following the procedures set out by Clay (2002, 2019). A different list was used for each of the three data collection points. The Burt Word Reading Test (New Zealand Revision) was also administered following already established procedures (Gilmore et al., 1981). The HFW assessment was administered in a similar manner, the participants had the HFW list in front of them and they proceeded to read through each word with the words being marked as correct, incorrect, or not attempted on the marking sheet. A wrong attempt was also recorded, for instance, if a participant read 'was' as 'saw'. If children were struggling, then each word was pointed to individually to help focus them. All three of these assessments took a short period of time and the participants consistently completed them in approximately 10 minutes.

It is important to note that the collection of Time Two data for Group Two was delayed as illness of the researcher impacted the timing. The data were collected after the group had begun the intervention; they had participated in two HFW intervention sessions before this data could be gathered. This was considered when analysing the data and the short cross over is believed to have had little impact on the data outcomes. Again, data collection post intervention was also delayed for two participants from Group Two due to illness of the participants, the data were unable to be collected until after the school holidays, meaning a three-week delay compared to the other children in their group.

Running records.

Running records were administered on three occasions along with the other quantitative measures. A gap was ensured between the HFW measures and administering the running records to prevent the students from being overwhelmed. The running records were also carried out one-on-one in a quiet place with as few distractions as possible. The initial level chosen to assess was based on recommendations from the classroom teacher and separate running records were administered to ensure that an Independent Level and an Instructional Level were gained. For some children this meant two running records, and for others, several needed to be administered to ascertain the correct levels. It is recommended that training is undertaken before administering a running record in order to gain accurate data. The researcher has over 10 years of experience administering running records and all running records for this study were observed, recorded, and analysed by the researcher following all administrative protocols.

Semi-structured interviews.

The research concluded with semi-structured interviews conducted between the researcher and each teacher participant, and with the two selected student participants. The two student participants were selected randomly at the start of the research and were the same students who were the focus of the student observations. Teachers proposed a time that was convenient to them, and all teacher interviews occurred in their own classrooms after school, therefore minimising distractions. Student interview times were again nominated by the teachers and were carried out in an area away from the main classroom to reduce distractions. The interview involved pre-planned open-ended questions (Appendix C). It was agreed that the teacher interview would take no longer than one hour, and the student interview no longer than 15 minutes. An audio recording was taken during the interviews to enable transcripts to be prepared. An interview schedule was used that contained a list of questions and topics, organised in a way relevant to the research questions. These questions ranged from general and broad through to specific questions as a way of gaining greater detail. There was one set of questions asked of each teacher and one set asked of each student participant. The same questions were used for each group so that the data obtained was reliable and comparable. Each teacher was made aware that the audio-taped interviews would be transcribed and that they would be provided with the opportunity to review the transcript.

Student observations.

Student observations occurred on three occasions for Dana and Carlo. These observations were timed observations that lasted for 30 minutes and took place during the student's literacy time. The aim was to gather data during the student's guided reading lesson and their post group lesson follow up activity. The final observation for Carlo was delayed by one week due to illness, followed by the two-week school holidays. In Term Three, Carlo began Reading Recovery and was withdrawn from class during literacy time meaning a literacy observation could not be carried out. As a result, the final observation was carried out during a Religious Education lesson, rather than during literacy.

The first observations took place before the intervention began. The second observations occurred during the third week of the intervention. Final observations took place in the week following the completion of the intervention. It has been already noted that the final observation for Carlo was delayed due to illness, however, illness also impacted the second observation for Carlo as well. Due to illness on the part of the researcher, the observation was unable to be carried out in the week before Group Two's intervention began, this was delayed to the following week and as such Carlo had already participated in one intervention session prior to the observation being carried out. The crossover was very short and as such it does not appear to have affected the baseline data.

On each observation day, with agreement from the teachers, the researcher arrived 10 minutes prior to the lesson. This was done to allow preparations to be made for the observation, for children to become familiar with another person being in the classroom and to organise an unobtrusive place for observation notes to be recorded. Both teachers, before the first observations, explained to the class the purpose of the researcher's presence. After this point, I ensured there were no further disruptions to the literacy

programme on my behalf. I positioned myself so that I could clearly hear the guided reading lesson and see the faces of the participants. Notes were taken at one-minute intervals for 30 minutes and were recorded on a prepared electronic template.

Analysis of data

The various types of data required analysis to be conducted in different ways, this is explained below.

HFW Assessment.

For the HFW assessment two types of analysis were made, visual analysis and then statistical analysis. Shifts in HFW knowledge were examined through visual comparison of the data points on graphs displaying data collected at the three time points. A comparison line of expected word knowledge after one year at school (national norms) was also added in order to visually compare the progress of the participants to expected levels.

Descriptive statistical analysis was also carried out with the quantitative data from this assessment. Initial baseline data provided raw scores of words known. Subsequent assessments provided further raw scores of known words. These additional scores were used to calculate the number of words learnt in each four-week period and the percentage increase in word knowledge at each point. The data were also collated for Group One and Group Two and descriptive statistical calculations were carried out to analyse the data and highlight trends. The average, median, minimum, maximum, and standard deviation score was calculated for both the raw scores and the percentage increases. The small number of student participants meant it was inappropriate to conduct further statistical tests

Burt word reading test (New Zealand revision).

Analysis of this assessment was carried out by taking the number of words read correctly and using the Equivalent Age Bands (EAB) table to determine the EAB range. Children who were unable to read 20 or more words received a 'Did Not Score' (DNS) result.

Clay Word Reading Assessment.

Analysis of this assessment was carried out by comparing each child's raw score with those of other children of the same age. Each child's total raw score correlates with a scaled score, a number between one and nine. The scaled score is called a stanine and stanines are "scores that redistribute raw scores according to a normal curve in nine groups from one (a low score) to nine (a high score)" (Clay, 2002, p. 121). This provides an indication as to how well each participant compares with a sample of 796 children from NZ (Clay, 2002).

Running Records.

Procedures recommended by Clay (2002, 2019) were used to analyse the running records. Error ratios, accuracy rates and self-correction ratios were all calculated to quantify the running records. The accuracy rate is calculated by dividing the total words in the text read by the number of errors, this produces an error ratio. The error ratio is then converted into a percentage, providing an accuracy rate. An independent reading level has an accuracy rate of 95% or greater, instructional levels have an accuracy rate of 90-95% and a text is considered difficult if the accuracy rate is below 90%.

Comprehension was also assessed through the running records and the *PM Benchmark* marking schedules with the lower-level texts generally comprised of four questions. A child is considered to show excellent comprehension of the text if they can answer all four questions correctly, satisfactory comprehension when answering three questions correctly and unsatisfactory comprehension when only one to two questions can be correctly answered. It should be noted that for a level to be considered independent then a minimum comprehension level of "satisfactory" is required.

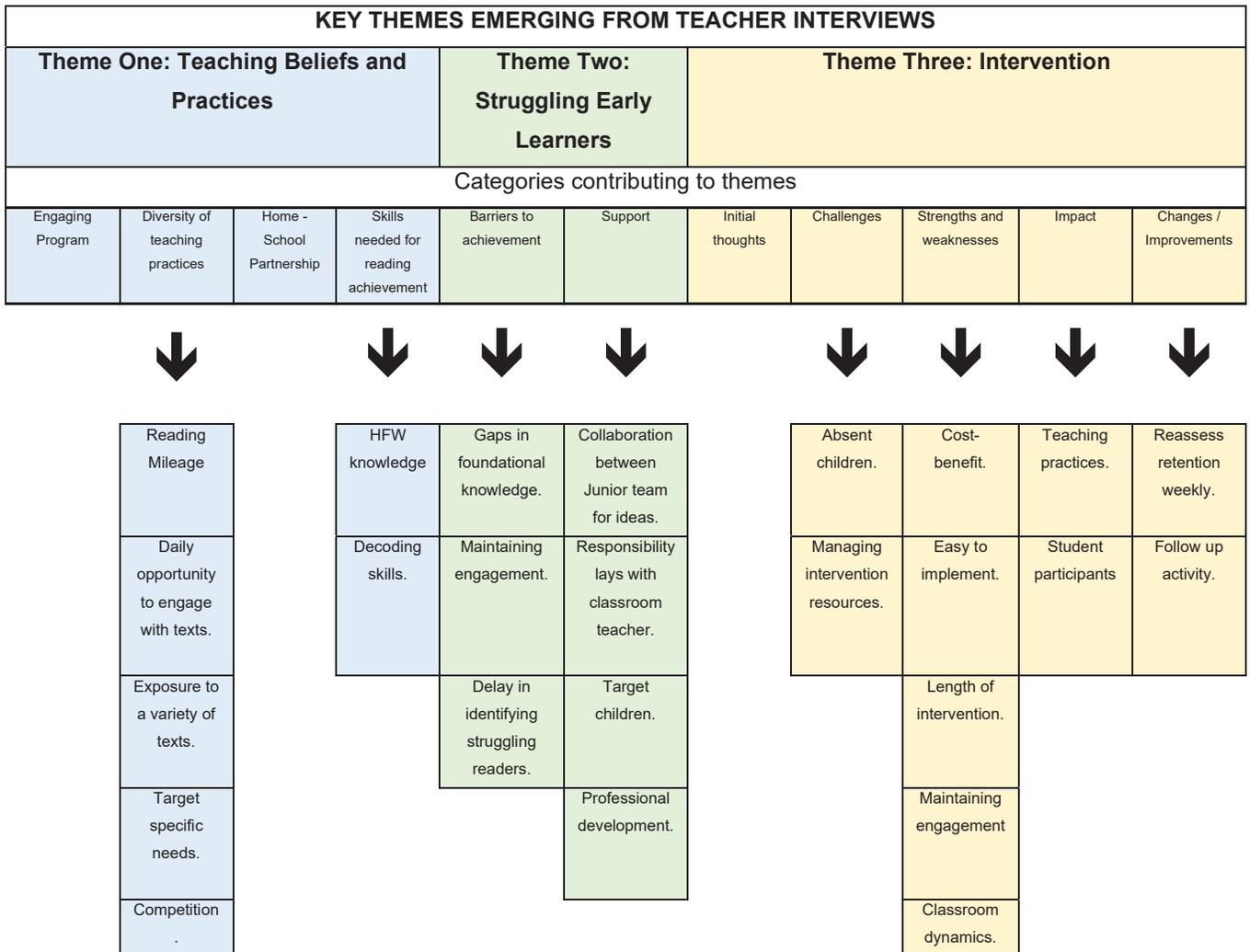
Observations were also made during the running records to assess participants' reading behaviours, including their knowledge and skills, strategies used, fluency and retelling indicators. The marking schedules were then used to analyse the behaviours observed.

Visual analysis was also carried out with the running record data. Reading levels at the different data points were plotted along with expected levels (national norms) to allow a visual analysis of progress made to be examined.

Semi-structured interviews.

The analysis of the interviews began with word-for-word transcription of the audio recordings by the researcher. The transcripts for the teacher interviews were provided to each teacher and a two-week period was given for review and verification. Both teachers returned their transcripts within a week with no changes required. Audio recording of the interviews was beneficial as it allowed for interviews to be repeatedly replayed so that an accurate reproduction could be obtained. Thematic analysis was then used to closely examine the interview transcripts to identify common themes (see *Figure 2*). Data analysis and interpretation procedures were informed by Braun and Clarke (2006). Whilst there are different ways in which thematic analysis can be conducted, the researcher followed the six-step method: familiarisation, coding, searching for themes, thematic review, defining and naming themes, and writing up (Braun & Clarke, 2006). This thematic analysis was conducted in an inductive way. The themes identified are linked strongly to the data in an inductive approach (Patton, 1990). Braun and Clarke (2006) note that inductive analysis is the method of coding the data without "trying to fit it into a pre-existing coding frame, or the researcher's analytic preconceptions (p. 83). The interviews were not analysed by grouping into preconceived categories but rather through the coding and thematic analysis of transcripts themes emerged.

Figure 2: Development of themes during the analysis process



Student observations.

The student observations were analysed using both quantitative and qualitative methods. Analysis of student observations was initially conducted using thematic analysis following the six-step process outlined by Braun and Clarke (2006). In the initial phase of analysis, the observation notes were read and then reread with initial ideas being noted down. Of particular interest in these observations was student engagement and participation during literacy time. Initial codes included *on task, distracted, fidgeting, off task, needing support, participating and/or responding, engaged, observing peers, following instructions, interruption to lessons, recalled to task*. These initial codes highlighted common themes over the observations with several of the codes being able to be grouped to produce three themes; *Participation and engagement, Barriers to learning, Guidance and Support*. Initial codes needed refinement over subsequent reviewal of data, for instance, the code of *needs support* was refined to specify whether support was needed during group time or during independent activity, it was further refined to look at

where support was sought from, for instance, the classroom teacher or peers. The initial code of *observing peers* was also refined to differentiate between *observing peers for support*, *observing peers during group activities*, and *observing peers as distracted*.

As the student observations were conducted using a timed observation method and then coded during the thematic analysis this data set also lent itself to quantitative analysis. The codes produced during thematic analysis were able to be quantified in two ways. Firstly, the amount of time a student was coded as spending in particular activities, such as being distracted from their learning in the 30-minute period, was able to be quantified. Secondly, as these observations were conducted on three occasions for the two students any changes over time could be identified.

Ethical considerations

This study was approved by the University of Auckland Human Participants Ethics Committee on 24/03/2021 for a period of three years (Reference Number UAHPEC21965).

Informed consent.

This study ensured that participation was voluntary and free and informed consent was acquired from the school, teachers, and Parent(s)/Caregiver(s). Assent was also required from each student as they were under the age of 16. Participant Information Sheets and Consent Forms were given to the potential teacher participants, and to the parents of potential student participants as part of an invitation to participate in the research. The student participants all received Participant Information Sheets and Assent Forms.

A potential ethical issue was that participants may have felt obliged to participate in the research. The Participant Information Sheets and the Consent Forms stated clearly that participation was voluntary and non-participation would not affect their employment or schooling in any way. The principal also signed a consent form affirming that participation or non-participation of the teachers or students would not affect the relationship with the school and would not affect their access to school services. Also, any child that may benefit from the intervention but was not given consent to be part of the study was still able to participate in the activity, therefore, mitigating any risk of harm to non-participants.

Confidentiality.

Procedures to ensure confidentiality include ensuring the school is not identified by name and only general descriptors have been used in reporting. For all participants pseudonyms have been used in all reporting and analysis. The researcher has ensured that all data collected during the study is stored securely and only accessible by the researcher and supervisor.

Risk of harm to the participants.

The design of the study ensured that it was highly unlikely to pose a risk of harm to the participants. All

measures used to collect data are part of standard classroom practice. The HFW intervention was designed to be incorporated into the classroom teacher's normal daily literacy program. Instructional reading groups are common practice in classrooms, these can be mixed ability or leveled groups, therefore the student participants should not feel singled out in any way. All student participants selected for this study were struggling early readers. Group Two acted as a comparison group for Group One during the first intervention. It was decided that since the participants selected for both groups were struggling readers who were currently achieving behind their peers it would be unethical to finish the study at that point. To mitigate this ethical issue Group Two participated in the four week intervention with their teacher after Group One finished.

Conclusion

This chapter has described the small-scale mixed methods design used in this study and the rationale behind the design decisions. Details regarding data collection and data analysis have been presented. The chapter concluded with a summary of ethical issues considered in this study.

4. Results

The following chapter will firstly report how effective the HFW intervention was in improving the student participants' HFW knowledge. To establish whether the HFW flashcard intervention was effective the quantitative results and statistical analysis from the HFW assessment, Burt Word Reading Assessment and Clay Word Reading will be reported. Secondly, the impact of increased HFW knowledge on reading progression, reading fluency and comprehension will be examined using both the quantitative and qualitative data from the running records. Qualitative data including thematic analysis of teacher interviews, student observations and student interviews will then be reported. Lastly summarised individual case study findings will highlight the impact this intervention had on the participants.

HFW Assessment

Group One

Results from the HFW assessment provides clear evidence of gains in HFW knowledge associated with the intervention (see *Figure 3*). The participants in Group One had all received at least three terms of formal schooling before participating in the intervention. The baseline data collected at Time One showed a minimum score of seven words (*Reese*) and a maximum of 25 words (*Luke*) and a mean of 17 words. After four weeks of intervention the minimum word score increased to 29 (*Reese*) and the maximum to 55 (*Oaklynn*), with a mean percentage increase of 169% (25 words). Further improvement was seen after a further four weeks of sustainability with the minimum word score increasing to 37 (*Reese*) and the maximum to 84 (*Oaklynn*) and the mean word score moving to 68. Examination of these results show a mean total percentage increase of 328% (27 words). There was an average total word increase of 52 words over eight weeks. High standard deviation values, along with visual analysis of the graph, shows that the data is widely spread. The graph highlights that this HFW intervention was more effective for some of the participants in comparison to others. It is important to note that while substantial gains were seen in HFW knowledge for these participants none of the six participants reached expected norms of being able to read 100-200 HFWs after one year at school.

Figure 3: HFW Assessment Group One



Group Two

As previously noted, Group Two acted as the comparison group during the first four weeks of intervention and had a delayed start for the implementation of the intervention. Group Two was also split into two groups; Group Two (A) and Group Two (B) due to the large degree of variation found in baseline data between these participants.

Results for Group Two, particularly Group Two (A) were more varied than Group One (see *Figure 4*). Regardless, visual analysis of the graph shows that for many of the participants the HFW intervention was effective in increasing their HFW knowledge. Group Two (A) saw a minimum total word increase of 17 (*Mark*) and a maximum of 109 (*Daniel*). The total percentage increase varied with a minimum increase of 90% (17 words) and a maximum of 575% (69 words), the mean increase was 302% (62 words). There was less variation between the two participants in Group Two (B). The data shows a total word increase of 92 words for *Olivier* and 96 words for *Kaidyn* and a mean total percentage increase of 144%.

As the participants in Group Two were Year Two students they had all been at school for over one year and therefore would be expected to be able to read between 100-200 HFWs. Two of the five participants in Group Two (A) had HFW scores of 100 or more at Time Three and both participants from Group Two (B) had scores over 150 words.

Initial baseline data collected at Time One showed low HFW scores for both Group Two (A) and Group Two (B) with a mean word score of 21 for Group Two (A) and 66 for Group Two (B). The mean word score for Group Two (A) increased to 33 and for Group Two (B) to 102. The data showed a mean 58% increase (11 words) for Group Two (A) and a 55% increase (36 words) for Group Two (B). Given that these participants had been at school for over a year and growth until Time Two had been slow, the sudden shift, whilst not at the same levels as Group One who carried out the intervention, needed to be investigated.

In a follow-up discussion, May shared that she stopped carrying out a daily HFW missing letter activity that is based on the *Building Blocks to Literacy Learning* approach in anticipation of the HFW intervention that was going to be implemented. May noted that her focus shifted to two-letter word flashcards with blendable letters, having found consonant vowel consonant (CVC) words to be too advanced for these children. May also noted an influence on teaching practice by the Structured Literacy approach she was seeing on teacher Facebook groups and in professional literature. May identified several factors that she considers impacted the progress of the participating children over the four-weeks as a comparison group, including:

- Integrated phonics approach, with the second half of Term One and the first half of Term Two focused on ai, a, e, ay digraphs using foam letters and magnetic boards.
- The use of personalised cloze worksheets using HFWs and their names.
- HFW lists were sent home on cards to every child along with instructions about how they could

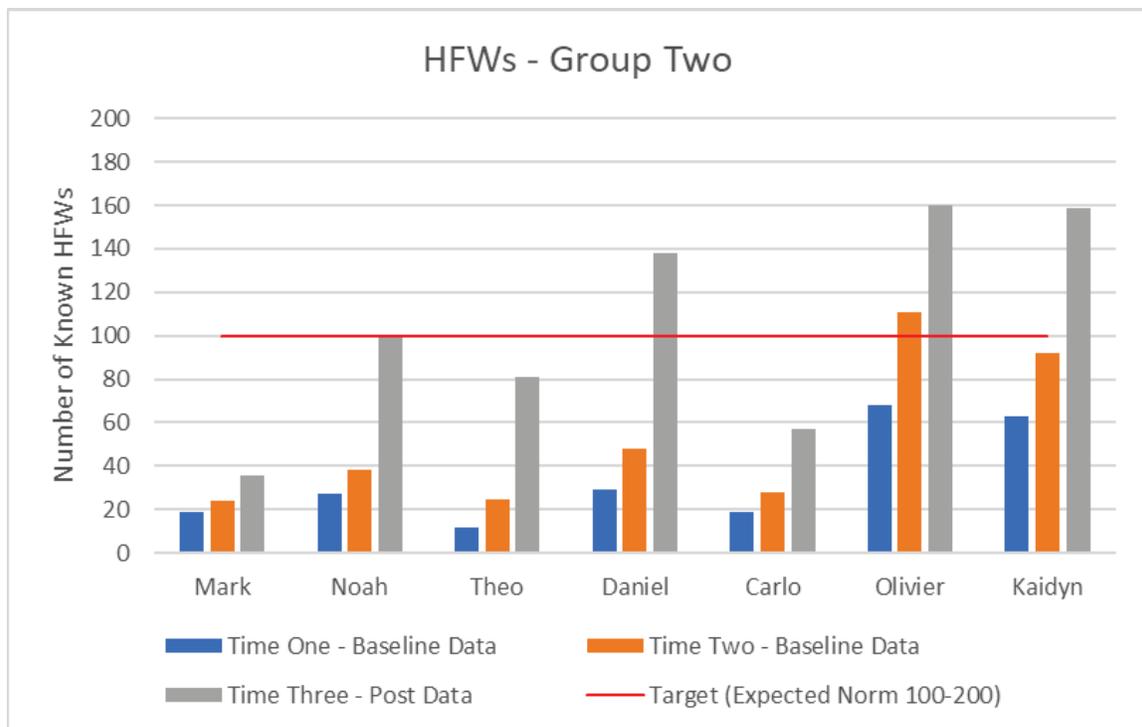
be used to make sentences (in context) as well as using them as flashcards.

- May's classroom also had a classroom helper, a former teacher, who focused on HFWs and reading mileage with the children.
- Maturation of the children.

May also noted that she had available in her classroom some independent HFW activities and sets of words, she did not feel that the children engaged with them much, but they were used in Term One prior to the intervention as teaching tools. One HFW activity that May did see the children engage in was picture word flashcard battles where one child would act as the teacher and two-three other children would compete to read the words.

Literacy planning from May was also provided to the researcher for the period when the participants were acting as a comparison group. Evident in the planning is a strong focus on CVVC and CVC word recognition for the before guided reading activity.

Figure 4: HFW Assessment Group Two



Comparison of Data

The HFW assessment data in *Figure 5* shows that the intervention group (Group One) made better gains between Time One and Time Two than the comparison group (Group Two). This effect was then repeated for Group Two for data between Time Two and Time Three. Group Two carried out the intervention during this phase and the data shows better gains made than for Group One who were in the sustainability phase.

Figure 5: HFW data comparison

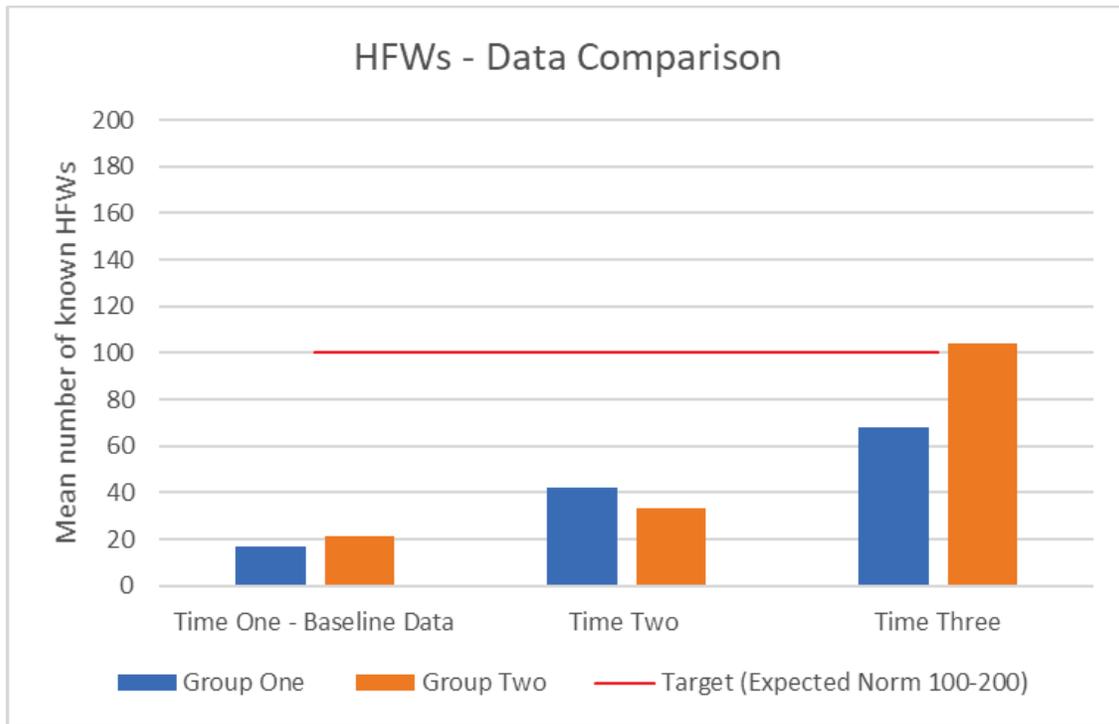


Figure 5: Shows the mean number of known words for each group at each time point.

Burt Word Reading Test (New Zealand Revision)

Group One

The Burt Word Reading Test data clearly demonstrates improvement over the three data collection points (See *Table 2*). All six participants were unable to read enough words during the initial assessment to generate an *Equivalent Age Band (EAB)*. Time Two's data shows that after four weeks of intervention half of the participants now had raw scores high enough to generate EAB's. These EAB's all aligned with the participants' ages at the time of assessment. Time Three's data again showed improvement in word recognition skills as all except one participant achieved an EAB. *Gracie*, *Luke*, and *Dana*'s ages all fell within their EAB's while *Carter* and *Oaklynn*'s EAB scores are higher than their ages suggesting sound word recognition skills. However, while *Reese*'s raw score moved from two in the initial assessment to 14 in the final assessment this raw score was still well below the score of 20 needed. An examination of the results presented in *Table 2* shows the mean raw score increased from 6 words in Time One to 22 words in Time Three. The increase in raw scores over time is also reflected in the movement in the EAB's with the median EAB of Time One being a DNS (Did Not Score) to and median EAB of 6.01 – 6.07 at Time Three.

Table 2: Group One Burt Word Reading Test (New Zealand Revision)

Group One						
	Time One - May		Time Two - June		Time Three - July	
	Raw Score	EAB	Raw Score	EAB	Raw Score	EAB
Gracie	6	DNS	20	5.10 - 6.04	23	6.01 - 6.07
Carter	6	DNS	21	5.11 - 6.05	25	6.03 - 6.09
Luke	5	DNS	14	DNS	22	6.00 - 6.06
Oaklynn	11	DNS	20	5.10 - 6.04	26	6.04 - 6.10
Reese	2	DNS	11	DNS	14	DNS
Dana	5	DNS	17	DNS	23	6.01 - 6.07
Mean	5.83	DNS	17.17	-	21.67	-
Median	5.5	DNS	18.5	-	23	6.01 - 6.07
Standard Deviation	2.93	-	3.97	-	4.26	-

Table 3: Raw Score being the number of words read correctly. EAB being the Equivalent Age Band, an estimate of word recognition skills within age ranges. DNS being 'Did Not Score' – this value was given when less than 20 words could be read due to the composition of the standardization sample (6.0 – 12.11-year-old-children) norms for outside this range would be inaccurate.

Group Two

Group Two also showed improvement over the three data points (See Table 3). As with Group One, the seven participants were all unable to read enough words during the initial assessment to generate an EAB. Time Two's data shows that after four weeks as a comparison group two participants' raw scores were high enough to generate EAB's. These EAB's aligned with the participants' ages at the time of assessment. Finally, after four weeks of intervention, Time Three's data showed improvement in word recognition skills with five of the seven participants raw scores generating an EAB. Noah, Theo, Daniel, and Olivier's ages all fell within their EAB while Kaidyn was the only participant in Group Two whose EAB score was higher than their age. For Mark, his raw score improved by only word at each point and with a final raw score of 11 he fell well short of the 20 needed to obtain an EAB suggesting word recognition skills that are below his peers. Carlo doubled his raw score from 9 words to 18 in the final assessment, he was still unable to generate an EAB and these results suggest his word recognition skills are still below his peers. An examination of the results presented in Table 3 shows the mean raw score increasing from 9 at Time One for Group Two (A) to 21 at Time Three. The increase in raw scores over time is reflected in the movement in the EAB's with the median EAB at Time One being a DNS to and median EAB of 5.11 – 6.05 at Time Three for Group Two (A). Group Two (B)'s mean raw score increased from 16 at Time One to 30 at Time Three. Again, the generated EAB's increased with a mean of DNS for Time One to a range of 6.07 – 7.01 to 6.08 – 7.02 at Time Three.

Table 3: Group Two Burt Word Reading Test (New Zealand Revision)

Group Two						
	Time One - May		Time Two - June		Time Three - July	
	Raw Score	EAB	Raw Score	EAB	Raw Score	EAB
(A)						
Mark	9	DNS	10	DNS	11	DNS
Noah	12	DNS	15	DNS	21	5.11 - 6.05
Theo	5	DNS	11	DNS	26	6.04 - 6.10
Daniel	12	DNS	18	DNS	28	6.06 - 7.00
Carlo	9	DNS	10	DNS	18	DNS
Mean	9.4	DNS	12.8	DNS	20.8	-
Median	9	DNS	11	DNS	21	5.11 - 6.05
Standard Deviation	2.88	-	3.56	-	6.76	-
(B)						
Olivier	13	DNS	22	6.00 - 6.06	29	6.07 - 7.01
Kaidyn	19	DNS	23	6.01 - 6.07	30	6.08 - 7.02
Mean	16	DNS	22.5	-	29.5	-
Median	16	DNS	22.5	-	29.5	-
Standard Deviation	4.24	-	0.71	-	0.71	-

Table 3: Raw Score being the number of words read correctly. EAB being the Equivalent Age Band, an estimate of word recognition skills within age ranges. DNS being 'Did Not Score' – this value was given when less than 20 words could be read due to the composition of the standardization sample (6.0 – 12.11-year-old-children) norms for outside this range would be inaccurate.

Comparison of Data

This data provides further evidence of a pattern in improvement associated with the HFW intervention. The gains for Group One are noticeably better between Time One and Time Two in comparison to Group Two as Group One had the intervention whereas Group Two did not. At this time Group Two were acting as the comparison group. As with the data from the HFW assessment, this pattern of improvement is repeated when Group Two participate in the HFW intervention with a noticeable improvement in results between Time Two and Time Three.

Clay Word Reading

Group One

Successive Clay Word Reading assessments provide evidence of whether progress is occurring in the child's reading of words. Data for Group One (See Table 4) shows progression in word reading knowledge after four weeks of intervention with the mean stanine increasing from three at Time One to six at Time Two. A stanine range of 3-4 suggests that a child is struggling with average tasks and more support and teacher attention is needed. Whilst a stanine range of 5-6 suggests that the child should be able to

participate in average classroom activities. There was more variability in data at Time Three with three of the participants scoring one word less than the previous times score, two the same, and Reese's raw score decreasing to five. A different word list was used for each assessment and the words on 'List C' proved to be more challenging for this group. Clay (2019) states that it is expected that children will completely master this learning and therefore move through the stanine score ranges until reaching a near-perfect scoring. Clay (2019) notes that slips and measurement errors could be responsible for scores that are less-than-perfect. Overall, this data does show movement for all six participants, providing additional evidence that the HFW intervention was effective in improving HFW knowledge.

Table 4: Group One Clay Word Reading

	Group One								
	Time One - May		Time Two - June			Time Three - July			Overall Stanine
	Raw Score	Stanine	Raw Score	Stanine	Stanine Increase	Raw Score	Stanine	Stanine Increase	Increase
Gracie	4	4	13	6	2	12	6	0	2
Carter	3	3	13	6	3	12	6	0	3
Luke	4	4	10	5	1	9	5	0	1
Oaklynn	7	5	12	6	1	12	6	0	1
Reese	1	2	12	6	4	5	4	-2	2
Dana	1	2	12	6	4	12	5	-1	3
Mean	3.333	3.33	12	5.83	2.5	10.33	5.33	-0.5	2
Median	3.5	3.5	12	6	2.5	12	5.5	0	2
Standard Deviation	2.25	1.21	1.10	0.41	1.38	2.88	0.82	0.84	0.89

Table 4: Raw Score being the number of words read correctly. *Stanine* is a scaled score that provides a comparison between the child being assessed and a representative sample of New Zealand children of a similar age.

Group Two

Group Two, by comparison, showed less overall increase in stanine scores (See *Table 5*). For Group Two (A) the mean stanine score at Time One was two, a stanine score in the 0-2 range suggests that those children will be unlikely to catch up to their peers without immediate, intensive teaching and support. At Time Two all children in Group Two (A) increased their stanine scores to the 3-4 range showing that they were still struggling with average classroom tasks. At Time Three all participants in Group Two (A) except for Mark achieved stanine scores of four, whilst Mark scored a stanine of two. Group Two (B) showed improvement in stanine scores between Time One and Time Two, however, Time Three results show Olivier's stanine result moving back to a stanine four, the same as his original data results.

Table 5: Group Two Clay Word Reading

	Group Two								
	Time One - May		Time Two - June			Time Three - July			Overall Stanine
	Raw Score	Stanine	Raw Score	Stanine	Stanine Increase	Raw Score	Stanine	Stanine Increase	Increase
Mark	4	2	6	3	1	2	2	-1	0
Noah	5	3	11	4	1	11	4	0	1
Theo	4	2	5	3	1	10	4	1	2
Daniel	7	2	11	3	1	13	4	1	2
Carlo	3	2	9	4	2	10	4	0	2
Mean	4.6	2.2	8.4	3.4	1.2	9.2	3.6	0.2	1.4
Median	4	2	9	3	1	10	4	0	2
Standard Deviation	1.52	0.45	2.79	0.55	0.45	4.21	0.89	0.84	0.89
Olivier	11	4	14	6	2	13	4	-2	0
Kaidyn	6	3	13	5	2	13	5	0	2
Mean	8.50	3.50	13.50	5.50	2	13	4.50	-1.00	1
Median	6	3	13	5	2	13	4	0	0.89
Standard Deviation	3.54	0.71	0.71	0.71	0	0	0.71	1.41	1.41

Table 5: Raw Score being the number of words read correctly. Stanine is a scaled score that provides a comparison between the child being assessed and a representative sample of New Zealand children of a similar age.

Running Records

Group One

The Running Record results for Group One provide evidence of the impact the intervention had on the participants' reading progression (See *Figure 6*). Improvement in reading levels as well as fluency and comprehension were associated with improvements in HFW increases. Group One's data shows that there was an average growth rate of two levels after four weeks of intervention, this average growth rate of two levels was again recorded for Time Three.

The PM benchmark reading assessment kit that was used to carry out the running records also assesses fluency and comprehension. Fluency is observed during the assessment and children are recorded in one of the following four categories:

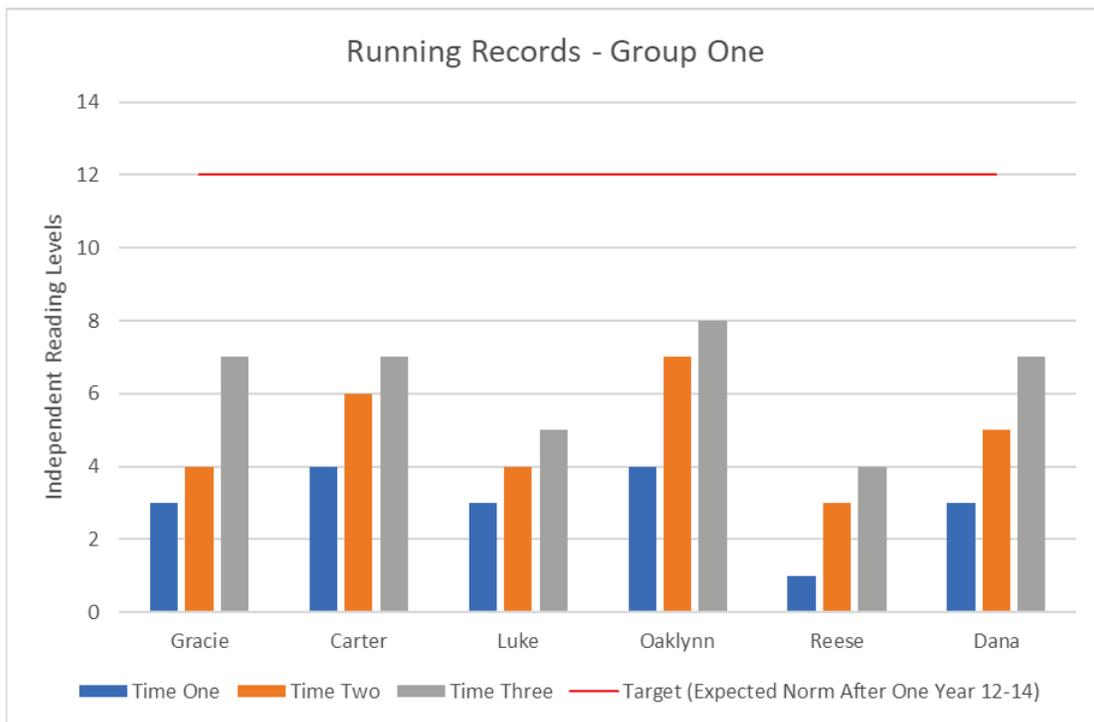
- Read the text word-by-word reflecting limited or no understanding.
- Read the text with irregular phrasing reflecting limited understanding.
- Read some of the text with natural rhythm and phrasing reflecting understanding.
- Read the text consistently with natural rhythm and phrasing reflecting a depth of understanding.

At Time One all participants in Group One were reading either word-by-word or with irregular phrasing that reflects a limited understanding of the text they were reading. Data for Time Two showed an improvement in fluency for all participants except Luke, with participants reading with irregular phrasing or beginning to read the text with some natural rhythm. Time Three again showed improvement in fluency for most of the participants in Group One, Luke and Reese were still observed to struggle with fluency and read with irregular phrasing. However, the other four participants were all observed as reading some of

the text with natural rhythm showing an improvement in the understanding of the text and *Carter* was assessed as being able to consistently read with natural rhythm.

The greatest increase in comprehension for Group One was seen between Time Two and Time Three data. At Time Two four of the participants scored satisfactory comprehension and two participants scored excellent comprehension. At Time Three five of the participants scored excellent comprehension with only one participant scoring satisfactory.

Figure 6: Running record results for Group One



Group Two

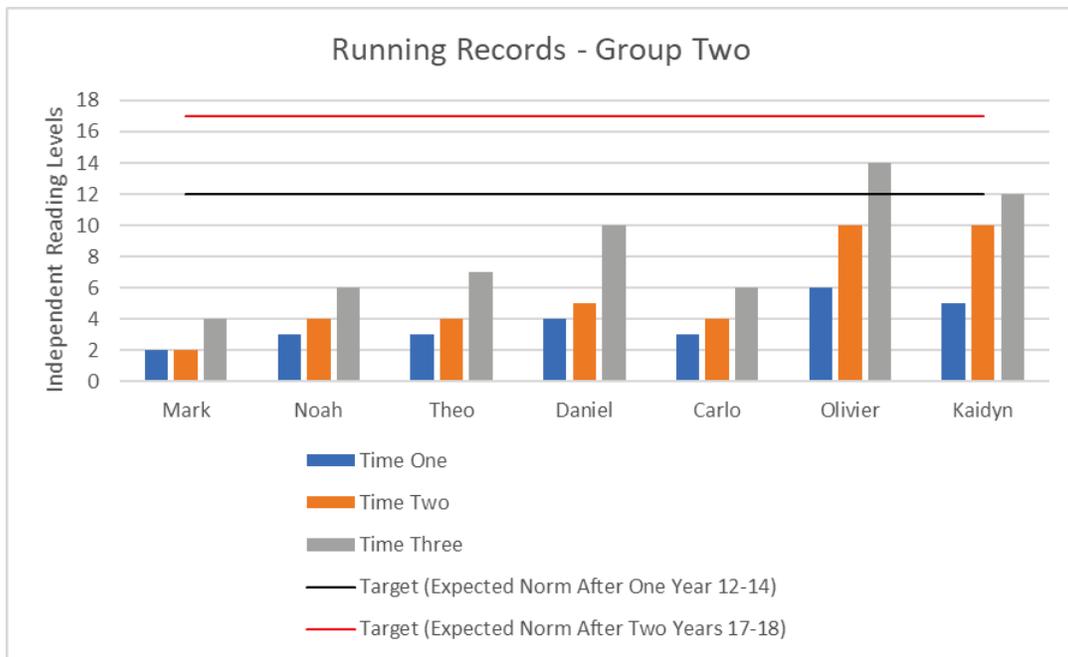
As with Group One, an increase in HFW knowledge can be seen to improve reading levels as well as fluency and comprehension (See *Figure 7*). Group Two (A)'s data shows that, as the comparison group, there was an average growth rate of one level after four weeks. After four-weeks of HFW intervention, the average growth rate increased to three levels. For Group Two (B) there was an average growth rate of five levels over the four weeks as a comparison group and then an average growth rate of three levels after four weeks of intervention.

As with Group One, fluency and comprehension were assessed using the PM benchmark reading assessment. At Time One all participants in Group Two (A) were reading either word-by-word or with irregular phrasing reflecting limited or no understanding of the text they were reading. Data for Time Two showed some improvement for half of the participants. Time Three showed improvement in fluency for all

the participants in Group Two (A) with all but Carlo reading with some natural rhythm. In Group Two (B), Olivier was reading word-by-word at Time One. Improvement in fluency was evident at Time Two and Time Three as he was able to read the text with some natural rhythm. Kaidyn started with demonstrating more fluency than the other participants as he was able to read with some natural rhythm at Time One. Time Three's assessment shows additional growth as he was now able to consistently read the text with natural rhythm and phrasing, reflecting a greater depth of understanding of the text.

Group Two (A) showed steady results for comprehension with an increase from satisfactory to excellent comprehension only seen for Theo. In Group Two (B) Olivier and Kaidyn showed improvement in comprehension with satisfactory scores at Time Two, and excellent in Time Three.

Figure 7: Running record results for Group Two



Comparison of Data

Along with previously presented data, the data for running records also shows a pattern in improvement associated with the HFW intervention (see Figure 8). Group One had a mean level increase of two levels between Time one and Time Two. In comparison Group Two (A) had a mean level increase of only one level and Group Two (B) had a mean level increase of four levels between Time One and Time Two. The pattern of improvement seen in other data is repeated when Group Two participate in the HFW intervention with a noticeable improvement in results between Time Two and Time Three for Group Two (A).

Figure 8: Running Records data comparison

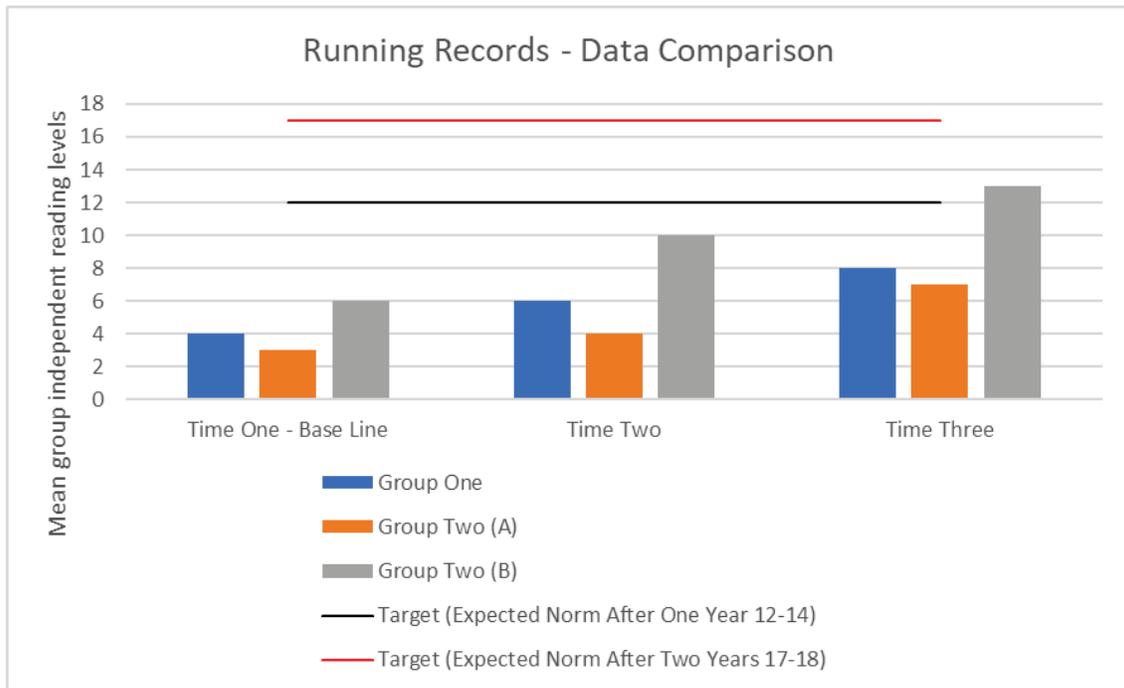


Figure 8: Shows the mean levels for each group at each time point. Due to the clear difference in levels between Group Two (A) and Group Two (B) this data has been presented separately rather than a combined Group Two mean in order to show a clear comparison of level progression.

Teacher Interviews

In order to examine the teachers views on literacy and to gain an understanding of their thoughts and experiences around implementing the HFW intervention, each teacher was interviewed at the completion of the intervention. The responses from the two teachers were analysed for common features and three key themes emerged, they are:

- Teaching beliefs and practice.
- Support for struggling early learners.
- HFW intervention.

Background Teacher Summary.

Both teachers are experienced and have taught for several years in the Junior school. Ada has been teaching for four years as a junior teacher and prior to that worked for six years at an intermediate school with special needs children. May has been teaching for 10 years after retraining from work at libraries.

Teaching beliefs and practice.

Factors in reading achievement.

Both Ada and May spoke of a range of factors that they believe are important in supporting achievement in reading. Ada discussed “reading mileage”, she felt that being exposed to a range of books was important as well presenting children with daily opportunities to engage with text in a variety of contexts. Ada’s classroom have weekly poems that they take home and practice until they are confident in reading them fluently. The readers that are used in her guided reading lessons are also available for children to reread at home and once returned to class are incorporated into reading boxes for the children so that they can continue to read familiar texts.

May highlighted “home-school relationships that is warm and honest” as being a factor that is important in helping children to succeed in reading. May felt that being able to have open discussions with families was important in helping to support children with their reading.

Both Ada and May agreed that instant HFW recognition is important, as well as children needing to have the skills to sound out words they do not know. May considers an “incredibly engaging classroom program” to be vital. She spoke of how a text cannot just be presented to a child, read and then “that is it”, other work around the text is important.

Another aspect that was evident in both teacher interviews was the diversity in teaching practises used in reading instruction. Teaching instruction is focused on the specific needs of the children at different points in time. Ada discussed various strategies including HFW flashcards, magnetic letters to make words, worksheets, guided reading groups, and when time allows one-on-one reading with children. May placed a lot of focus on phonological awareness and had several activities associated with this. Like Ada, May also teaches HFWs using letter materials for the children to build a HFW, mix it up, and build it again. May discussed the need to respond to children’s ability levels, having found that CVC word activities were too challenging for a group she was working with, there was a need to “fold it back” to similar two-letter words. An interesting note from May was around competition, in her experience “, especially with the boys” competition was a useful component in learning words. Ada also spoke about competition being one way of engaging the children and she incorporates that into some activities.

When discussing how much focus each teacher placed on HFWs prior to implementing the intervention, Ada stated that she has “always done HFWs but that was within the word list of our school”. The word list in the Junior school is used for both reading and spelling and contains 36 HFWs. HFW instruction was carried out through a few different activities in Ada’s classroom, including flashcards which were used each day during guided reading lessons. Another frequently implemented activity was a HFW dice activity where the children roll the dice, read the word on the dice and then put it into a sentence. May was also able to talk about a range of different HFW activities that she uses within her classroom including activities from ‘Building Blocks for Literacy’.

One clear finding from the teacher interviews was that neither teacher focused solely on whole words or phonics, both teachers implemented instruction and strategy at different times and depending on the needs of the children they are working with. May stated that “I straddle two schools, I have never been a solely phonics person, I’ve never been solely whole word”. It was evident from these interviews that both teachers are experts at responding to the needs of their children without relying specifically on one strategy or method.

Support for struggling early learners.

The discourse regarding struggling early readers showed that each teacher had clear beliefs about barriers and factors that hinder reading achievement. Ada attributes some struggles in reading achievement to gaps in foundational knowledge; “they do not have the basics, such as sounds or letter recognition”. When children have gaps in these foundational skills Ada finds it very hard to get them reading. May also spoke about gaps in foundational skills and knowledge, when presented with a group of children achieving significantly lower than she had previously encountered with Year Two children at the start of this year her first instinct was to go back to basics, such as do they know the letters of the alphabet and what basic HFWs could they identify. May also talked about the difficulty in maintaining engagement with these children as she finds that they lose interest quickly.

Acquiring support for struggling early readers, Ada perceives, is impeded by a schoolwide policy of waiting until they are six years of age before they can be recommended for Reading Recovery. Teachers present the names of children they believe would benefit from Reading Recovery at the syndicate meeting, and as a team, children are chosen but not all children receive Reading Recovery due to number limits. There was frustration at there being no guarantee of receiving support for those children who are struggling. May also noted that the six year observation assessment is one way that some of the struggling readers will be picked up for support either from Reading Recovery or on occasion RT Lit support. Ada noted that she currently has a teacher aide in class to help with both reading and writing. Accelerating children’s learning falls primarily back on the classroom teacher, Ada states that “if your methods that you already know are not working, then that’s when you have to go back to the syndicate meeting and say I’ve tried this, this, this and this, it’s not working, does anybody have any other ideas?”. May made similar statements to Ada regarding the feeling that supporting struggling early readers was “left up to the teacher to find their own way”, there is no checklist of strategies to try, structure to follow and no explicit program for “problem children”. May highlighted that most of the support came from the classroom teacher who would have to develop activities or strategies to try and support these children. It was clear from this discussion that a lot of time is put into developing resources to meet the specific needs of specific children.

Target children were also mentioned as one strategy of focusing on struggling early readers. For reading, writing and numeracy children are selected as target children for the term, these children are discussed at syndicate meetings, ideas and strategies shared and goals set.

Professional development emerged as a factor in being able to provide support for struggling early

learners. Professional development was undertaken last year in the 'Early Words Program', and this was then implemented with the aim of trying to increase reading levels of the lowest readers. Ada saw some success in this program with an increase in word knowledge but did not feel it had enough impact on reading achievement. This year, the junior syndicate has discussed Structured Literacy, one Year One teacher is trialling it this year and is receiving professional development around this. It will then be decided whether this program will be implemented across the entire junior syndicate. Ada, believes as a team they are at a turning point as they do not have an official program that they are all following, some are using 'Early Words', others are experimenting with Structured Literacy.

Intervention.

Initial thoughts.

Initial thoughts on the design of the intervention ranged from excitement for Ada to no preconceived ideas for May. Ada was excited to be exposing the children to additional words, though she had been doing daily HFWs with her children this was from a small pool of words that were colour coded and it appeared that the children were able to memorise the words based on the colours but not read the same words in other contexts. This notion was evident in the Time One data in which they were unable to identify words they had already been practising daily with Ada. The intensity and pace of the intervention was also different to the way in which Ada currently taught HFWs, so she was interested to see how the children responded to this. Ada noted that the coloured words were an inherited system that was initially used for new entrants and believes there may have been another step in the process after memorising the words on the coloured cards. However, she was never trained in this, she just knew these were words that the children needed to learn. This links to the previously mentioned idea of professional development and how targeted development can support teachers in their teaching methods.

May was surprised after implementing the intervention at "how quickly they did learn them [HFWs]... because it did seem just too damn simple in some ways". It was apparent that though May might have begun the intervention without any preconceptions she felt by the end of it that "yes this is a good way to do it".

Challenges.

One challenge that Ada found with the intervention was when a child was away, it was challenging having to "try and go through the words that we had previously learnt so that they didn't miss out and fall behind the group". An absent child meant that additional time was needed to work one-on-one with the child who had been away. This was more so an issue for May as some of her participants were away for more than one day at a time, making it impractical for them to catch up on the number of words missed.

Changes to intervention.

Ada felt that the intervention would have benefited from having a weekly opportunity to revisit all the words from that week and reassess retention. It was evident in the HFW assessment that there were words

considered 'learnt' during the intervention that were unable to be identified at the later assessment date. Ada also noticed this when working with the children that a word learnt earlier in the week in the intervention was not necessarily transferring into word identification when reading the words in a text at a later point in time. This raised the question as to whether there needed to be a follow up to the HFW intervention, the design of the intervention meant the HFW activity was carried out as a stand-alone activity. Ada wondered if it would help if once the children had finished their guided reading and follow-up activity if they then went into pairs and tested each other and practised the words. May however did not feel that an additional activity or follow-up was needed.

Impact of intervention on teaching practices.

Regarding ways in which the intervention impacted their teaching Ada stated that it "really supported the work I was doing anyway with the HFW". Ada discussed how it has made her think about the way she teaches HFWs and the steps she needs to take following the intervention. As noted previously, the school word list the teachers have been working on has 36 words on list one and 55 words on list two, meaning that they are currently not covering 100 HFWs. The words used in the intervention were found by Ada to be helpful and she has started using those words with other reading groups in her classroom.

May found this intervention made her think about how she can use this resource in her classroom. She noted that the intervention has given her a "bigger pool, because before that the only list I had was the [School Name] list, which is currently under review anyway".

Strengths and weaknesses of intervention design.

Ada noted that a strength of the intervention was the "repetition and the reiterating words sometimes in a sentence or the word structure if they don't understand it". Another strength discussed was that this intervention would not need to be carried out at this intensity indefinitely, as HFWs can be mastered. Ada felt that this was a worthwhile activity to do and the cost to benefit was worth it. May stated that the intervention was "pretty easy to implement", the children quickly became used to the process and wanted to carry it out daily. May noted that the words used in the intervention were words that the children were coming across in their readers.

A weakness Ada found with the intervention was maintaining the engagement of the participants, she found some of the kids got "bored with redoing it and redoing it again". Though she did note that the group size and the personalities of the group contributed to some of the difficulties with engagement. She would prefer to do it with a smaller group and pay attention to which children were grouped with each other. It was acknowledged that these challenges are part of normal classroom dynamics. May also noted some difficulties with maintaining engagement throughout each intervention session, her participants did not like the three second delay and wanted to be able to respond immediately. May talked about how if this was implemented with other children in her classroom she would, like Ada, need to think about group dynamics.

Participants.

In the discussion around the impact of the intervention on students reading, Ada noted that all participants in Group One have moved up reading levels. She has seen evidence of an increase in HFW knowledge as she has carried out testing using the school HFW List. In her observations of the participants' reading, she has seen "a little bit more confidence, out of the six there is definitely four that are more confident". Ada's opinion is that for the two children still displaying less confidence in reading, this perhaps could be explained by the personalities and characteristics of those two children. Regarding improvement in comprehension, Ada was less sure of any improvements, she felt they were able to retell the story well prior to the intervention and could "generally answer the questions that you could ask them about comprehension". Ada was hopeful that the intervention had improved comprehension but had not carried out tests to check this. Other impacts of the intervention discussed by Ada included writing, "as they can now identify words" they are able to find these words within the classroom environment and can copy them in their writing as needed.

When speaking about the impact the intervention had on the participants, May discussed how it has given the participants "confidence to read quickly". It was also noted that this intervention seems to have impacted fluency. May talked specifically about Carlo and Theo who are more aware of reading with more flow. There was one outlier to this, Mark, who appears to have internalised that the goal is to read as fast as you possibly can and that even if you make a mistake, you do not stop and reread the text to correct the mistake, you just want to get to the end.

May has also seen an impact on writing and spelling, telling a story of how one of the participants was at Reading Recovery and wrote "There were.....". The Reading Recovery teacher asked how they knew how to spell those words as May noted they "are technically spelt similarly but have completely different sounds, but they clearly had this picture in their head of what it should look like when you read it". The participants answered was that was one of "Mrs Ericksen's" (the researcher) words. May labelled this a concrete example of the transfer of knowledge from reading to writing.

Student Observations

Student observations were conducted in order to observe for any changes in behaviours that may be connected to the HFW intervention, such as more engagement in reading activities due to an increase in reading skills. As noted in Chapter Three, student observations were conducted using a timed observation method and then coded during thematic analysis of the data. Initial codes were grouped to highlight three common themes over the observations, *Participation and engagement*, *Barriers to learning*, *Guidance and Support*. A summary of observed behaviours can be found in *Table 6*.

Participation and engagement.

Both Dana and Carlo were observed as being on task for two-thirds of the 30-minute observations at Time One. Observations carried out at Time Two produced similar results with being *on task* noted at 18 of the

one-minute observation intervals for Dana and 19 for Carlo. The greatest change in observed behaviours occurred at Time Three with Dana recorded as being *on task* at 28 of the 30 minute checkpoints. This was reflected in her *participating and engaging* observed behaviours with an increase from 13 at Time One to 24 at Time Three. This could suggest improvements in her HFW knowledge and reading skills impacted her confidence and self-efficacy in participating in reading activities. However, for Carlo, Time Three observations showed a decline in his *participation and engagement*, he was recorded as *on task* at only 16 points and noted *participation and engagement* behaviours mirrored these results with this only recorded at nine points, a decrease from the 15 points at Time One. It is important to note that the context of Observation Three was different from the previous observations due to the illness of the participant (as stated in *Chapter Three – Methodology*). It was clear through this observation that the change from small group literacy teaching, with a follow-up activity, to a whole class Religious Education lesson with independent follow up work greatly impacted Carlo's ability to manage himself and to engage in his learning and activities.

Barriers to learning.

Multiple instances of distraction were observed during each participant observation, it is interesting to note however that few of these distractions were observed as being caused by others. For Dana, the source of distractions was observed as being entirely from lapses in concentration and failing to engage in the task at hand. Carlo was observed as being distracted by his peers on one occasion during Time One, and two occasions during Time Two and Three. Dana was noted as being *distracted and off task* at eight of the 30 checkpoints at Time One, at 12 checkpoints at Time Two and this decreased to only being observed at five of the 30 checkpoints during Time Three. Dana's increase in observed behaviours regarding her *participation and engagement* links to the decrease seen in her observed behaviours of *distracted and being off task*. For Carlo, instances of being noted as *distracted and off task* were recorded at nine of the 30 checkpoints at both Time One and Time Two. This increased significantly to 16 points at Time Three. Carlo's inability to engage in the lesson during Time Three is clearly demonstrated in the 16 times he was observed as being *off task*.

Support and guidance.

Dana showed only a small variation in the recorded number of instances where support was needed during her three observations, with it being recorded 11 times at Time One, nine at Time Two and eight times at Time Three. At Time One and Two she sought support and help from both her Teacher and peers in equal amounts. At Time Three however of the eight times she sought support and guidance, seven of those times were from her teacher and only one time from her peers. The three observations showed that Carlo in comparison sought help on far fewer occasions than Dana. As his distractions increased at Time Three the number of instances in which he looked for help decreased, only being recorded two times.

	Participation and Engagement			Barriers to Learning		Support and Guidance				
	On Task	Participating in activity of engaged and	Following Instructions	Observing peers during group activity	Distracted and off task	Observing Peers (Distracted by others)	Support needed during a group activity	Support needed during independent	Support needed from Teacher or Teacher Aide	Observing Peers for support
Observation One										
Dana	20	13	12	3	8	-	8	3	5	6
Carlo	20	15	16	-	9	1	1	4	4	1
Observation Two										
Dana	18	12	14	1	12	-	6	3	5	4
Carlo	19	11	15	2	9	2	3	1	4	-
Observation Three										
Dana	28	24	27	-	5	-	3	5	7	1
Carlo	16	9	14	2	16	2	-	2	2	1

Table 7: Numerical values represent the number of times behaviours were observed at one-minute check points over the course of 30-minutes of observations. Observations across multiple categories could be made at each observation check point, e.g. Dana could be participating in an activity and need support

Individual case study summaries

Case Study One – Dana

Dana is a warm and friendly child who is engaging and polite.

HFW Assessment.

As *Figure 3* shows, Dana was able to initially identify 13 HFWs. At Time One she had been at school for nearly One Year and the baseline data shows she was identifying far fewer HFWs than would be expected at this point. After four weeks of intervention, Dana increased her HFW score to 37, which was an increase of 185%. At Time Three Dana again increased her HFW score to 68, showing an 84% increase between Time Two and Time Three, an overall word increase of 55 words and a total increase of 423%. Dana's HFW scores are still below expected levels, however, this rate of increase suggests that it would require only a few more weeks of intervention for her to reach 100 HFWs.

Burt.

Dana's raw scores for Burt showed improvement over the three data collection points. Whilst Time One and Time Two's raw scores did not reach the number required to establish an *Equivalent Age Band (EAB)*, the final raw score of 23 (see *Table 2*) meant that Dana achieved an *EAB* of 6.01 – 6.07 years (using the combined 'Boys and Girls' band). As Dana was 6.01 years old at the time of the final data collection, this, according to the Burt Word Reading Assessment, places her within an appropriate reading age for word recognition skills.

Clay.

Dana's raw score moved from one at Time One to 12 at Time Two and Time Three. Her initial stanine score was one, according to Clay (2019) this suggests that without immediate, intensive, instruction Dana would be unlikely to catch up to her peers. Time Two and Time Three saw Dana's stanine scores increase to six and five respectively. A range of 5-6 suggests that Dana should be able to participate in classroom activities without a great deal of struggle.

Running Records.

The *PM Benchmark* running records show evidence of progress in reading achievement. Dana's independent level at Time One was Level Three. These results highlighted the struggles Dana had in reading and placed her well below expected reading levels for her age (See Appendix D for Colour Wheel Chart). After four weeks of intervention participation, Dana's running record at Time Two showed a move of two reading levels to a score of independent Level Five. This running record also highlighted progression in fluency, at Time One Dana read the text with irregular phrasing, with numerous pauses observed. At Time Two Dana was reading the text with some natural rhythm and phrasing. Time Three showed progress in reading achievement with Dana achieving an independent Level Seven. Overall, Dana

moved four levels in eight weeks showing evidence of accelerated learning. It is important to note that Dana would need to progress an additional five levels to be reading at an expected level for her age.

Evidence from the student and teacher interviews suggests that overall, the HFW intervention was of benefit to Dana. The timed observations supported this with improvement observed in engagement and participation over the three time points. Dana's enjoyment and love for reading were clear in each interaction with the researcher. Her level of self-confidence and self-efficacy showed development, though she still sought help from her peers and teacher she appeared more willing to give things a go and attempt the tasks set for her. The quantitative results show that Dana responded well to the HFW intervention and furthermore that the increase in her HFW knowledge impacted her reading progression and fluency. Dana showed an ability to comprehend the text she was reading at each assessment point. There was, however, evidence of more detail being provided in her retelling of a text and as the levels progressed the comprehension questions include more inferential questioning which Dana was able to answer.

Student Interview.

When asked what she likes about school, Dana spoke about how she likes playing. Dana also shared that she likes to read, explaining that she likes learning "how to read". When asked "what do you think about reading?" Dana responded that she thinks "it's really cool, and I think you just know how to learn to read and then you'll just get better". Responding to what she thought she was good at in reading, Dana talked about the HFW dice game that she does with her teacher in which they roll the dice, read the word, and make a sentence. Dana was able to talk about the parts of reading that she finds difficult. Dana talked about finding the words "hard", she feels she needs more help with reading difficult words. Dana said that she reads every day, both at school and at home.

Dana was asked, "how being able to read more words independently may help?". She thought that knowing more words would "make it easier to read". Dana was able to give simplified summaries of the HFW intervention that she participated in and could talk about the different parts of the activity. Dana liked that the HFW activity was "fun and helps you learn" and there was not anything that she could think of to change about the HFW activity. Dana was asked about why they thought they had been learning those words with their teachers. Dana responded, "So I can learn more words". When prompted "what do you think the words are going to help you do?" she answered simply "read".

Case Study Two – Carlo

Carlo is a quiet child who seems to prefer observing others than actively participating himself. His twin brother is in the classroom and was also a participant in this HFW intervention.

HFW Assessment.

As *Figure 4* shows Carlo initially was able to identify 19 HFWs. At Time One he had been at school for

nearly 1.5 years and the baseline data shows he is identifying far fewer HFWs than would be expected at this point. After four weeks in the comparison group, baseline data collected at Time Two showed an increase to 28 HFWs, this was an increase of 47%. At Time Three, after four weeks of intervention, Carlo increased his HFW score to 57, showing a 104% increase between Time Two and Time Three and an overall word increase of 38 words and a total increase of 200%. This is clear evidence that the HFW intervention was associated with growth in HFW knowledge. Carlo's HFW scores are still well below expected levels, and further attention to HFW acquisition is needed. Though Carlo showed an increase in HFW knowledge when part of the comparison group, this rate of increase was over double after participating in the HFW intervention.

Burt.

Whilst Carlo's raw scores for Burt showed improvement over the three data collection points, doubling from a score of nine at Time One to 18 at Time Two, the number of words recognised never met the threshold for determining an *Equivalent Age Band (EAB)*. These results would suggest that Carlo is still struggling with word identification and is able to recognise fewer words than his peers of a similar age.

Clay.

Carlo's raw score moved from three at Time One to nine at Time Two and ten at Time Three. His initial stanine score was two, and as with Dana, this suggests that without immediate, intensive, instruction he will not catch up to his peers. Time Two and Time Three saw Carlo's stanine scores increase to four. This is an obvious improvement on stanine two, however, it still suggests that *Carlo* will be struggling with average classroom tasks and will need additional teacher support to improve this situation.

Running Records.

The *PM Benchmark* running records show evidence of progress in reading achievement. Carlo's independent level at Time One was Level Three. These provide further evidence of the struggles Carlo has in reading and places him well below expected reading levels for his age (See Appendix D for Colour Wheel Chart). After four weeks acting as a comparison group, Carlo's running record at Time Two showed a move of one reading level to an independent Level Four score. This running record showed no progression in fluency, with texts at Time One and Time Two read word-by-word with pauses and no expression. Time Three showed progression in reading achievement with Carlo achieving an independent Level Six. This shows that the HFW intervention had an impact on reading progression for Carlo. As with Dana, it is important to note that Carlo would need to progress an additional six to nine levels to be reading at an expected level for his age.

Student Interview.

When asked things Carlo enjoys at school he spoke about how he likes playing. *Carlo* spoke about how he likes that he can read. When asked "what do you think about reading?" *Carlo* responded in a contrasting manner to Dana and said he felt that reading is "quite hard". Responding to what he thought he is good at

in reading Carlo identified that he is good at “checking the words”, further prompting clarified this as when he makes a mistake in reading, he can check the mistake and read the sentence again. Carlo could talk about the parts of reading that he finds difficult, saying he finds parts of the stories too hard, further discussion suggests that Carlo struggles with the difficulty of some words within the stories. Carlo indicated that he reads every day, both at school and at home.

Carlo was asked, “how being able to read more words independently may help?”. He believes that you will “get better” at reading and be able to “read harder books”. Carlo was also able to give a simplified summary of the HFW intervention that he participated in and could talk about the different parts of the activity. Carlo enjoyed “reading the new words that I’ve never read”. Carlo said that the constant time delay component was too long and needed to be changed, he did not like “doing the three second wait”. When asked about why he thought they had been learning those words with their teachers Carlo responded that they were learning the words “so we can get better.” When questioned about whether he thought that the HFW activity had helped he thought that it had.

Conclusion.

The results of the data collection and data analysis that contribute to this study have been presented in this chapter. Quantitative results from the HFW assessment, Clay, Burt, and Running Records were presented in tables and graphs to show the effectiveness of the HFW intervention and its influence on reading fluency and comprehension. Results from Student Observations were analysed to see patterns of behaviour of the two case study children. Student interviews were examined to highlight the student perspectives on reading and the HFW intervention. Thematic results from the teacher interviews were also presented in an attempt to understand their teaching beliefs and practice and gain insight into their experiences and thoughts on the HFW intervention that they participated in.

In the following chapter, these accumulated results will be discussed in relation to the research questions.

5. Discussion

The purpose of this pilot study was to investigate the effectiveness of a HFW flashcard intervention on HFW acquisition for struggling early readers. In addition, this study sought to investigate what impact increased HFW knowledge had on reading progress, fluency, and comprehension.

This chapter begins by discussing the main findings that emerged from the study. Previous research, literature, and results from this study are used to interpret the findings. Each finding concludes with implications for learning and teaching. Limitations of this study will be presented along with recommendations for further research. Lastly, the conclusions of the research are discussed.

Finding One

HFW intervention was effective at increasing acquisition rates of HFWs

Often reading interventions premised on developing fluency often look at flashcard drills to develop automaticity. The underlying assumption is that a flashcard drill method will increase automaticity and may impact reading fluency. As seen with previous international studies, this study provides strong evidence that the HFW flashcard intervention effectively raised children's knowledge of HFWs. This can be seen by the comparison between Group One and Group Two at Time Two and by the replication of the effect at Time Three for Group Two. Joseph and Schisler (2007) argue that the method of 'drilling' is effective at increasing word recognition skills at an accelerated pace.

Similarly, Volpe et al. (2011) stated that the design of flashcard drill methods provides increased opportunity for instructional targets, like HFWs, to be practised. As noted in the literature review, a common instructional drill strategy implemented in studies is the 'look, say' method (Sullivan et al., 2013, Watts & Gardner, 2013, Griffin & Murtagh, 2015). The findings of this study supports the effectiveness of this method at increasing acquisition rates, it is of particular importance as it begins to validate this strategy as effective within the context of NZ classrooms.

The intensity in which the participants were exposed to unknown words was associated with the accelerated growth of HFW knowledge for these participants. Teachers noted in their interviews that whilst they were using HFW flashcards within their classroom instruction prior to this intervention, neither utilised them at the intensity offered by this intervention design. The interventions daily ten minute requirement appears to have successfully provided the intensity and duration needed to achieve the academic target of increasing their HFW knowledge. Furthermore, participants' exposure to new words increased significantly as both teachers were previously working from a set of 36 HFWs from the school word list.

This supports Bos et al's, (1999) argument that those children who struggle with reading, can be supported to better achieve in reading if the child's needs determine the effective instructional method, intensity and duration required. Clay (1979) contends that a child who has been making progress at a slow rate and therefore is falling further behind their peers will need to, for a time, progress faster than their peers, if

they are to catch up. This intervention has been shown to be effective at accelerating participants' progress in acquiring HFW knowledge, though it also showed that a longer duration would be required to support them in reaching the expected levels for their age. What was also evident in the results of this study was that this HFW flashcard intervention was more effective for some participants than others. This links back to Stanovich's (1986) theory of the *Matthew effect in reading* and will be discussed in Finding Three.

Implications of this Finding for Learning and Teaching

Flashcards are commonly used in classrooms to promote rapid recall of important facts, as discussed by both teachers during the interviews. This study has provided further evidence of the value of HFW flashcards for developing automaticity in HFW knowledge. The intervention was a simple instructional method to implement as noted by the participating teachers. The intervention requires only a small amount of time daily to be seen to be effective, limited resources (HFW flashcards), and training of teachers was minimal. Joseph and Schisler (2007) identify time constraints as a factor that is frequently taken into account when educators are evaluating instructional methods. The cost-benefits of this instructional method are clear, this is an instructional method that is effective as well as efficient in supporting children in achieving greater HFW knowledge. Demonstrated by May's quote that this intervention was "just too damn simple in some ways". Overall, this study has shown that this HFW intervention is an instructional method that can be readily implemented and has been shown to make a difference for students who need it.

Finding Two

Evidence of progression in reading, fluency, and comprehension, with some transfer of knowledge to writing.

As previous research and theory suggest progress made in the automaticity of HFW knowledge was associated with improvements in other areas of reading for the participants in this study. Along with increased HFW knowledge, all participants showed growth in their independent reading levels and improvement in fluency. However, the results were less clear with progress in comprehension due to the way in which comprehension was assessed, as discussed in Chapter Four. This corresponds with findings from other studies that have provided evidence of a connection between the development of automaticity in HFW knowledge and reading fluency, the premise being that more attention can be directed to comprehension when fluency is improved as children do not have to decode every word (Ehri, 2014).

This study demonstrated that whilst automaticity in HFWs may be a constrained skill, it is still important in early literacy. Additionally, this study suggests the benefits went beyond the constrained skills and impacted on fluency and comprehension as well. This is consistent with Paris's (2005) argument that constrained skills must be mastered and instruction on these skills needs to occur early.

The transfer of knowledge to writing was an aspect of improvement noted by both teachers but not considered in the design of the intervention or this study. For Group One students the teacher noted that

they were able to identify HFWs more easily around the classroom, copy them into their writing, giving more independence to these students. Group Two, anecdotally, were able to use more HFWs in their writing without the need for additional support or resources. It appears for some participants, being able to identify HFWs automatically has transferred into being able to spell and write these words from memory. Further studies on the impact of HFW interventions on writing are warranted.

Implications of this Finding for Learning and Teaching

The findings from this study further support the need for constrained skills, such as automaticity in HFWs, to be mastered as these skills impact other reading skills. It is apparent constrained skills can be affected by the Matthew effect and for that reason, assessment and teaching of these skills is vital during the first year of schooling.

Finding Three

Early identification of struggling readers is important.

The data from this study highlights the importance of early identification of struggling readers and targeted intervention to meet those needs. As discussed in findings one and two, this HFW flashcard intervention resulted in progress for all participants in their HFW knowledge, reading progression, and to varying degrees, in their fluency and comprehension more generally. However, findings one and two showed the disparity in results amongst the participants. While participants in both groups made progress as an outcome of the intervention, at the completion of the study, none of the participants from Group One reached expected levels for age in either HFW knowledge or independent reading levels. In Group Two four of the seven participants reached expected HFW knowledge levels at the end of the intervention but none reached expected independent reading levels. These results are consistent with the literature on the Matthew effect in reading and link to issues with a “wait to fail” approach. Early learners with struggles in reading find it hard to catch up to their peers, for this reason, early identification and intervention is needed to ensure these children do not continue to fall behind. What may begin as relatively small differences in essential reading skills at the start of schooling can promptly progress into a downward spiral of shortfalls in achievement that leads to negative self-efficacy and behavioural side effects (Stanovich, 1986). This suggests that all participants from Group One would benefit from more HFW focus. For Group Two (A) all participants except Daniel would benefit from continuing focus on HFWs. However, for Daniel and the participants in Group Two (B) this suggests that the HFW intervention has progressed them this far but now identification and focus on other areas of need is required.

This study highlights the importance of identifying children with reading difficulties early supports the argument that it is critical for young children who are at risk to receive the necessary support sooner rather than later. As seen between the two participant groups in the study, the participants in Group One had been at, or were close to approaching one year of schooling at the end of the intervention and were in a Year One classroom. The children in Group Two had been at school for up to 1.5 years at the completion of the intervention and were Year Twos. The baseline data showed that the children in Group One and

Group Two (A) all had similar HFW knowledge and independent reading levels, even though Group Two (A) had been at school for longer. The significance of this is Group Two (A), as year Two students had a larger gap between their assessed levels and their expected levels than Group One participants. As a result, the children in Group Two (A) needed to increase their HFW knowledge and reading progression at an even more accelerated rate than Group One to reach expected levels. Lai et al. (2009) contends that implementing effective interventions presents considerable challenges as there is not simply a need to improve achievement but rather achievement needs to be accelerated. Lai et al. (2009) states that these students need to “make more than the expected rate of gain” (p. 31). This study supports the argument by McLachlan and Arrow (2015) that children who are identified at six years of age as requiring additional support could have been identified at five years of age when beginning school without difficulty. The obvious advantage of this is that they could have had a year of early intervention to support them with their reading difficulties.

Implications of this Finding for Learning and Teaching

The implications of this finding, along with previous research, are that it is imperative that schools have procedures to identify children who are struggling in reading early. Torgesen (2002) argues that there must be procedures in place to identify children who are not progressing as expected and are struggling in early reading. Along with early identification procedures, it is essential appropriate and effective strategies are available to meet the needs of these learners. Greaney and Arrow (2012) argue that in order to prevent literacy learning difficulties, these identification procedures and appropriate and effective interventions need to be available soon after children begin school. An initial assessment, conducted when children begin school, assessing foundational skills such as alphabetic and phonological awareness, HFW knowledge and fluency would be beneficial and identifying needs early and enabling appropriate support to be provided.

Finding Four

Struggling early readers have diverse needs that need to be specifically targeted.

The design of this study required initial profiling of the students in order to identify those with a need in HFWs. Initial profiling used standard classroom assessment to identify children who had lower than expected HFW knowledge and were reading at levels below their peers. Baseline data were collected from the selected participants were then used to ensure that the specific gaps in HFW knowledge for these participants were being targeted. This study has shown the importance of identifying the specific needs of the student as struggling early readers have diverse needs. It is clear that some students do have an identifiable need in HFW knowledge and that developing automaticity in HFWs has benefits. Whilst this intervention demonstrates that it is effective in increasing HFW knowledge and has a positive effect on reading progression, fluency, and comprehension for children with gaps in HFW knowledge it cannot be argued that this is a ‘silver bullet’ fix for all struggling readers. Although, in a more generalized sense, it could be argued, that where there are students with needs, whatever those needs are, this study shows that interventions targeting well-understood problems can be effective. For instance, if a group of students

were identified as having difficulties with making inferences, then the evidence suggests that implementing an intervention that targets that specific need is likely to work, provided the intervention is founded on effective instruction. Regardless of the learning difficulty, if an intervention is designed to solve a particular problem for the students who have that problem then it is more likely to be effective.

Implications of this Finding for Learning and Teaching

There are two implications from Finding Four; the specific needs of struggling early learners matter, and teachers need to have the knowledge to be able to interpret assessment data as well as knowledge of effective strategies in order to know how to meet the needs of these children.

As discussed in Finding Three, the specific needs of the students are important. Effective and efficient intervention necessitates that those specific needs are targeted. Teachers know their students best, and as highlighted in the teacher interviews support for struggling learners can often fall almost entirely on the classroom teacher with additional support never guaranteed due to availability and limits regarding these resources. Given this, this finding implies it is vital that teachers are confident and capable of interpreting the assessment data they collect and can profile their children to identify specific needs. In addition to this, teachers need to be able to select and implement appropriate effective instructional methods to target the identifiable needs. A focus, therefore, needs to be not only on what the gaps in the students knowledge is but also on identifying gaps in teachers knowledge that is hindering them in effectively supporting their struggling learners.

Limitations and recommendations for further research

As this study was a small-scale pilot study, the number of teacher and student participants is limited, making the results difficult to generalise. However, the smaller group of participants resulted in rich data. A benefit of conducting a small quasi-experimental design like this is that it allowed for comparisons to be made but avoided ethical issues as Group Two was able to participate in the intervention too, just with a delayed start. A similar intervention conducted on a larger scale could be considered to ensure the reliability of this study. It would also be of interest to include children who had been at school for less time to see what impact this had on accelerating children to expected levels given the implications of the *Matthew effect*.

Furthermore, the small number of participants meant that statistical data analysis were limited to descriptive statistical calculations. The limited data meant it was inappropriate to conduct further statistical tests such as a t-test or ANOVA. This is a clear limitation of this study and further research would be strengthened by a larger group of participants that enabled more detailed statistical analysis to be carried out.

Data for the comparison group (Group Two) at Time Two must also be acknowledged as a limitation of this study. Growth of HFW knowledge and progression in reading levels, fluency and comprehension were greater than expected for many of the participants in Group Two between Time One and Time Two data

collections. Some of the reasons for this unexpected growth were explored in Chapter Three. It is clear there has been some degree of 'contamination' of data for Group Two and that there was a focus switch to two-letter word recognition and CVC words. Educational research is commonly carried out within a classroom setting rather than in laboratory settings and as this quasi-experimental intervention was carried out in a classroom environment it is difficult to control for all factors and variances in the implementation of the intervention. The nature of teaching as inquiry, along with teachers' tendencies to problem solve and alter teaching and learning experiences to suit the needs of the children, means that in this instance there is evidence of data contamination for Group Two.

Despite this, information and insights could still be gained from the data collected. Though growth was greater than expected over the time the group acted as a comparison group, data collected at Time Three showed more substantial growth after they participated in the intervention. This data highlights that HFW instruction is beneficial to progression in reading, however, the intensity and structure of the HFW intervention had a greater impact on the participants. This scenario demonstrates the challenges of research carried out within a classroom setting.

A further limitation in measures was due to the Running Record assessment utilised in data collection requiring children to have a satisfactory to excellent mark for comprehension at each level for it to be considered an independent reading level. This meant that only a small amount of growth was seen in this measure as it was a prerequisite for attaining an independent level. When a child read at a level higher than their independent level, it was clear to see their levels of comprehension decreased, along with other reading processes, however, this remained stable at the independent level. The data collected and reported was unable to show a significant increase in comprehension amongst the participants clearly. Future research would benefit from investigating other ways of measuring and reporting reading comprehension.

The measures used to examine progression in fluency were sufficient in showing the growth in reading fluency for the participants. The focus of this measure was a child's ability to read at an appropriate pace and with expression. This measurement is subjective and would have benefited from having the additional measurement of reading rate in order to gain more detailed data around fluency skills. Reading rate is often calculated by taking the total number of words read in a one-minute period and subtracting the number of errors made. The resulting calculation provides a word per minute (WPM) or reading rate. The reading rate could then be compared to different data points to determine improvements.

Another element of design for this study was a limited time frame. Although, studies and interventions that occur over short time periods are common, as seen in the Literature Review when looking at empirical studies. For this study, several factors, including COVID interruptions and researcher availability, meant the study needed to be conducted over one school term. Studies that occur over longer periods of time and/or include data collection showing the longitudinal impact of HFW interventions would add to the current understandings. As noted previously, data were collected at three time points for each group, in a subsequent interview with Ada, she anecdotally reported that several of the children from Group One

continued to have accelerated progress in reading and by the end of 2021 were reading at expected levels. Even with an extended COVID lockdown that occurred after the intervention, several participants from Group One managed to progress in reading enough to catch up to their peers. Having more than the three data points would have given a broader picture of the impacts of the intervention on the participants.

A final important limitation of this research regards COVID. The pandemic impacted this study in multiple ways, including delays to the start of the research, illness amongst the researcher and the participants, and restrictions and health measures due to COVID impacted data collection times. Furthermore, to a certain degree, it helped determine the design of the study, as different designs were considered; however, this design could be carried out with the least impact from restrictions and lockdowns. Lastly, it cannot be underestimated the impact the pandemic has had on learning and progress. In particular, for children in Auckland, restrictions and ongoing lockdowns meant a large amount of learning time in 2021 had to be carried out online and at home. The disruption to normal routines has undoubtedly impacted the children's progress in varying degrees, but this study did not specifically address this within its parameters.

Conclusion

As acknowledged, there is continuing debate around how 'best' to teach children to read. Commonly known as the "reading wars" this debate pits phonics against whole language instruction. However, many argue that a more balanced approach is needed. This study is founded on the understanding that reading is a complex, multifaceted process that requires numerous skills. The importance of early identification of children struggling with reading and providing explicit instruction targeted to their specific needs has been highlighted. Analysis of the data from this study supports this theory. Research clearly shows that fluency is a vital component of reading and within fluency, automaticity is crucial in supporting and developing comprehension skills. For children with gaps in HFW knowledge, a targeted intervention to increase HFW acquisition can effectively increase success in reading.

The HFW intervention was associated with increased acquisition rates of HFWs for this group of struggling early learners. Increased HFW knowledge also associated with progression in reading, fluency and to some extent comprehension as seen in previous studies. As a simple intervention that didn't require a large amount of professional development, time, or resources this activity can easily be used by classroom teachers to target their children who have gaps in their HFW knowledge and are struggling with reading. Furthermore, the design of this intervention is such that teachers could use it as part of their own teaching as inquiries as it balances the need for robust data with practical considerations.

Research specific to NZ children is important, as noted, variances in educational contexts may affect outcomes on early literacy measures (Schaughency, 2015). NZ children generally start school when they turn five, rather than at the start of the school year, as is the case in other countries. This leads to differences in the amount of time children are exposed to schooling and reading instructions. Therefore, more research specifically carried out within NZ classrooms to establish instructional strategies that are effective is warranted.

Appendices

Appendix A

200 HFWs used in the intervention.

the	of	and	a	to
in	is	you	that	it
he	was	for	on	are
as	with	his	they	I
at	be	this	have	from
or	one	had	by	words
but	not	what	all	were
we	when	your	car	can
said	there	use	an	each
which	she	do	how	their
if	will	up	other	about
out	many	then	them	these
so	some	her	would	make
like	him	into	time	has
look	two	more	write	go
see	number	no	way	could
people	my	than	first	water
been	call	who	am	its
now	find	long	down	day
did	get	come	made	may
part	over	new	sound	take
only	little	work	know	place
year	live	me	back	give
most	very	after	thing	our
just	name	good	sentence	man
think	say	great	where	help
through	much	before	line	right
too	old	any	same	tell
boy	follow	came	want	show
also	around	farm	three	small
set	put	end	does	another
well	large	must	big	even
such	because	turn	here	why
asked	went	men	read	need
land	different	home	us	move
try	kind	hand	picture	again
change	off	play	spell	air
away	animals	house	point	page
letter	mother	answer	found	study
still	learn	should	New Zealand	world

Appendix B

Procedural reliability observation template.

Date:

Time:

HFW Assessment	Yes/No	Comments
Teacher goes through set of HFW flashcards from previous session to assess retention. (Children do not need to pause for 3 seconds before saying word, they need to read the word instantly).		
Any HFWs that are unable to be instantly recalled (within 3 seconds) are added to the new set of HFW flashcards for the day.		
A maximum of 10-word cards are used. Each daily set has five words cards as well as any cards that have not been learnt from the previous day. No more than 10 HFW cards to be focused on in each session.		
Trial One		
Teacher recaps how the intervention will run.		
Teacher holds up the 1 st HFW flashcard and says the word clearly.		
Teacher counts out 3 second delay on her fingers.		
Children repeat the word.		
This procedure is done for all HFW flashcards in the set.		
Trial Two and subsequent Trials		
HFW flashcards are shuffled after each trial.		
One HFW flashcard at a time is shown to the group and the children need to wait 3 seconds before they say the word.		
If the word is correctly read, the teacher praises briefly and then moves on to the next HFW flashcard.		
Any HFW flashcards that are read incorrectly, or the group gets stuck on, the teacher will say the word and point out a memorable feature. Children will then wait 3 seconds before they repeat the word.		
This process will repeat through the set of HFW flashcards until the children can read each word correctly at least twice.		
Intervention runs for no less than 8 minutes and no longer than 12 minutes		

/ 14

_____ % Procedural Reliability

Appendix C

Interview Questions and topics

Semi-structured interviews will be conducted with the two teachers and one child from each participant group. The interviews will be conducted individually and for the teachers will go for no longer than one hour and for the children no longer than 30 minutes. Prior to carrying out the interviews with the participants I will pilot these questions with a colleague and a child to check timing and clarity of the questions.

Potential topics and questions for teacher participants:

<p>Teaching beliefs and practice</p>	<ul style="list-style-type: none"> • Tell me a little about your teaching experience. • What do you believe are important factors in reading achievement? • What teaching methods and strategies did you use prior to this intervention? • How much focus did you place on HFWs prior to this intervention and in what ways? • Tell me about your thoughts and understandings about struggling early readers? • What steps are commonly taken to support struggling early readers?
<p>Intervention</p>	<ul style="list-style-type: none"> • What were your initial thoughts on the design of this intervention? Have these thoughts changed since participating? • How practical did you find this intervention to implement into your classroom programme? Were there any challenges with carrying out this intervention? • How has this intervention impacted or changed your teaching? • What are some of the strengths and weaknesses of this intervention?
<p>Student participants</p>	<ul style="list-style-type: none"> • Could you tell me a little bit about the group participants and their schooling experiences? • In what ways do you think this intervention has impacted on the students reading? • Do you think this intervention has impacted any other areas of the participants schooling? Elaborate. • How could this intervention benefit others? • Are there any changes to this intervention that you believe could improve it?

Potential topics and questions for student participants:

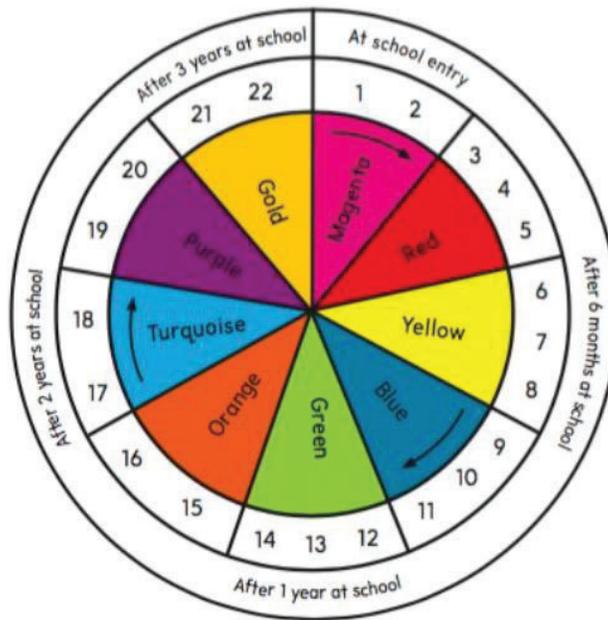
Student and schooling experiences	<ul style="list-style-type: none">• Can you tell me a little bit about yourself and this school? <p>Prompts – how old are you? What do you like about school?</p>
Reading	<ul style="list-style-type: none">• What do you think about reading?• What do you think you are good at in reading?• What do you find hard or need more help with in reading?• How much reading do you think you do each day? School? Home?• If you can read lots of words by yourself tell me how you think this might help you with your reading?
Intervention	<ul style="list-style-type: none">• Tell me about the HFW activity you did each day with your teacher?• What did you like most about the HFW activity?• Was there anything you did not like about the HFW activity or would change?• What are some other word activities you have done in your classroom?• Why do you think you were learning those words with your teacher?

Appendix D

Reading Colour Wheel

Children move around the wheel clockwise, starting at magenta when they are a new entrant. After one year at school children are expected to be reading at green. After two years at school children are expected to be reading at turquoise.

Figure 3: Reading colour wheel with reading levels and expected norms



Appendix E

Participant Information Sheet - Teacher



**EDUCATION AND
SOCIAL WORK**
SCHOOL OF CURRICULUM
AND PEDAGOGY

PARTICIPANT INFORMATION SHEET

Teacher

Project title: Teaching High Frequency Words (HFWs) To Early Learners

Supervisor: Associate Professor Dr Aaron Wilson

Student Researcher: Nikita Ericksen

Kia ora,

My name is Nikita Ericksen, and I am undertaking research for my Thesis as part of my Master of Education degree at the University of Auckland with Associate Professor Dr Aaron Wilson overseeing this study as my supervisor. The Principal has given consent for me to carry out my research at this school and to approach the Year One and Year Two teachers about this study.

I would like to invite you to take part in a study that is focused on a high frequency word (HFW) intervention for early learners who are struggling in reading. HFWs are those words that appear repeatedly in written text, as much as 50 – 60% of words that children come across in their reading are HFWs. The frequency of these words in texts means it is beneficial for early learners to be able to instantly recognise them.

You may have used flashcards in your classroom before as they are often used in New Zealand classrooms, commonly the teacher presents a flashcard, prompts a response, and then provides feedback. The flashcards that will be used for this study will be a small rectangle piece of card with a single HFW on it. This intervention will combine the 'look/say' method with constant time delay procedures. The 'look/say' method is where the children are shown a HFW flashcard, the teacher says the word, and then the children repeat the word back to the teacher. Constant time delay procedures will mean that the teacher will say the word on the flashcard and then pause for 3 seconds before asking the children to say the word back.

This study requires two teachers with either Year One or Year Two children. One teacher and a small group of children from their class, will participate in the intervention for ten minutes a day over four weeks first while the other group acts as a comparison group. At the completion of the first intervention the second teacher and their small group of students will then participate in the intervention .

The aim of this study is to examine the effectiveness of a HFW flashcard intervention on improving word acquisition for children who are struggling in reading. This study will also investigate what relationships there are, if any, between changes in HFW knowledge and reading progress, fluency, and comprehension.

What are you being asked to do?

If you agree, the following is what would be required of you:

1. Partner with the researcher to choose children from your classroom who may benefit from a HFW intervention.
2. Allow access to the participating children, at a time that is suitable to yourself, for collection of baseline data, postdata and maintenance data. All data will be collected by the researcher and this will include *Clay Word Identification assessment*, *Burt Word Reading Test (New Zealand Revision)*, *HFW assessment* and *Running Records*. Assessment collection time will differ from child to child. It is anticipated that the *Burt Word Reading Test (NZ Revision)* and *Clay Word Reading assessment* will be completed in approximately 5 minutes per child. The *High Frequency Word Assessment* will take approximately 5-10 minutes per child. Each child's *Running Record* will take around 15 minutes per child.

3. Be available for a one-hour intervention training session with the researcher.
4. Administer the intervention for ten minutes each day, for four weeks.
5. Allow the researcher to observe four of the intervention sessions, one a week, to check that intervention procedures are being followed. These observations are a short observation that is carried out while the intervention is being run so it is anticipated they will go for approximately ten minutes.
6. Allow the researcher classroom access on three occasions, at a time convenient for yourself, to observe one child from the participant group during a reading session. Observation notes will be written and focused solely on the one student participant. These observations will go for 30 minutes.
7. Participate in a post intervention interview with the researcher that will be audio recorded. This interview will go for no longer than one hour. The interview will be transcribed by the researcher and a transcript provided for you to review. A period of two weeks will be available for you to make any amendments to the transcript.

Voluntary participation

Participation in this research is entirely voluntary and there are no obligations for you to participate. Assurance has been given from your school Principal that regardless of whether or not you choose to participate in this research this will not affect your employment or your relationship with the school.

If more people volunteer than participants required for the study, participants will be randomly selected.

You will be free to withdraw from the study at any time, and to withdraw your data up until 9 July 2021 which is the final date assigned for the completion of data collection. Participants do not need to give a reason for their withdrawal.

What will happen to the data collected?

All data and information will be confidential. During the study, data will be analysed and stored securely on the researcher's password protected computer in a password protected file. All data will be deleted from the researcher's computer after the study is completed. All data and information will also be stored securely and separately from consent forms at the Faculty of Education and Social Work for a period of six years, after which time all information and data will be destroyed or deleted.

The recorded interviews will be transcribed by the researcher and only the researcher and supervisor will have access to the recordings.

A summary of the findings and results from the research will be shared with all participants. The final summary will be presented as a thesis for my Master's degree and possible conference papers and articles.

Every effort will be made to protect participant's identities. There is a chance that other teachers from within your school may become aware that you are participating in this research but not of any data from your class or anything said in the interview. The school will not be identified by name and only general descriptors will be used in reporting. No student or teacher will be identifiable beyond the researcher and researcher's supervisor. Pseudonyms will be used for the participants in all analysis and reporting.

Thank you very much for considering this. If you have any questions or concerns, please phone or email. Our contact details are below:

Nikita Ericksen
nikita.ericksen@gmail.com

Associate Professor Dr. Aaron Wilson
aj.wilson@auckland.ac.nz
Ph: (09) 623 8899 ext. 48574

The Head of School is:
Dr. Katie Fitzpatrick Ph.D
k.fitzpatrick@auckland.ac.nz
Ph: (09) 6238899 ext. 48652

For any queries regarding ethical concerns you may contact the Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373- 7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 24/03/2021 for three years. Reference Number UAHPEC21965.

Appendix F

Participant Information Sheet - Student



**EDUCATION AND
SOCIAL WORK**
SCHOOL OF CURRICULUM
AND PEDAGOGY

PARTICIPANT INFORMATION FOR CHILDREN

Project title: Teaching High Frequency Words (HFWs) To Early Learners

Kia ora,

My name is Nikita Ericksen and I am studying at the University of Auckland. I am interested in helping children to learn to read. With your help I want to see if flashcards are a good way to help you to learn to read new words quickly.

A flashcard is a piece of card that has a word on it, there is a picture below to show you what a flashcard might look like.



The word activity will take 10 minutes each day, for 4 weeks. It will be done during your reading time and your teacher will help you and a small group of other children from your class. If you want to join in with this then I will work with you before and after the study to see how many words you can read and ask you to read a story to me.

I will also choose one child to come and watch in class for 3 times and after the four weeks I will ask you to come and talk with me about reading and I will use an audio recorder.

You do not have to be a part of this study if you do not want to. If you say yes but then change your mind, you can stop at any time.

If you have any questions you can ask them at any time.

Thank you for thinking about this.

Nikita Ericksen

Approved by the University of Auckland Human Participants Ethics Committee on 24/03/2021 for three years.
Reference Number UAHPEC21965.

Appendix G

Participant Information Sheet – Parents and Caregivers



**EDUCATION AND
SOCIAL WORK**
SCHOOL OF CURRICULUM
AND PEDAGOGY

PARTICIPANT INFORMATION SHEET

Parent/Caregiver

Project title: Teaching High Frequency Words (HFWs) To Early Learners

Supervisor: Associate Professor Dr Aaron Wilson

Student Researcher: Nikita Ericksen

Kia ora,

My name is Nikita Ericksen and this letter is to invite your child to participate in a small research project that I am conducting for my Thesis as part of my Master of Education degree at the University of Auckland. This project is under the supervision of Faculty of Education staff member Associate Professor Dr Aaron Wilson.

Some children find learning to read tricky and I am interested in finding ways to make reading easier. This study is focused on a high frequency word (HFW) intervention for children who are in their first year or two at school and are finding reading challenging. HFWs are words that appear repeatedly in written text. 50 – 60% of words that children come across in their reading are HFWs. The frequency of these words in texts means it is beneficial for early learners to be able to instantly recognise them.

The flashcards that will be used for this study will be a small rectangle piece of card with a single HFW on it, such as 'the'. Children will learn to read new words with their teacher by practising with the flashcards until they are able to read each word instantly by themselves. Your child's teacher will work with a small group of children in reading time for ten minutes each day over four weeks. The aim of this study is to see how effective HFW flashcards are at improving children's HFW knowledge. This study will also look at whether being able to read more HFWs automatically causes any other improvements in a child's reading progress.

This study will be carried out during Term Two. Data about your child's progress in HFW knowledge and reading will be collected by the researcher. Your child may also be chosen to be observed by the researcher during reading on up to three occasions. These observations will be carried out by the researcher during the children's classroom reading lessons and will go for 30 minutes. At the end of the study the researcher will also be talking with one child from the group about reading and how they found the HFW activity, this discussion will be audio recorded. The interview will last for no longer than 30 minutes and will be done during class time.

What is your child being asked to do?

If you agree, the following is what would be required of your child:

1. Participate in the HFW activity with their classroom teacher for ten minutes daily for four weeks.
2. Have reading data that monitors their reading progress collected before and after the study.
3. Your child may be chosen to be observed in class by the researcher. These observations will occur three times, once prior to the study beginning, once during the study, and once after the study.
4. Your child may be chosen to be interviewed by the researcher about the study. This will be audio recorded and transcribed by the researcher.

Voluntary participation

Participation in this research is entirely voluntary and there are no obligations for your child to participate. Assurance has been given from your school Principal that regardless of whether your child participates or not in

this study, this will not affect you or your child's relationship with the school or their access to any school services. If your child would benefit from this HFW activity but choose not to participate in this research they will still be able to carry out this activity with their teacher.

If more children volunteer than participants required for the study, participants will be randomly selected.

You or your child will be free to withdraw from the study at any time, and to withdraw their data up until 9 July 2021 which is the final date assigned for the completion of data collection. Participants do not need to give a reason for their withdrawal.

If consent is not provided for your child or your child does not provide their assent to participate in the intervention but would benefit from this intervention, they will still be able to participate in the HFW activity without being part of the study. Their classroom teacher will be welcome to include your child in the intervention however no data will be collected by the researcher and your child will have no interaction with the researcher.

If you agree to give consent for your child to participate in this study and your child agrees I would appreciate you signing the Consent Form and helping your child to complete the Assent Form by reading the form to them and helping them to fill it in. Please return both forms to your child's teacher who will pass them on to me.

What will happen to the data collected?

All data and information will be confidential. During the study, data will be analysed and stored securely on the researcher's password protected computer in a password protected file. All data will be deleted from the researcher's computer after the study is completed. All data and information will also be stored securely and separately from consent forms at the Faculty of Education and Social Work for a period of six years, after which time all information and data will be destroyed or deleted.

The recorded interviews will be transcribed by the researcher and only the researcher and supervisor will have access to the recordings.

A summary of the findings and results from the research will be shared with all participants. A copy will be mailed to you if you indicate on the Consent Form that you would like to receive one. Participants will be invited to attend any presentations at the school that come as a result of the research. The final summary will be presented as a thesis for the researchers Master's degree and possible conference papers and articles.

Every effort will be made to protect participant's identities. There is a chance other students in the class may become aware that a child is participating in the study but not what that child's assessment scores are or what they said in the interview. No one beyond the classroom would be able to identify who the student's in the research are. The school will not be identified by name and only general descriptors will be used in reporting. No student or teacher will be identifiable beyond the researcher and researcher's supervisor. Pseudonyms will be used for the participants in all analysis and reporting.

Thank you very much for considering this. If you have any questions or concerns, please phone or email. Contact details are below:

Nikita Ericksen
nikita.ericksen@gmail.com

Associate Professor, Dr. Aaron Wilson
aj.wilson@auckland.ac.nz
Ph: (09) 623 8899 ext. 48574

The Head of School is:
Dr. Katie Fitzpatrick Ph.D
k.fitzpatrick@auckland.ac.nz Ph: (09)
6238899 ext. 48652

For any queries regarding ethical concerns you may contact the Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373- - 7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 24/03/2021 for three years. Reference Number UAHPEC21965.

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