EVALUATING THE EFFECTIVENESS OF A TIER 2 VOCABULARY INTERVENTION ON THE WRITING AND SPELLING OF ELEMENTARY STUDENTS WITH DYSLEXIA: A FORMATIVE CASE STUDY

By

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Abstract

This formative case study sought to explore the effectiveness of a remedial intervention based on Tier 2 word meanings for students whose primary deficit is phonological. Within the framework of a formative design research study, collaboration between a special education teacher and the researcher allowed for adaption and delivery of content while providing an opportunity to develop teacher capacity as well as student ability. The study found that focussing on the teaching of word meaning enhanced the remedial program due to the inclusion of a greater range of teaching strategies. Too few words were taught in order to bring about a significant improvement in vocabulary knowledge or spelling skill; however, most of the students believed they had improved in spelling and their attitude to writing was more positive at the end of the study. Several students showed improvement in written expression.
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CHAPTER ONE: INTRODUCTION

Rationale

This study explored a teacher's remedial intervention based on Biemiller’s Tier 2 word meanings (2010) for students with dyslexia whose primary deficit is phonological. Word meanings were selected according to their phonetic structure and inflections were taught in a phonics-based spelling intervention. This exploratory investigation described a special education teacher’s experience in applying new research findings (2010) to help select words that are semantically relevant as well as encodable.

Dyslexia is regarded as a reading disability resulting from deficits in phonological processing and orthographic knowledge (Shaywitz, 2005; Nation & Snowling, 2004; Stanovich, 1986; Thomson, 2009; Wolf, 2007), which may impede vocabulary acquisition and reading comprehension. Students with dyslexia have difficulty learning letter-sound correspondences, segmenting words into phonemes, reading words in isolation and reading fluently. They may have difficulty pronouncing phonetically irregular words and observing punctuation signals. Students with dyslexia also have difficulties spelling, which include poor letter formation, reversals of letters and letter sequences and syllable deletion (Moats, 1995; Orton, 1937/1999).

Interventions for students with dyslexia typically focus on improving reading performance by teaching phonological awareness, phonics, and fluency (National Reading Panel, 2000, Shaywitz, 2005; Wolf, 2007). Several studies using systematic phonics interventions have met with success in improving reading (Shaywitz, 2005; Torgesen, 2001; Vellutino, Scanlon, Small & Faneule, 2006). Other interventions
emphasize the importance of teaching skills involved in fluency development, such as, prosodic features, automatic word recognition and text comprehension (Kuhn, Schwanenflugel & Meisinger, 2010). A third focus for reading intervention is vocabulary instruction, given the strong correlation between vocabulary knowledge and reading comprehension (National Reading Panel, 2000).

Teachers have noted that gains made by weak readers in reading fluency and comprehension do not always lead to corresponding gains in spelling and written expression (Graham, 2000). Students with dyslexia may make considerable progress recognizing letters, reading words in isolation and reading longer passages of text concomitant with their phonetic knowledge, but they appear to have greater difficulty learning to spell those same words. Despite extensive remediation, some students with dyslexia have persistent difficulties with spelling and writing. Spelling is characterized by vowel confusion both of tense and lax vowels, letter reversals, substitutions and deletions, over-generalizations of spelling rules, and syllable deletion in polysyllabic words (Moats, 1995). Writing is often poorly organized, short on elaboration and inadequately punctuated. For dyslexic students, it seems easier to remediate the skills involved in decoding, rather than the skills involved in encoding. Spelling and writing appear to be more recalcitrant problems for learning disabled students (Berninger & Amtmann, 2003; Reid, 2009).

Dyslexic students are disadvantaged by their weak spelling skills, which may interfere with writing skills, such as, note-taking, copying, expository and narrative text creation. If dyslexic students are expending considerable cognitive effort on letter
formation and spelling, then the fluent communication of ideas may be impaired. Concern for spelling and handwriting may supersede awareness of coherence and unity, leaving writing disorganized and poorly elaborated. Sometimes students cannot read what they have written, which hampers editing, reflection and revision of text. Their decoding skills are adequate but incorrect spelling obscures meaning making rereading laborious. These learning disabled students need interventions to remediate spelling difficulties so that words can be encoded correctly and automatically. Spelling is an important factor in a student’s ability to produce accurate and clear written communication. Teaching spelling has also been found to improve word reading in kindergarten students (Ehri & Wilce, 1987) by improving phonetic segmentation skill and memory of grapheme-phoneme association. In short, there are several good reasons for paying greater attention to spelling instruction in remedial interventions for students with dyslexia.

In considering remediation of spelling and writing for students with dyslexia, two questions sprang to mind: What knowledge to teach? and What teaching strategies to use?

The primary deficit of a student with dyslexia is phonological processing, which means that the intervention needs to help remediate the student’s deficit in this area (Carreker, 2006). Students with dyslexia receive phonics-based interventions, which seek to address these weaknesses. Spelling skills are taught in tandem with instruction in phonological awareness and phonics. The scope and sequence of skills are selected according to the developmental stage the student has reached so that the knowledge taught will be relevant to the student and be readily assimilated and learned. The
developmental sequence loosely described here begins with instruction in the alphabet code, followed by the use of tense (short) vowels in closed syllables, then more complex syllable types involving lax (long) vowels represented by vowel digraphs and patterns such as VCe (vowel-consonant-silent “e”). The final stage involves teaching morpheme derivations where the student learns to identify affixes and core roots (Latin origin), combining forms (Greek) and base words (Anglo Saxon) (Moats, 1995; Shlagal, 2007). Inflections denoting plurality and tense can be understood as early as Grade 2 (Moats, 1995).

What is missing in the phonics-based intervention is a consideration of which word meanings are relevant for students of different age levels. When faced with many words to choose from to exemplify a phonetic element, how does the teacher determine which words to choose so that the student will derive the most benefit from the instruction? For example, when teaching a student the “ir” pattern, should the words “girth”, “mirth”, “bird” and “stir” all be considered suitable teaching words based solely on phonetic structure? Which meanings of “stir” should be taught? This researcher has often been confounded by lists of words that occur in phonics-based programs, which assume that all words presented have equal value for the student’s text reading or written expression. It seems that greater attention needs to be paid to the meaning of words selected for intervention as words are not only learned because they are readily decodable, but because they are relevant and useful for the student. Successful reading and writing skill depends on vocabulary knowledge as well as phonological processing skills.

Dyslexic students have reduced opportunities for acquiring vocabulary due to
difficulties with accurate and fluent reading and resulting reduced reading experience. Students at the lowest reading levels have been found to have vocabulary deficits in relation to their peers (Biemiller & Slonim, 2001) and struggle to understand age appropriate text. Therefore, it would seem beneficial to integrate vocabulary instruction with phonics in a remedial intervention for students with reading and writing difficulties.

This study seeks to utilize current findings (Biemiller, 2010) that word meanings (vocabulary) are acquired in a developmental sequence and that specific words need to be taught to ensure that students with reading and writing deficits can understand and use age appropriate vocabulary. Tier 2 words are high-priority words for teaching in elementary school. Biemiller (2010) has identified 1,633 Tier 2 word meanings needed by the end of Grade 2 and another 2,813 word meanings needed by the end of Grade 6 (p. 29).

A further objective of this study is to explore effective teaching practices that utilize current vocabulary research and incorporate vocabulary instruction into a structured phonics intervention for students with severe spelling and writing difficulties. Within the framework of formative design research study, the teacher is mentored by and collaborates with the researcher to provide an effective intervention program. Research on effective schools points to providing intellectual stimulation, individualized support, modeling, vision and mentorship of teachers (Leithwood, 2003). The formative design method was chosen because it provides an opportunity to develop teacher capacity as well as student ability.
Effective teaching strategies help students to recognize orthographic patterns through direct instruction, self-discovery or induction (Moats, 1995), multisensory techniques (Carreker, 2006), and the development of metacognitive skills; that is, consciously using selected knowledge or strategies appropriately. For the dyslexic student, spelling becomes a thinking subject rather than an act of rote-learning. The student is shown how English orthography is largely predictable and rule governed at the phoneme-grapheme, syllable and morphological levels. The Orton-Gillingham Approach is a flexible remedial teaching methodology specifically developed for students with dyslexia, including all the elements required for an effective intervention (Gillingham & Stillman, 1997). The Orton-Gillingham lesson plan includes instruction on phonemic awareness, phoneme-grapheme correspondence, word reading, word spelling, sentence dictation, vocabulary instruction and reading comprehension. The student is encouraged to discover patterns through inductive reasoning processes and construct an understanding of the orthographic representations of the English language. Daily review strengthens associations of phonemes and graphemes, spelling rules and phonological awareness. Words are dictated in sentences or phrases, so that the meaning can be constructed through use in appropriate context. Words containing orthographic patterns taught are read in longer passages and comprehension is ascertained through questioning, fluency practice incorporating instruction of prosody.

The Orton-Gillingham Approach also regards as paramount, the setting of a “therapeutic climate” in which a supportive and trusting teaching relationship is established. Research confirms that the teacher-student relationship is an essential
component in the learning process (Kosnik & Beck, 2009). The Orton-Gillingham methodology is consistent with research findings emphasizing the development of close and positive relationships between teacher and students, where the teacher sets the tone by providing an atmosphere of respect, trust and affection.

This study grew out of a perceived need to integrate the most current research findings on vocabulary acquisition, phonological awareness, orthographic processing and writing into a holistic intervention addressing the multiple literacy needs of dyslexic students with particular emphasis on writing and spelling skill deficits. Formative design method was chosen to promote effective teaching through collaboration, mentorship, and knowledge building to enable a successful intervention.

**Purpose of Study**

**Overall Goal**

This study seeks to investigate the effectiveness of a Tier 2 vocabulary intervention on the spelling and writing skills of a small group of dyslexic elementary students using a systematic phonics approach. Tier 2 words were selected from Biemiller’s *Words Worth Teaching* (2010) that lists alphabetically word meanings that are known by 40 – 80% of students in by Grade 4 and 40-80% of students by Grade 6. Words are selected from the lists by the teacher and researcher based on the phonetic structure known by each student in the study or according to the phonetic element taught in the sequence of instruction. Lesson plans are designed using the Orton-Gillingham Approach, which incorporates a systematic phonics approach to instruction; that is, the
use of step-by-step procedures with explicit instruction. The sequence of instruction follows the theory of developmental acquisition of spelling skills: broadly speaking it starts with knowledge of the alphabetic code, proceeding to predictable monosyllables with tense vowels, inflections, then lax vowels, polysyllabic words and finally morphologically complex words. The study is a formative design case study involving six students in a private school in Toronto, Ontario.

**Guiding research questions.**

Guiding the research are the following questions:

- How frequently and how accurately do the students make use of Tier 2 words taught in various writing assignments?
- How frequently do students spell Tier 2 words correctly?
- Are derivations and inflections of the Tier 2 words used?
- How does the quality of writing change over time?
- What range of teaching methods are used to teach Tier 2 vocabulary?
- How effective is the mentorship process?
- Is there any change in the attitude of the students to their spelling and writing when comparing pre- and post-intervention attitudes?

**Significance of Study**

The richer an individual’s knowledge of words the more precisely an individual will be able to understand, process and think about information. Words communicate knowledge
of objects, people, events, abstractions, relationships and concepts in our environment. They form the modules, which we use to reason and construct meaning (Stanovich, 1994). Some estimates put annual word growth of an average child at 2000 to 3000 words (Stahl & Nagy, 2006). Students who have difficulties reading may have difficulty acquiring knowledge of word meanings and will find academic success elusive, falling behind their peers with each successive year. This growing gap has been described as resembling the Matthew Effect (Shaywitz, 2005), a biblical reference describing a situation where the advantaged accrue more as the disadvantaged lose the little they have.

Teaching dyslexic students to spell and comprehend words that are known to most of their successful peers would seem to address two primary deficits of students with reading difficulties: vocabulary deficits and phonetic deficits.

Although exhorted to select age-appropriate vocabulary in their instructional practices and curriculum, teachers have little specific guidance in assessing what is appropriate and what is not. Vocabulary selected for instruction has typically derived from text used by the teacher or education professionals. Criteria used to select text include readability formulae, content, or the presence of structured vocabulary. Heeding recent calls for a greater emphasis on vocabulary instruction (Biemiller, 2003), this study hoped to shed light on how teaching relevant vocabulary can be incorporated into a phonics intervention for students with dyslexia or identified as at-risk for a reading disability.

Specifically, the study investigates whether knowledge of the meanings, phonology and spelling patterns of Tier 2 words will bring about greater usage and
improved communication in writing assignments. By targeting words known by their successful peers, it is hoped that a developmental vocabulary curriculum will prove an efficient and effective way to improve necessary vocabulary skills and hence written expression.
CHAPTER TWO: REVIEW OF LITERATURE

Introduction

After considering evidence for the presence of dyslexia and the nature of specific deficits associated with this type of learning disability, appropriate intervention content and delivery supported by research findings will be described. As this formative design case study seeks to integrate research-based interventions addressing writing difficulties, specifically spelling and vocabulary use, these areas will be the focus of the literature review.

Medical Origins of the Term “Dyslexia”

Dyslexia is a controversial term for some. Not everyone agrees on whether the term is relevant, whether it refers to one condition or a spectrum of disabilities and whether there is one cause or a combination of causes. Thus, before considering the intervention proposed in this study, it is necessary to clarify use of this term and to establish its existence as a distinct type of learning disability requiring a specific remedial approach.

Individuals who had difficulty learning to read, but who were otherwise unimpaired first caught the attention of medical practitioners almost 100 years ago when Dr. James Hinshelwood (1917) published his findings in his book *Congenital Word-blindness*. It is perhaps good fortune that the first researchers of dyslexia were medical doctors as they provided a careful, systematic description of the syndrome and
brought academic recognition of this condition. Subsequent studies by physicians Dr. W. Pringle Morgan (1896) and Dr. Samuel Torrey Orton (1966) describe similar cases of children and adults exhibiting unexpected difficulty with reading and writing despite normal intelligence quotients. The research led these doctors to believe that dyslexia was a condition stemming from physiological differences in the brains of their patients. Recent research in neuroscience conducted across different languages has revealed that the brains of reading disabled learners have a “common neurobiological signature” (Pugh, Sandak, Frost, Moore, & Mencl, 2005, pp. 26-7). Today, studies at the Haskins Laboratory and the Yale School of Medicine using functional magnetic resonance (fMRI) imaging have demonstrated differences in the neural activity of the brains of children and adults with and without reading difficulties (Uhry & Clark, 2004).

Many may share Siegel’s (2003, p. 159) opinion that the labels “reading disability” and “dyslexia” are interchangeable; however, dyslexia is now considered a specific reading disability causally linked to deficits in phonological awareness and possibly rapid naming weakness. Uhry and Clark (2004) cite various studies indicating that genetic markers, specifically chromosome 6 and 15, are present in individuals with dyslexia and there is a high degree of inheritability in the condition. In 2003, the International Dyslexia Association (IDA) and the National Institute of Child Health and Human Development (NICHD) acknowledged dyslexia as a specific learning disability with this definition:
Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge (Annals of Dyslexia, 2003, p. 2).

**Characteristics of Dyslexia**

**Phonological Deficit**

Stanovich (1992, p. 315) has suggested that dyslexia or specific reading disability (he uses the terms interchangeably) stems from a deficit in phonological processing ability, “a primary mechanism that determines early reading success.” Stanovich notes that difficulties with the definition of dyslexia arise because of the assumption of a specific deficit involved in reading but not involving other cognitive processes, whereas dyslexics exhibit other processing (cognitive) deficits involving reading comprehension, listening, spelling, sequencing, executive control, speech impediments. “The results instead suggest that reading-disabled children exhibit rather generalized cognitive deficits” (p. 322), making it harder to establish dyslexia as a discrete disability. He advocates limiting the term dyslexia to refer to individuals who have a reading disability due to phonological impairment only (Stanovich, 1988). A “simple view of reading” (Hoover & Gough,
where reading comprehension (R) is a product of two factors: decoding (D) and listening comprehension (C), seems to clarify the debate: The dyslexic student has a reading disability due to difficulties decoding but will not have difficulty with higher-order cognitive processing involved in comprehension.

Weaknesses in phonological awareness refer to the difficulty dyslexics have with discriminating sound and manipulating these sounds in oral language. They have difficulty mapping symbols (graphemes) with associated sounds, so that hearing a sound and recalling the appropriate symbol will be difficult. This leads to spelling errors when the incorrect letter or grapheme is retrieved. Students with dyslexia have difficulty recognizing the segments that compose written words such as letters, letter combinations, syllables, and morphemes (Shaywitz, 2003).

**Rapid Naming and Phonological Deficits**

Across several languages, studies have shown that deficiency in rapid naming of objects, letters, colours and digits is a strong predictor of dyslexia (Wolf, 2007). This rapid naming deficiency is an indication of the lack of efficiency present in processing networks linking linguistic and visual neural circuits and leads to slow, laborious reading which inhibits comprehension. Dr. Wolf’s Double Deficit Hypothesis posits three subtypes of dyslexia: one associated with a phonological awareness deficit, a second associated with a deficit in rapid automatic naming speed and a third subtype consisting of both deficits or “double deficit” (Wolf, 2007, p. 189).
Second-Order Deficits: Vocabulary, Reading Comprehension and Written Expression

As students acquire new vocabulary through print, dyslexics through reduced reading experience may not acquire necessary vocabulary to comprehend age or grade appropriate text. This is considered a second-order deficit as weak comprehension skills result from the phonological deficit rather than an inability to understand text content.

Difficulties with spelling, letter formation and rapid naming all contrive to make writing a difficult task for students with dyslexia (Uhry & Clark, 2004). The considerable cognitive effort expended on spelling, punctuation and letter formation create disincentives for dyslexics to express themselves in writing. Hanbury King (1985) noted that students with dyslexia grow more resistant to writing as they progress through school. Disinclination to write leads to avoidance and skills remain weak. Academic demands for written work grow as the student reaches high school, and the student may experience considerable difficulty keeping abreast of the demands of school. This may lead to a sense of frustration and failure, which if prolonged can have a lasting effect on the individual’s self-image and self-esteem (Reid, 2009).

Appropriate Interventions for Students with Dyslexia

As there have been no interventions to date that use Biemiller’s (2010) vocabulary curriculum integrated into a systematic phonics-based spelling intervention, this literature survey reviews the research on each intervention separately with the ultimate goal of combining the findings in this investigation.
The Value of Teaching Spelling

Students with dyslexia frequently have difficulty learning to spell (Moats, 1995) for the same reasons they have difficulty learning to read: both abilities depend on phonological skill. By teaching spelling, the student becomes aware of patterns shared by words at the letter, syllable and morpheme level thus strengthening the associations between the sounds and structure of words and making the student more aware of how the structure of words affects meaning (Templeton & Morris, 1999).

Stanovich found that poor readers have difficulty forming orthographic representations of words and difficulty in detecting letter details within words. He speculates that phonics training may help because it focuses attention on the composition of words and thus helps form accurate orthographic representations. Ehri and Wilce (1987) found spelling instruction for beginner readers promoted phonemic awareness and grapheme-phoneme correspondence. Berninger, Abbott, Abbott, Graham, and Richards (2002, p. 46) found evidence of “bidirectional, reciprocal relationships between word recognition and spelling. Training spelling should influence word recognition and training word recognition should influence spelling.” They also found significant covariant relationships between spelling and compositional fluency, between spelling and compositional quality, and between spelling and reading composition at grade levels one to six, except for Grade 5. Dyslexic students need explicit instruction of the spelling of words to promote phonological awareness, word reading, and writing.
How to Teach Spelling

Dyslexic students will not gain knowledge of spelling spontaneously, nor will they make progress through memorizing lists of words or copying them repeatedly (Carreker, 2006; Graham, 2000). These students need to be taught explicitly about the structure of language and they need sufficient time to commit this orthographic and phonological knowledge to memory so that retrieval of either is speedy and automatic freeing up cognitive processes to concentrate on conveying meaning beyond the single word level.

Spelling interventions need to take into account the developmental acquisition of knowledge needed to spell and the stage the student has reached on the continuum. Firstly, the student needs a solid foundation in speech sounds and the associated alphabetic code. The student needs to be able to discriminate the speech sounds within spoken language and associate these sounds with particular letters and letter combinations. The student then learns that meaning is delivered in words and understands the discrete nature of words in print, the direction of the flow of letters from left to right and gains the grapho-motor skills to form the letters so that they can be read. There are approximately 44 phonemes in the English language and 26 letters that the student needs to be taught (Henry, 2006).

Subsequent teaching moves to growing complexity within closed syllables, such as, initial and final clusters of consonants. Later other syllable types are taught and combined with closed syllables to form polysyllabic words. Inflections are taught as early as possible to enable the student to communicate a variety of verb tenses and
plurality. Students with dyslexia not only need explicit instruction in recognition of the orthographic and phonological representation of morphemes, but also the phonic rules that apply, such as, doubling of the final consonant when adding a vowel suffix and other predictable changes to the base word when adding suffixes.

Finally, the student learns to spell polysyllabic words with bound morphemes derived from the Latin and Greek languages (Carreker, 2006; Gillingham & Stillman, 1997; Henry, 2006; Moats, 2009).

The studies of Templeton (1989) suggest that the word represents meaning more than it does sound and that “direct and systematic instruction aimed at exploring ‘spelling/meaning connections’ may be the key to facilitating vocabulary development “ (p. 243). Knowledge of derivational prefixes and suffixes can help a student to spell a word even though the syllable may have a schwa (neutral vowel sound) due to a lack of stress. If the student recognizes the affix and recalls the consistent spelling of that affix then guessing is eliminated. Templeton stresses teaching pattern recognition to enable students to realize that English spelling is not as arbitrary as they may think. Linking meaning with orthographic representations provides an additional way of predicting correct spelling.

Stahl and Nagy (2006, p. 160) suggest that the teaching of “word parts” be included as an important component of a vocabulary instruction program, citing research that correlates reading ability with morphological awareness. Nunes and Bryant (2006) in a study exploring the outcome of morphology interventions on spelling in a group of 201 children averaging 91/2 years found that explicit morphology instruction improved the
students' ability to analyze and spell words. They found that students learned more when they were exposed to contrasting patterns compared to when they were taught each pattern separately.

Explicit instruction in morphemic awareness as a spelling strategy may be of value in teaching children about word structure and meaning relations from the beginning grades. Wolter, Wood & D’zatko (2009) conducted a study on the influence of morphological awareness in first-grade students and found that they had the ability to generate morphological derivations orally that predicted their word-level reading and spelling abilities.

Knowledge of morphology helps students acquire meaning of derived and inflected words. In teaching morphemes the student is made aware of semantic connections between words and consistent spellings in word families. Learning about word origins and word structure can be a motivating experience, which promotes word-awareness and learning (Bowers & Kirby, 2009). English orthography will appear much less arbitrary when students are shown the repetitive patterns that are common within groups of words sharing the same affix and root.

The Value of Teaching Word Meanings

Due to Matthew effects (Stanovich, 1986), students with dyslexia fall further behind their peers as they advance through school, leading to decreased opportunities to access information from grade level text. Remedial programs and modifications provide the dyslexic student with decodable text, which limits exposure to new vocabulary. In
order to ensure that dyslexic students in remedial programs are growing their vocabulary, they need to acquire vocabulary meanings as well as decoding and encoding skills. Nunes and Bryant (2006) argue that knowledge of morphology can have a powerful bidirectional influence on reading and writing skills. Students with dyslexia often present with delays in acquiring morphological knowledge of words. Teaching morphology may help with spelling as well as create swifter access to the lexicon (Beck, McKeown & Kucan, 2008; Moats, 1995).

**Selecting word meanings to teach.**

Given the large amount of vocabulary to choose from—Bryson (1990) estimates that there are over a million words in the English language—the question arises as to which words to teach. Biemiller’s (2010) recent work on word meaning acquisition in elementary school is helpful in this area.

Biemiller and Slonim (2001) found that on average, by the end of Grade 2, children in the normative sample had acquired 5200 root words “or about 2.2 words/day from age 1 year” and children in the advantaged sample had acquired 6200 root words. Differences between lowest and highest quartiles estimated a mean difference of 4100 root words by the end of Grade 2 (p. 508). A sequence of difficulty was evident in the root words acquired regardless of the gender, normative or advantaged sample groups to which students belonged and ability—all students appeared to acquire the same root meanings in mostly the same sequence. This led Biemiller to advocate for the
development of a sequenced introduction of vocabulary (p. 510).

According to Biemiller’s (2005) findings, words are learned in the same sequence regardless of home language and socio-economic class. He suggests accelerating student progress “through the known vocabulary sequence” (Biemiller, 2010, p. 15). His book *Words Worth Teaching* (2010) contains approximately 10,400 root words drawn from *The Living Word Vocabulary* by Dale and O’Rourke that are known by 40 to 80 percent of students by the end of Grade 6. Biemiller provides a rough sequence for teaching these words by dividing them into Low Priority and High Priority Tiers for the Primary and Upper-Elementary divisions. There are also two additional groups at either end of the scale representing easy and difficult words. Tier 2 refers to high priority words to be taught in the Primary and Upper-Elementary divisions.

There is no internal sequence of instruction suggested for any of the Tiers. Biemiller (2005) assumes that the derivations and inflections need not be taught if the root word meaning is known, as the word meaning can be inferred from the context. Biemiller (2010) estimates that 20 new word meanings can be taught every week, which is equivalent to about 800 word meanings for each grade level. For the purposes of this study, Biemiller’s word meanings provide a useful framework for a phonics-based intervention, which focuses on teaching phonetic patterns using lists of words introduced in a sequence. Text selected for reading can be based on the phonetic patterns of words taught. By providing a more comprehensive phonetic intervention including relevant age-appropriate vocabulary instruction, it is hoped that the students will gain knowledge
leading to improvement in the spelling and overall quality of their written work.

**How to Teach Morphology, Spelling and Word Meaning Acquisition**

In order to teach word meanings, Stahl and Nagy (2006, p. 62) suggest three “principles of teaching words”: teach definitions alongside the context in which the word is used; ensure the learner take an active role in constructing meaning; and expose the learner to the new word multiple times. One way students can play an active role in constructing meaning and coming to develop an interest in words, is to teach etymology and morphology. Here the student gains an understanding of the origins and history of their language and can play “word detective”. Teaching the etymological origins of words and morphemic units can also promote retention of the meaning, sound and phonetic composition of words (Henry, 2006; Moats, 1995).

**The pedagogy of choice: The Orton-Gillingham approach for students with dyslexia.**

The Orton-Gillingham instruction is not a programme, nor a system, but rather a pedagogical approach (Rawson, 2000; Gillingham & Stillman, 1997): “Teaching with this approach is based on the teacher’s integrating his knowledge of the nature of the English language, and his understanding of the nature and growth of the language function in human beings” (Rawson, 1968, p. 64-5). Strategies involving inductive and deductive reasoning are incorporated into the lesson wherever possible to promote a cognitive approach (Gillingham & Stillman, 1997; Rawson, 2000).
The Orton-Gillingham Approach was chosen for this study because of four reasons: First, it incorporates the concept of “overlearning” that originates from neuroscientific and cognitive-processing research. For example, the Approach directs the teacher to teach sound-symbol-kinesthetic associations until the student forms strong connective associations between orthographic, phonological and kinesthetic information. The stronger the phonological-orthographic connection, the faster the student will read: “Overlearning may be necessary for the development of automaticity in any area. It is the result of extensive repetition, drill, and practice” (Shaywitz, 2003, p. 268-9). Second, the Approach suggests a sequence for teaching phonograms that is flexible and pedagogically sound (Rawson, 2000; Shaywitz, 2003; Uhry & Clark, 2004): moving from simple to complex concepts and from predictable to unpredictable phonetic structures. The sequence includes parallel spelling rules to be taught and morphology (Gillingham & Stillman, 1997). Thus, it provides a comprehensive curriculum scope and sequence to follow which can be adapted to meet the needs of individual students. Third, the diagnostic and prescriptive elements of the Orton-Gillingham lesson plan ensure the students are successful and active in creating their own knowledge. It is thus emotionally sound and constructivist (Stanovich, 1994) in philosophy. Finally, the elements in every lesson plan provide opportunities to address the needs of students with dyslexia, namely, the areas of phonological awareness, spelling, writing and reading.

Planning a curriculum for six different students at different instruction levels necessitates a flexible yet consistent framework. The Orton-Gillingham Approach is an effective remedial reading intervention (Shaywitz, 2003), which has been in use since the
The Approach is flexible and adaptable to a wide range of student abilities and ages. The age and needs of the student will determine which of the following components of a lesson plan may included: instruction of phonemic awareness, phoneme-grapheme correspondence, spelling patterns, syllabication, morphology, vocabulary, grammar, syntax, fluency training and comprehension strategies. It is an instructional approach used to teach phonological awareness, phoneme-grapheme correspondence, vocabulary acquisition, spelling and reading.

The Orton-Gillingham lesson plan involves multisensory instruction, beginning every lesson with an initial visual-auditory-kinesthetic-tactile (VAKT) drill, which teaches the phoneme and grapheme associations. These associations are later synthesized in subsequent elements of the lesson plan. Finger tracing of letters on a textured surface while saying letter names or sounds is used to promote connections between orthographic and phonological knowledge. The methods are based on the belief that associations between sensory systems will enable the retention and retrieval of information involved in the production of fluent reading and correct spelling (Moats, 2006).

There is much anecdotal evidence of the role that kinesthetic-tactile memory can play in memory formation and retention. Fernald (1943, pp. 26-9) in the early 20th century developed a method of “look and say” while tracing the letters of a word based on kinesthetic methods used by various historical figures, such as, Plato, Horace, Seneca, Charlemagne and Quintilian. Braille is another well-known kinesthetic-tactile method used to teach reading. Recent studies by Berninger (2002) which posit four connected language systems: language-by-hand (writing), language-by-eye (reading), language-by-
ear (aural) and language-by-mouth (oral) systems intuitively support the VAKT strategy used in Orton-Gillingham lessons as they found that these systems shared knowledge and processes.

The Orton-Gillingham Approach was chosen for this study because it is holistic and can accommodate for individual variability and inter-subject variability. The Orton-Gillingham Approach supports the constructivist paradigm where learning is viewed as an active process where knowledge is transferred, constructed, deconstructed and shared in a supportive, respectful manner. The Gillingham Manual (Gillingham & Stillman, 1997) gives many practical strategies for implementing a successful lesson plan as well as instructions for diagnostic tracking and subsequent lesson planning. A suggested scope and sequence is advocated with the acknowledgement that adjustments based on individual needs can be made—pace, detail, content and sequence may all be adapted to create a flexible approach to suit the student’s spectrum of interests and abilities.
CHAPTER THREE: METHODOLOGY

Case Study Methodology Overview—Principles of Inquiry

Case study methodology is useful, firstly, when the research investigation is descriptive and/or explanatory: It helps with questions involving “what”, “how” and “why”. Secondly, case study methodology enables gathering of observational data in natural settings aiming “to produce a firsthand understanding of people and events” (Yin, 2006, p. 112). Central to this type of inquiry is the notion of “case”, the importance of the case to the study and its definition. A “case” is “bounded” in that is viewed as a separate entity “in terms of time, place, or some physical boundaries” (Cresswell, 2005, p. 439). Yin (2009, p. 30) refers to “case” as a “unit of analysis”, which can have variable meanings, such as, referring to a single individual, multiple individuals or an event, program or procedure. Stake (1994, p. 236) argues that choosing a “case study is not a methodological choice, but a choice of object to be studied.”

Yin points out that case study differs from ethnography and grounded theory methodology, in that case study begins with a theoretical proposition (Yin, 2009, p. 35) whereas the former two “avoid specifying any theoretical propositions at the outset of an inquiry.” It differs from experimental research where the investigative unit of analysis is the variable studied in a laboratory or other controlled environment (“Case Study”, 2008, paragraph 3). The case study may be considered “intrinsic” when the case is unusual, studied for its own sake, and “instrumental” when the case is designed to shed light on a
particular theory or issue. “The [instrumental] case is often looked at in depth, its contexts scrutinized, its ordinary activities detailed, but because this helps us pursue an external issue.” (Stake, 1994, p. 237). Studying a number of cases simultaneously is referred to as a “collective” or “multiple” case study (Cresswell, 2005, p. 440).

When considering how to classify case study research, Wolcott (2009, p. 85) regards case study “as a genre for reporting than as a strategy for conducting research.” He sees case study as a generic label that may refer to any type of qualitative research, but differentiated by the specific fieldwork techniques employed. Case study data can be qualitative, involving participant observation (Wolcott), quantitative or a combination of both (Stake, 1994; Yin, 2010).

**Formative Design (Formative Experiment and Design Experiment)**

This investigation is more than a descriptive, instrumental, collective case. As the intervention is not a one-time activity but involves the introduction of multiple vocabulary items over time, the nature and pace of instruction will change according to each student’s progress. Knowledge building will not be linear and adaptations of content and strategy will occur continuously throughout the study. Thus, the intervention is iterative and developmental with the teacher-researcher collaboration playing an essential role: the researcher is familiar with the theory under investigation and determines the curricular content to be included while the teacher implements and integrates the intervention.
The study is rooted in pedagogical praxis: the teacher develops, plans, carries out, and changes the intervention to meet the needs of each student in each lesson. The objective here is to utilize and build on teacher capacity to provide an effective intervention while acknowledging the cyclical and iterative nature of teaching. During the knowledge and skill building process, students need practice, repeated instruction, differentiated strategies and activities, and motivating materials. The project is initiated and driven by the researcher and the researcher’s motivation to explore theories of vocabulary acquisition, phonological awareness and issues arising from uniting these two, often disparate, approaches to teaching literacy. The study is situated in a real classroom bound by administrative, parental, Ministry of Education, and school curricular conditions and expectations. The methodology best suited to a study such as this is the formative and design experiment which sets out to investigate what factors influence the implementation of a valued educational goal and what subsequent iterative adjustments need to be made to further the achievement of this goal (Reinking & Watkins, 2000; Reinking & Bradley, 2008).

The term “formative design” is an amalgamation of the term “design experiment” which Brown (1992) used to describe a new approach to the investigation of “the systemic nature of learning, teaching, and assessment” and “formative experiment” used by Reinking and Bradley (2008, p. 14). Reinking and Bradley view formative experiment and design experiment as two essential aspects of a new approach to investigating and creating interventions that work and achieve a “valued pedagogical goal” (p. 14). The
“design” aspect refers to the researcher who designs an intervention used to achieve an educational goal in the real world of the classroom. The design of the experiment is informed by fundamental research, technology and practice, and explanatory resources. The components of the design and the implementation change and develop iteratively according to responses in the field (Greeno, 2006).

Barab and Squire (2004) point out that another important criterion for design experiment is the importance of “consequential validity” (Messick, 1992) resulting from changes brought about by the experiment at the local level. It is demonstratable change that proves the theory is valid. Brown (1992) argued that far from being a detractor from her findings, the Hawthorne Effect validated her theories. This appears to link to the “formative” aspect where modification is a logical and necessary response to “factors that enhance or inhibit the intervention’s effectiveness, efficiency, and appeal” (Reinking & Bradley, 2008, p.15). As these two methodologies are so closely related with precise definitions still evolving (2008), I have conflated the two terms for the sake of brevity and removed the “and” yielding “formative design” rather than “formative and design”.

Several recent formative studies have pointed to the advantage of formative experiment and design experiment in enabling collaboration between researchers and teachers and in obtaining a wider variety of responses from the subjects involved. Jimenez (1997) points out how formative experiment enabled the responses of five low ability Latina/o students to modify a cognitive strategy lesson. He concludes that a wider variety of student responses was elicited using the formative component. In a study on the organizational impact of computers in schools, Newman (April, 1990, p. 10), likens
formative experiment methodology to software development where the designer continually changes the product until it reaches the desired level of “appeal and effectiveness”. His formative experiment had a pedagogical goal of promoting collaboration among students using a local area network (LAN). During the experiment, ongoing data analysis determined how to adjust and maintain necessary support for teachers and students to achieve the desired goal. This included changes to technology, software use and curriculum materials and the provision of professional development workshops where necessary.

This study is a formative design investigation because it seeks to identify interventions that have practical value in the classroom and provide insight into how these interventions can best be delivered. Formative experiment is collaborative and flexible involving the researcher and the participants (Reinking & Bradley, 2004).

The purpose of this investigation was to explore one teacher’s attempts to integrate Biemiller’s “Words Worth Teaching” (2010) into a spelling intervention for students with dyslexia. Due to the novelty of this approach where vocabulary was selected for instruction based on the dual criteria of phonological elements present and expected developmental acquisition of Biemiller’s Tier 2 words, it was expected that over the course of several months the intervention would be modified to meet the changing needs of the students. The pedagogical goals of the study are pragmatic and rooted in the interest of the researcher to understand and promote the teaching of the spelling. “A distinguishing characteristic of formative experiments is that the instructional intervention of interest is modified as needed during the experiment toward more
effectively or efficiently attaining the pedagogical goal that drives the intervention” (Reinking & Bradley, 2004, p. 163).

**Formative Design is not Action Research**

Both action research and formative design share several attributes: both are cyclical, have an instructional goal, are grounded in the field, and involve the teacher as participant, yet there are several differences which set formative design apart. What distinguishes formative design experiment from action research is that the former seeks to establish connections with theories in the field and is researcher-designed, whereas the latter seldom leads to theory development and is teacher-designed (Reinking & Bradley, 2008). Action research can involve collaboration between teachers and other participants but this occurs at the local level, with the results seldom shared outside the location in which the action research takes place (Reeves, 2004). Action research has historical roots in the empowerment of the participants and in the promotion of democracy.

Action research, then is about taking everyday things in the life of education and unpacking them for their historical and ideological baggage. It is similar to, but not the same as, the everyday process of improvement, in that it is public and collaborative. It highlights process with content, rather than content alone. It allows for a focus on teaching, in addition to student outcomes, and on the interplay between the two. (Noffke & Stevenson, 1995, p.4)
Formative designs are experiments in contrast to action research are performed with the same attention to the constructs of validity, reliability and rigor as other research methodologies. Qualitative and/or quantitative data collection is an essential element (Reinking & Bradley, 2004).

To summarize, this grounded study is a pragmatic attempt to integrate new research findings in the area of vocabulary acquisition with well-established theory relating to literacy acquisition skills. The intervention is a collaboration between the researcher and teacher allowing for adaption of content and delivery in an authentic setting in the pursuit of worthwhile pedagogical goals.

**Data Collection**

**Participant Recruitment**

This qualitative descriptive case study was an intensive and systematic study of the delivery of a remedial vocabulary and phonics-based spelling intervention by one special education teacher to six students in one-on-one or small group teaching situations. It explored the factors that determine the nature of success, if any, in the teaching and learning process of the six individual cases representing six students in grades 3 to 8, all taught by one teacher at the same private school. All students were boys and two are twins. Each student represented a bounded system within a collective case study. These six cases formed a collective case study in which current theories of developmental vocabulary acquisition and spelling were applied and explored.
Each student in this collective case study has distinct difficulties in reading and writing, which present in varying degrees, for which they receive individualized remedial support in a special education classroom. In viewing each student as a separate case, the researcher will collect detailed information using participant and direct observation (Yin, 2010) including the student’s responses, attitude, knowledge retention, development of understanding and any changes intended or otherwise related to the intervention. Participant observation involving in-depth, close observation of students and teacher in the naturalistic setting of the classroom enables the researcher to study each case’s responses to the intervention and to compare outcomes across several variables, such as, spelling, word usage, comprehension and attitude.

The case study framework enabled the researcher to observe phenomena as they occurred in situated circumstances and incorporate multiple points of view to substantiate the researcher’s interpretations (Yin, 2009). Shaywitz (2003) suggests that a child with dyslexia may need “150 to 300 hours of intensive reading instruction” and that the longer it takes to identify and implement the intervention, the longer the course of instruction (p.259). Students in this study received approximately 200 hours of intervention. This allowed for observable progress to be made.

The value of this case study may be of too short a duration (4 months) and too small a sample (6 students) to provide a “grand generalization, [but] a single case as negative example can establish limits to grand generalization” (Stake, 1994, p. 245). The methodology employed in this study may reveal limitations or conditions under which
interventions based on Stake’s “grand generalizations” may or may not succeed.

**Schedule**

Students received four lessons of approximately 45 minutes every eight-day cycle. The researcher observed two out four lessons in the classroom with bi-monthly meetings with the teacher to discuss and reflect upon student progress, effective strategies, lesson content and structure. The duration of the study was 16 weeks.

Each lesson followed the Orton-Gillingham lesson plan with adaptations made to each of the segments. Please see the Appendix A for the Orton-Gillingham lesson plan framework.

**Data Sources**

Of importance in case study is the use of *data triangulation* to enhance validity (Yin, 2010). Triangulation of data involved the collection of data from multiple sources to support findings and results. Both quantitative and qualitative data were gathered.

Quantitative data resulted from standardized pre- and post-intervention testing in the fields of receptive and expressive language, written language and reading comprehension. Standardized, norm-referenced and criterion-referenced tests were used.

Examples of standardized tests used:

- *Comprehensive Test of Phonological Processing* (Wagner, Torgesen & Rashotte, 1999)

- *Gray Oral Reading Test (GORT), Fourth Edition* (Wiederholt & Bryant, 2001)
Informal criterion-referenced spelling tests took the form of dictation which were used to determine whether the students could spell Tier 2 words taught in the intervention in isolation and as part of a phrase or sentence. These dictations consisted of 5 – 15 words dictated by the teacher, which the student wrote in his notebook. When the student spelled the words in isolation, the teacher proceeded to dictate a short phrase or sentence including the word.

Base-line data indicated levels of phonemic awareness, knowledge of the alphabet system and letter-sound correspondence, word reading, word reading fluency, passage comprehension, expressive and receptive vocabulary, and listening comprehension. A writing sample was taken where appropriate. Standardized tests were carried out pre- and post-intervention and criterion-based tests were carried out throughout the intervention. Qualitative data created a “thick description” of the teaching-learning environment. Multiple sources of data included, direct and participant observation, semi-structured interviews of students and teacher, work samples, teacher notes, records, lesson plans and journals. Multiple data sources involving verbal and non-verbal behaviours of the teacher and students (units of analysis); interaction between the students and the teacher; processes involved in the teaching-learning situation; outcomes of the intervention; and factors in the environment that may have played a role in the knowledge building process, contributed to the validity of the findings.

The teacher’s delivery of the intervention was recorded, noting case specific
strategies used, and subsequent modifications to the delivery in response to the student’s progress, attitude and learning style. Rich descriptions of the teacher’s language, framing of questions, support, tone, prompting, preferred use of strategies, adaptation of material were recorded in order to illuminate the delivery of the intervention and relationship to learning outcomes of the case in question.

The student’s oral and written responses provided evidence of students' learning processes. This case study involved collecting detailed descriptions of the student’s behaviour and learning as evidenced by the nature of the interaction between student and teacher, student and lesson activities, and student reflection on his performance. The nature of student response, including language used, type of questioning, and application of knowledge are also data sources. Semi-structured interviews pre-and post-intervention were conducted with the students to ascertain any change in their perceptions, attitudes and opinions resulting from the intervention.

The teacher will kept a journal of reflections on the process of implementing the intervention and any changes occurring in any aspect of the teaching or learning process. These data were compared with the researcher’s notes to further the trustworthiness of the findings and serve as part of the triangulation process (Wolcott, 2009). Semi-structured interviews pre- and post-intervention were conducted to explore the teacher’s intervention including thoughts, attitudes and knowledge building or transformation related to this study.
Changes occurring in the student’s environment beyond the special education classroom contributed to data as they pertain to each case and lesson, such as, interruptions on the intercom, confusion over scheduling or special assemblies. These changes may have interfered in a case specific manner with the student’s daily schedule and subsequent learning.

Thus, multiple sources of data including the exploration of the students’ perceptions; journal reflections of the teacher; diagnostic and prescriptive notes taken by the teacher after every lesson; teacher and researcher discussions; student work; and teacher and student discourse contributed to triangulation of data and the validity of the researcher’s observations (Yin, 2009). In short, the effectiveness of the intervention was determined using multiple sources of data gathered throughout the process of the intervention, that is, from its inception, to its introduction and through its subsequent application.

Data analysis used current theories of reading, spelling and vocabulary acquisition (Nation & Snowling, 2004; Stanovich, K., 1988; Torgesen & Mathes, 2001) in addition to Professor Biemiller’s (2010) theories that underpin this study. By examining the results using multiple theories (Yin, 2010), different perspectives of the same data may be achieved. This use of theory triangulation served to further corroborate any findings resulting from the study. Conclusions drawn from the analysis of promoted understanding of how one teacher applied current theories of vocabulary acquisition
in the context of an elementary special education classroom. Herein lies the “instrumental” aspect of this case study.

**Selection of Tier 2 Vocabulary: A Collaborative Selection Process**

1. The teacher and researcher filled out a checklist of phonetic elements that are either at the instructional level or mastery level reading for each student. The checklist categories evaluated were: each of the short vowels; single consonants and ways of pronouncing them, for example “s” has two sounds /s/ and /z/; vowel and consonant digraphs; diphthongs; vowel-consonant-silent e syllables; the “welded “ sound of “n” when followed by “k” or “g”; initial and final consonant clusters; suffixes that inflect; multiple spellings of sounds; syllable types that can be read and spelled (see Table 3.1).

2. The researcher used *Words Worth Teaching* by Professor Andrew Biemiller as a source of vocabulary words to teach the students. In the book, words are listed in alphabetical order and are assigned Tiers. In the study we referred to all words worth teaching as Tier 2 words even though Biemiller has broken Tier 2 words into those for elementary (T2) and those for upper elementary (T6). These words form the source for the lists. T2 for the younger group in Grades 3 and 4, and T6 for the older group in grades 7 and 8. Essentially these are the words deemed worth teaching and knowing by the end of elementary school.

3. Tier 2 words were selected for the study and then a second selection process took place based on whether the words contained phonetic elements the students knew or were
being taught. The search for Tier 2 words started at the beginning of the book with “A” and the alphabetic sequence determined the order in which words are considered. Thus, words in the lists frequently began with the same letter which was thought to be helpful to the students as they also had difficulty with letter formation in cursive and printing. The students were writing in cursive and were supposed to write in cursive in other classes, but this was not consistently followed by other teachers. Several of the students had difficulty with the joinings between letters in cursive, and repeating words with the same initial letter was thought to provide a rudimentary system for practising letter formation.

4. Once the researcher selected a list of approximately 12 words, the words were sent with their definitions, parts of speech, example sentences and T2 and T6 code to the teacher. In addition, if the words contained phonetic elements that had not been taught, these were listed as “teachables” for the teacher to address in parallel with the list of words. The teacher and researcher thought it acceptable that spelling of phonetic elements and spelling rules should be taught alongside vocabulary as this was a crucial part of their special education curriculum at the school. Altogether five list words were introduced, that is, a total of 55 words for the younger group and 60 words for the older group (see Appendix D).

5. The teacher reviews these suggestions and can make any changes to the content she thinks necessary. Approximately 14 words were supplied which gave her the opportunity to leave out those that she deemed too hard or inappropriate.
Table 3.1.

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<th>Sam</th>
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<th>Fred</th>
<th>Greg</th>
<th>David</th>
<th>Jack</th>
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<td>Short vowels</td>
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<td>Vowel-R</td>
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6. The students were introduced to the list words using an Orton-Gillingham lesson plan format (see Appendix A). The teacher established whether the students knew the meaning of the words during the segment Oral Reading of Words. If the student used the word in a sentence or gave a context in which the word was used, it was assumed the student knew the word in its base form, that is, not the inflected or derived form.

7. The students were taught the new meanings of the words orally if they did not know the word, with the teacher providing definitions or examples of use. Follow up writing activities created by the teacher or researcher were provided in a subsequent lesson in which the student had to use his knowledge of the word (see Appendix C).

8. Changes occurred over the course of the study based on perceived needs of the students and the teacher’s curriculum (see Appendix E).

9. Summative criterion tests were conducted at the end of the study with the older two students. The students were asked to read the words in isolation, in passages and to spell them in isolation and in sentences. The teacher did not have time to carry out the summative tests with the younger group as she had to use this time for school tests and report writing (See Appendix F).
CHAPTER FOUR: RESULTS

The Schedule

In the middle of January, 2010 the researcher began observing a special education class in order to have the students become accustomed to her presence in the room and to give them an opportunity to determine whether this would interfere with their learning in any way. The formal study commenced at the beginning of February and was completed June 4th, 2010.

In total, the study lasted for the duration of 13 weeks spread out over four months due to the March break which lasted two weeks. Five lists of words, consisting of approximately 11 words each, were introduced. Each of the five students in the study was scheduled to see the special education teacher for four lessons in an eight-day cycle. The research study took two of the four lessons per cycle on average, with the researcher present for one lesson per cycle for each student. Each list of words took on average 2 lessons to complete. The special education teacher taught related spelling patterns, reviewed phonetic elements or punctuation rules in the interim lessons which were not part of the study.

During the 13 weeks of the study 16 visits/lessons were scheduled to be observed so that the researcher could be present for the list introduction and see each pupil once in a cycle. On Day 1 of the eight-day cycle students Sam, Fred and David were observed and on Day 7 students Mick, Greg, David and Jack were observed. These names represent pseudonyms and are not the real names of the students. The latter two students had a joint
lesson, so that David was observed twice. Day 3 and Day 5 were used as alternatives in case Day 1 and Day 7 were cancelled for unanticipated events. In practice, it was not always possible to reschedule. All lessons lasted 45 minutes with the exception of Mick’s session which lasted 30 minutes.

Each student was to receive approximately 16 lessons devoted to the study of new vocabulary on the lists. The remainder of their special education lessons was spent on other spelling and language concepts. Each student lost special education lessons due to student absences, school field trips, assemblies, parent-teacher meetings, testing, class activities and the teacher’s absences. Not all children lost their lessons for the same reason, for example, late assemblies only affected those students scheduled earlier in the day. One student, Jack, was absent from school almost the entire month of March due to an illness and there was a scheduling conflict so that he lost 8 lessons scheduled for the study (see Table 4.1).

The Students: Six Individual Cases

The six students that were scheduled to participate in the study fell into two groups, a lower and higher group based on skill level and grade level. Sam, Mick, Greg and Fred formed a lower level group and received words drawn from the lower elementary lists, while Jack and David received a different set of words drawn from upper elementary lists. The results are reported to reflect the guiding questions of the investigation, where the questions referring to how the Tier 2 words were used: accuracy of use, frequency of use, and type of inflection are grouped together and reported in one subsection. Attitudes
toward writing pre-and post-study are based on the semi-structured interview (see Appendix B) and self-rating scales of spelling performance (see Table 4.2).

Table 4.1.

**Number of Lessons in Study (L) Compared with Total Lessons Taught (T)**

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<td>Sam</td>
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<td>32</td>
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<td>_</td>
<td>Discontinued</td>
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<tr>
<td>Mick</td>
<td>16</td>
<td>9</td>
<td>15</td>
<td>32</td>
<td>17</td>
<td>9/15</td>
</tr>
<tr>
<td>Fred</td>
<td>16</td>
<td>9</td>
<td>18</td>
<td>32</td>
<td>14</td>
<td>9/18</td>
</tr>
<tr>
<td>Greg</td>
<td>16</td>
<td>12</td>
<td>20</td>
<td>32</td>
<td>12</td>
<td>12/20</td>
</tr>
<tr>
<td>David</td>
<td>16</td>
<td>14</td>
<td>29</td>
<td>32</td>
<td>3</td>
<td>14/29</td>
</tr>
<tr>
<td>Jack</td>
<td>16</td>
<td>8</td>
<td>17</td>
<td>32</td>
<td>15</td>
<td>8/17</td>
</tr>
</tbody>
</table>

*Interviews and the summative testing session are not counted as lessons taught and are not included in Table 4.1.
Table 4.2.

**Spelling Ability Self-Rating & Reading Results**

<table>
<thead>
<tr>
<th>Case</th>
<th>Spelling self-rating Pre-study</th>
<th>Spelling self-rating Post-study</th>
<th>GORT-4 results Grade levels 9/9/09</th>
<th>GORT-4 results Grade levels 10/5/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Sam</td>
<td>“I don’t know”</td>
<td>N/A</td>
<td>Rate 1.0</td>
<td>Accuracy 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accuracy 1.0</td>
<td>Fluency 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Comprehension 2.2</td>
<td></td>
</tr>
<tr>
<td>Case Mick</td>
<td>5</td>
<td>Between 7-8</td>
<td>Rate 0.5</td>
<td>Accuracy 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accuracy 0.5</td>
<td>Fluency 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Comprehension 3.4</td>
<td></td>
</tr>
<tr>
<td>Case Fred</td>
<td>7</td>
<td>Between 7-8</td>
<td>Rate 0.5</td>
<td>Accuracy 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accuracy 0.5</td>
<td>Fluency 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Comprehension 4.2</td>
<td></td>
</tr>
<tr>
<td>Case Greg</td>
<td>2</td>
<td>6</td>
<td>Rate 1.0</td>
<td>Accuracy 2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accuracy 0.5</td>
<td>Fluency 2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Comprehension 5.7</td>
<td></td>
</tr>
<tr>
<td>Case David</td>
<td>5</td>
<td>4</td>
<td>Rate 4.4</td>
<td>Accuracy 3.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accuracy 4.4</td>
<td>Fluency 3.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Comprehension 8.4</td>
<td></td>
</tr>
<tr>
<td>Case Jack</td>
<td>5</td>
<td>6</td>
<td>Rate 4.7</td>
<td>Accuracy 4.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accuracy 2.7</td>
<td>Fluency 4.7</td>
</tr>
<tr>
<td></td>
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<td>Comprehension 8.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rate 5.4</td>
<td>Accuracy 9.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fluency 4.7</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Comprehension 9.7</td>
<td></td>
</tr>
</tbody>
</table>
Sam

Sam was a Grade 3 student who was scheduled for special education support in the first period of the day at 9:00 a.m. Due to his frequent absences, late arrivals and school assemblies his attendance in the study was erratic from the inception. His parents later indicated that he would be withdrawn for a family holiday, which further disrupted the delivery of instructional material. For these reasons, the study could not be implemented effectively and any progress or lack of progress made would be difficult to attribute to the study. His pre-and post-test scores are included in Table 1 as his case is referred to in the discussion, albeit briefly.

Mick

Background information.

Mick was a Grade 3 student, identified with a Learning Disability. He was very quiet spoken and never contributed any information unless asked to do so and even then his answers were very brief, involving one or two word answers. He was very resistant to writing at the beginning of the study and when asked to write on a subject of his own choosing, wrote only several words with great difficulty. His classroom teacher, who taught him Language in the regular class with his peers, commented that he would “freeze whenever writing was asked of him or involved in any of the work he was doing.”

Lessons with this student began with the special education teacher asking several personal questions about his weekend, holiday or activities to put him at his ease. The remediation began promptly after this as this student was focused and compliant. He was
not interested or willing to prolong the conversation or interact with the teacher. In fact, he seemed uncomfortable with the attention the teacher bestowed upon him and sat hunched in his chair—it seemed trying to make himself invisible. He had long hair which covered his face and obscured his features. He made no attempt to move the hair out of his face. The lesson was very goal orientated.

**Range of teaching methods used to teach Mick Tier 2 vocabulary.**

This student had difficulty with auditory discrimination and segmenting words into phonemes especially end clusters (blends). The teacher would repeat the word he had difficulty with and ask him to segment the word into sounds using tiles to help him “anchor” or represent the discrete sounds as a concrete objects. He was asked to trace the letter(s) while saying the letter name(s) to build strong auditory, visual, kinesthetic and tactile associations. If the difficulty involved spelling end clusters, such as, “band”, the teacher would ask him to think of a rhyming word spelled the same way to help recall and identify the pattern. She would ask him to repeat the word back to her and ask him to concentrate on what his mouth was doing—asking questions about air flow and lip, teeth, and tongue movements. These strategies were used frequently with this student throughout the study.

When checking for understanding of the vocabulary used, sometimes he appeared to have difficulty hearing the correct short vowel sound in Tier 2 words introduced. For example, he heard “doll” for “dull” and gave the incorrect explanation. Subsequently, the teacher asked the student to say the word back so that she could determine if he had heard
it correctly. If not, she repeated the word and asked him to sound out the word prompting him to use his drill pack of letter names, keywords, and sounds.

In addition, this student was given many positive comments for reinforcement. Whenever he answered appropriately, the teacher would complement him on his ability and tell him how “smart” he was. She pointed out many times how he was incorrect in thinking he could not do something when in fact he could work out the sounds and spellings of words.

**Mick’s use of Tier 2 words taught in various writing assignments.**

Mick was a non-writer at the beginning of the study in his regular Language class and the study looked at whether he would use these words in his writing in his Language class and whether he would spell them correctly with or without inflections and/or derivational affixes. The unedited writing samples obtained from the special education teacher and regular Language class indicate that the student did not make use or have an opportunity to use the Tier 2 words introduced in this study. When dictated within the Orton-Gillingham lesson plan after considerable “priming” with phoneme-grapheme correspondence practice and word analysis, the student spelled the words when they were dictated in the base form.

**Change in quality of Mick’s writing over time.**

Although Mick is not writing at grade level, when one assesses his writing according to the criteria of word usage, length, ability to communicate complete thoughts, knowledge of sentence structure and mechanics, it is apparent that a marked improvement in his skills occurred between January and June.
Initially, Mick was asked to write a short piece on a person he admired, he could only write four words in capitals and these did not form a sentence. He was essentially a non-writer and this was confirmed by his classroom teacher. He was hesitant and took 20 minutes to write these four words. His special education teacher reported that he felt “upset, discouraged and sad” about the writing task he was asked to do. In contrast, by June, Mick was writing in sentences averaging nine words in length, using the past continuous tense, and simple and complex sentence structure. His sentences at the end of the study represent complete thoughts and show unity of topic. He is aware of his audience. His writing does not use any of the words taught in the Tier 2 lists; instead he uses other words that he cannot spell. In comparison to minimal written expression at the beginning of the study, Mick is subsequently attempting to communicate through print. Despite spelling errors, the meaning of his writing is clear and well-punctuated and capitalized. This represents a significant gain in writing skill.

**Changes in Mick’s attitude to writing.**

The changes in Mick’s attitude to writing were gauged by comparing his oral responses to the semi-structured interview questions conducted pre- and post-study. The questions are listed in Appendix B.

Mick began the study as a non-writer both at school and at home. He anticipated writing with dread and found it difficult to write more than a few words on the page even though he could express adequately orally. Both his special education teacher and classroom teacher noticed that he was more ready to write and had less resistance to tasks involving writing by the end of the study. Although he continued to write little if anything
spontaneously on his own, he did so with greater confidence and sustained attention when directed by his teachers over the course of the investigation. His attitude to his writing seemed to be one of growing confidence and this development took place in parallel with a growing sense of his ability to spell correctly. He had many negative comments about writing at the beginning of the study, but fewer at the end. His special education teacher noted several instances where Mick demonstrated uncharacteristic enthusiasm for learning a new spelling rule and appeared to enjoy generating his own sentences using Tier 2 words.

Mick stated that what he liked best about writing was generating ideas and writing about friends. He said he has enjoyed writing stories that he made up himself since Grade 1, but he could not remember the last story he wrote. He could not write find a subject to write about both in the pre- and post-study without the teacher’s help and considerable prompting. This assessment of his own optimal writing conditions may be more wishful thinking that actuality.

Mick rated himself a 5 on the pre-study interview because he said, “sometimes I made mistakes and sometimes I don’t.” He believed he knew lots of words, but had difficulty finding the correct way to spell them and did not like to write the words incorrectly. Subsequently he rated himself 7 or 8 because he felt he was a “better speller.” He could not elaborate on that thought. In addition, Mick’s ability to successfully remember longer passages in dictation and spell inflected words improved over the course of the study. For example, pre-study spelling dictation exercises typically involved one dictated sentence per lesson, with no errors present, such as, “The boss got a bell for the
shop.” Post-study spelling dictation exercises typically involved several sentences dictated per lesson, with no errors present. For example, “That guy will get drenched. That baby is drooling. The sink is dripping. The doll is a big dummy.”

His writing skills, GORT-IV scores for reading fluency and reading accuracy improved over the course of the study; reading comprehension scores dropped slightly (see Table 4.2).

Of the word meanings introduced, he knew all but 10 words: act, ball, ban, brim, by, clip, clot, drench, drift, drug. This indicates that the acquisition of new word meanings was not significant.

**Fred**

**Background Information.**

Fred is Greg’s identical twin and they are both in Grade 4. He is identified with a Learning Disability. Fred is very talkative and likes to ask questions about a variety of subjects. He appears happy and confident in most lessons. Fred is easily distracted and he looks around the special education classroom constantly during his lesson. He notices anything new and asks about it, such as, posters on the walls and footsteps in the hall.

His special education teacher has to refocus his attention throughout the lesson. He often touches the computer screen to bring it out of “sleep” mode so that he can see what time which is displayed on the screen.
Range of teaching methods used to teach Fred Tier 2 vocabulary.

Fred tends to rush through his work and the teacher needs to remind him of drill procedures, for example, he needs to be reminded to trace as he says letter names, (see Orton-Gillingham lesson plan, Appendix A). She frequently asks him to “slow down” and not to forget the steps. He has difficulty remembering the multiple pronunciations of graphemes and requires prompting around generalizations, for example “You know two sounds that “s” makes.” The teacher also gives him the keyword for the long /e/ sound made by the final “y” in a polysyllabic word, to help him recall which letter makes the final long /e/ sound. The VAKT drill took longer than the time allocated because of the prompting required to follow procedures or to recall information. By the end of the study, he was still confusing his short vowel sounds when spelling and reading.

Due to this student’s weak memory, the teacher frequently has to veer off from the planned lesson and include incidental topics that need to be addressed through direct instruction, such as, the syllable concept, short vowels, generalizations of /s/ and /k/ spellings; ff-ll-ss pattern; letter formation of consonants and vowels in printing and cursive.

He struggles in cursive, worrying about his letter formation and joinings. The teacher had to either reassure him constantly that he was correct or to demonstrate how to form or join letters. Sometimes it appeared that his spelling was incorrect, but this was the result of weak knowledge of cursive rather than weak knowledge of spelling. He talked constantly about possible errors he was making, which also disrupted the flow of the lesson plan. It appears to be his overriding concern when he is writing. He appears to be so
focussed on his cursive that in April, the teacher and researcher decided to let him print in manuscript rather than cursive.

**Fred’s use of Tier 2 words taught in various writing assignments.**

The teacher in the regular Language class noticed no spontaneous writing or note jotting takes place in her classroom. In the special education class, pre-study, Fred was writing one-syllable words, and dictation was either single words or sentences, such as, “Kim had the cat on her lap.”

By 12th April, the student was able to make up his own sentences using the vocabulary and inflections “-ed” and “s” taught. For example, “A lion lives in a den. The outer layer of bread is called crust. He dodged to the side when the ball came at him. The car drove passed the ditch.”

The last sentence has a reversal “ot” for “to” and a spacing before, instead of after, the silent “e”.

**Change in quality of Fred’s writing over time.**

Fred’s pre-study writing sample is characterized by several elaborative and persuasive details. When asked to write about people he admires, he wrote about his parents. He gives many reasons why he admires them. His thoughts are somewhat disorganized as he goes back and forward between his father and mother and then back to his father. As a thought occurs to him he writes it down. His vocabulary is mostly monosyllabic, but there are some polysyllabic words used with accurate spelling, namely, “fight”, “people”, and “everything”. He self-corrected “people”. His syntax is affected by
his lack of punctuation so that there are several run-on sentences. He writes as he speaks. His several corrections shows his concern for spelling. Of the 71 words written, eleven words were self-corrected for spelling by erasing and rewriting.

In contrast, his post-writing sample represents a regression in skill level. During this lesson, the student appeared upset and needed to talk about what had happened to his friend Alex who had been absent from school. He wrote for 15 minutes and often seemed lost in thought. He self-corrected “bed” to “bad” in the last line. This writing represents a lower skill level in written expression both in length and elaborative detail although he wrote spontaneously and did not require help to convey his thoughts. He wrote two words per line and incorrect syntax “to be OK” instead of “will be OK” shows regression to an earlier developmental stage where he uses simple words and short sentences. Possibly, his mood overruled his focus for the task at hand. This sample does not seem to represent his knowledge of spelling seen in structured tasks.

**Changes in Fred’s attitude to writing.**

The regular classroom teacher saw more “fluid” expressive oral communication, improved spelling in terms of accuracy and speed, but no spontaneous writing or note jotting takes place in her classroom over the course of the study. The special education teacher believes Fred’s knowledge of morphology has improved and his use of spelling rules, such as, doubling the final consonant in words with short vowels. He did not make use of the Tier 2 words in his free writing, which was minimal. At home, he said sometimes he typed on the computer when
playing games, but added he could only remember once writing at home when his mother told him to write a story. He could not remember what it was about.

The semi-structured interview reflects a negative attitude to writing with many comments showing that Fred does not like to write especially if he is tired and he is requested to write about "boring" topics. In the post-study interview he is more positive about writing and comments on areas that motivate him to write. He appeared more confident in his ability and this development occurred in parallel to a growing resistance to the idea of special education support. He mentioned that it was important to improve his writing skills so that he could achieve “good grades” and not have to come for extra help.

Fred’s self-rating of his spelling skills did not change appreciably over the course of the study. He began by rating himself with a 7 on a scale of 1 to 10 and subsequently rated himself between a 7 and 8 because he could spell “pretty well”.

His reading scores in fluency, accuracy and comprehension as measured on the GORT-IV did improve considerably (see Table 4.2). His writing dictation skills improved, including more polysyllabic words with inflected verbs.

Fred knew most of the meanings of the words taught, with only 5 word meanings taught: brim, clot, cross and drench. This does not represent a significant change in vocabulary acquisition as a result of the study.
Greg

**Background information.**

Greg is Fred’s twin brother and is also in Grade 4. He is identified with a Learning Disability. This student had good concentration and enjoyed getting his spelling dictation correct. He really appeared to enjoy the learning process and was proud of his work. On one occasion he was so pleased with what he had written that he wanted the special education teacher to photocopy it so that he could show his regular classroom teacher. He was very chatty and expressed satisfaction when he got an answer correct, saying, “Yes, I finally got one.”

**Range of teaching methods used to teach Greg Tier 2 vocabulary.**

Greg chose to write in cursive, but as he was spelling he frequently became concerned with letter formation. For example, while writing “unk” he thought his “u” looked like an “r”. The focus then changed from spelling and word meaning to letter formation and joinings between letters. The teacher would demonstrate the formation and correct his work, encouraging him to rewrite and practise the letters he was uncertain about.

Greg had difficulty segmenting words into their phonemes and difficulty remembering sentences for dictation. The teacher inserted incidental teaching around syllable division, clapping words that contain two syllables. She used tiles to represent phonemes as with Mick described above. The teacher used inferencing and inductive reasoning to help the student determine when the “-tch” and when “-ch” spelling is
appropriate. Other phonetic patterns were taught through direct teaching and association with other patterns, for example, the “ar” combination was associated with other r-controlled vowel patterns. The steps involved in the Simultaneous Oral Spelling (SOS) (see the Orton-Gillingham lesson plan, Appendix A) appeared to give him confidence in his spelling and writing of sentences based on these words. On 20th April he wrote:

“A man went into a pizza store He bought a pizza but only ate the crust. When he was eating his pizza, he saw a mouse. He got scared, ran out of the store, and tripped and fell into a ditch.”

He self-corrected the spelling of “went” and “scared”, and he corrected the letter formation of “and”.

**Greg’s use of Tier 2 words taught in various writing assignments.**

When asked to use derivations of some of the list words, he created incorrect versions, such as in the following sentences, written on May 31st: “The ditch ball rolled into the road. The dodge pen was there. He rode dodgingly past the car.”

Instead of writing “dodges” or “dodging”, he changed the word’s part of speech converting it to an adjective in the first two cases and an adverb in the last sentence. He seemed to be experimenting with this word and was still unclear of acceptable and unacceptable versions. As the teacher focussed more on inflections and derivations at this stage of the study, it is possible that his overgeneralizing of the use of suffixes was part of his growing awareness of their role and indicates increasing knowledge about morphology.

The teacher in the regular Language classroom commented that the student was less
resistant to beginning writing tasks, but no spontaneous writing was evident at all. The student was “more articulate” when speaking and his spelling was more accurate and his writing “faster.” She notes, “[Greg’s] ability to recall and/or write correct spellings flowed (rather than halted by difficulties with recall or coming up with cues to help with recall). Accessing words seemed to flow more easily and their ability to use this vocabulary appropriately in sentences also appeared to improve. This was the case both in written and oral expression.”

**Change in quality of Greg’s writing over time.**

Greg’s pre-study writing sample was about someone he admired and during the writing he self-corrected the spellings of 10 words and of these “drodl”, “dall” and “laph” remained incorrect. Prior to writing this piece, he stopped and started several times and thought out loud. “I like to write about Warhammer. It’s hard to paint Warhammer. I don’t know how to describe it. Some people like orcs.” Then he asked the teacher, “How much do I write? What should I list? Should I start with a list? I don’t know what to write.” Greg preferred to talk about the subject and the teacher directed him to write about it as opposed to telling her. Greg’s writing piece was characterized by reversals between d/b and difficulty with spelling polysyllabic words. He wrote several words as one word which may be due to difficulty with visual discrimination of spacing between words or he may have an incomplete grasp of discrete word representations. He attempted to represent separate syllables as separate words. Several words have consonants omitted or reversed. He showed no knowledge of the vowel digraphs needed for the spelling of words in this
passage. His capitalization was inappropriate and pointed to an incomplete understanding of punctuation and sentence structure.

In contrast, to the first writing sample, which began with much difficulty, the student decided to create his own passage from words that he had been taught in the study. Although Greg did not write much: he wrote 31 words in 10 minutes. He erased and respelled five words correctly, which is an improvement over his pre-study passage. This sample showed good word spacing, use of inflections and two spelling errors. One error involved the doubling rule for “drum-drummed” and the other was the final –cle syllable occurring in a polysyllabic word which he had not been taught. Punctuation had improved. His sentences had a repetitive pattern starting with ‘I”. He made good use of the list words to create a meaningful and unified piece. He approached this writing piece without the questioning and doubt of the pre-writing sample. The structure of using his list words made it easier for him to compose a piece.

Changes in Greg’s attitude to writing.

No change was evident in the amount of spontaneous writing completed by the student over the course of the study. Although Greg was proud of his spelling with the special education teacher, this did not seem to transfer to the regular classroom where he produced no written work unless asked to do so. His unedited work in the regular grade classroom showed no use of the Tier 2 words taught in the study. His attitude in the pre-study interview showed a student who did not like any kind of writing: “not even on a computer.” He believed he was not good at it and it “hurts my
arm, takes up time.” He had felt that way “forever” and added that his handwriting “doesn’t look good” and he could not write for long periods. His best writing was “free writing” when he wrote about what he wanted to, not topics the teacher gave him like “my cat” or “my first day at school”. He said that would like to be able to write longer paragraphs and faster, but realized that he could only write half a paragraph. He said that he had “a lot of ideas”, but that he could not put these ideas into correctly spelled words. He gives an example of the word “octopus” which it takes him “minutes” to figure out. He preferred that someone scribe for him so that he “can get my ideas out.” He did not write at home except for practising spelling words.

In contrast to the pre-study questionnaire, the post-study responses indicate he found writing easier. He realized that writing “is not so difficult if you know the spelling.” He liked his spelling the least as he still thinks he makes mistakes. He added that does his best writing when knew how to spell the words. It was still difficult for him to write when a teacher told him what to write about and he had no ideas. His best type of writing is when he can use words that he knows. By the end of the study his attitude to writing was still largely negative and has no personal value for him, but improving his skills will make the teacher “like his work.”

Greg’s self-rating in spelling increased from a 2 to a 6 on a scale of 1 to 10 where 1 is the lowest score and 10 is the highest. He thought he was good at some spelling patterns like “sticky words” which referred to the welded sound of the /n/ with endings “-nk” and “-ng”. His scores in reading fluency, reading accuracy and reading comprehension all improved markedly according to scores on the GORT-IV (see Table 4.2) by the end of the
study. His dictation when scaffolded involved more spelling of inflected words. He knew the meanings of all the Tier 2 words taught.

David

Background information.

David is in Grade 8 and identified with a Learning Disability. He appeared very unmotivated most lessons. He frequently touched the computer screen throughout each lesson to look at the time. He was on friendly terms with his teacher and frequently engaged her in chats about his interests and activities in school and outside school. He took a long time to settle down to work.

Range of teaching methods used to teach David Tier 2 vocabulary.

Due to David’s difficulty in recalling spelling rules, such as, when “g” says /j/, the teacher frequently reviewed the VAKT phonogram drill (see Appendix A) in which the student recalls the sound, letter name and keyword. He needed reminding to follow the Orton-Gillingham procedures for segmenting words into sounds before naming the letters and spelling the word. The teacher produced written chart with symbols placed in front of him to help him recall the steps used to help spell his words correctly. The teacher focussed on reviewing phonograms, spelling rules, and spelling patterns such as “ow” words read as long /o/ and syllable division.

His printing was very irregular and he used a capital “b” in the middle of words. He had difficulty keeping his words on a line. The teacher would correct his printing, but he
did not seem concerned and responded to her corrections by acknowledging that his handwriting was “terrible” and that he preferred to type on the computer, which eventually he was allowed to do.

Throughout the study, he had difficulty spelling words with a schwa sound, such as, “turn” spelled as “tern” and “arrested” spelled as “erested”. The teacher referred back to patterns of words taught with the vowel teams or consonants he was having difficulty with. The teacher introduced matrices in which he was presented with a root word and he would have to combine it with given affixes, applying doubling or dropping the silent “e” rules.

Due to his lack of interest and focus during the lessons, the teacher introduced more structured tasks, such as, cloze procedures and matching definitions to words (see Appendix C).

David’s use of Tier 2 words taught in various writing assignments.

He created these sentences using Tier 2 words on 22nd April:

1) “The man said “Go ahead” he jumped and the crash mat absorbed the fall because he aimed.” The man said, “Go ahead.” He jumped and the crash mat absorbed the fall
2) “The Queen is above everybody but she is going to turn old age. When you are old age you have ailments ahead.” The Queen is above everybody, but she is going to turn old age. When you are old age you have ailments ahead.
3) “The man was aside the king there were a lot of people around him. The assashin killed the king from a angle.” The man was aside the king. There were a lot of people around
him. The assassins killed the king from a angle.

He typed these sentences on the computer with the spell checker turned off.

It is evident that he found it difficult to review his work and isolate spelling errors, spacing errors and use the correct syntax. His knowledge of punctuation was incomplete. He was an articulate speaker and used correct grammar when he spoke. Using the words in sentences was obviously difficult for him. During dictation of sentences he continued to use capitals within his sentences and showed a lack of interest in checking over his work. Once he had written the sentence down, it was of no concern to him whether he had spelled the words correctly or not. He did not seem to care whether he did well. Comments by the teacher show that he seemed very “unengaged” during the last few lessons. Towards the end of the study, he was very distracted by the upcoming graduation of his class and preparations for moving to a new high school.

**Change in quality of David’s writing over time.**

The student’s writing showed minimal skill improvement when comparing the pre- and post-study writing samples. One area that did improve was the appropriate use of capitals “B” and “D”, whereas in the pre-study “b’s” and “d’s” are capitalized mid-word, they are not in the post-writing sample. This may be a result of his use of the computer to write his passage, but many of the spelling errors seen in the first writing sample persist. For example, he had difficulty with the schwa sound seen in spelling of “lava” as “lave”, he spelled phonetically as in “doows” for “dues”, he omitted consonant sounds in clusters and he had difficulty correcting his spacing errors. Homophones were another area of
difficulty. He chose to use the list words to form a narrative which he admitted was not his favourite genre, yet the piece was coherent and unified. This student’s attitude to special education support was most likely key to interpreting the lack of effort he put forth during writing assignments. It is possible that he chose to use the list words in his passage because they provided much needed structure and ideas rather than as a evidence the list words were useful to express his thoughts. His spelling knowledge of Tier 2 words was not consolidated as evidenced on the summative test, and other difficulties in spelling persisted, such as, lack of application of the doubling rule, omission of letters, difficulties spelling vowel teams correctly and poor letter formation (see Appendix F). Otherwise his spelling results were better on the sentence dictation task, with David spelling most words correctly. Interestingly, he achieved the same score when spelling the uninflected and inflected forms of the Tier 2 words, scoring 4/10 words correct on both tests. This shows that the error occurred in the base form and not because of the adding of a suffix.

David’s classroom teacher commented that his written work “continues to be well below the expectations.” He continued to spell numerous words phonetically, for example, “anamies” for “enemies”. According to her rubric, she gave him 2+ for content and 2 for editing on his progress report. She has had several “serious” talks regarding his work attitude and his lack of ambition to “use all the tools at his disposal.” She did not believe he was using the spell checker on Word software. She said he was a very good participant in class discussion, but this level of expressive language was not reflected in his written work. His teacher believed his lack of focus and immaturity played a role in his poor performance and lack of engagement. The special education teacher
agreed with these comments and noted that David’s motivation to improve his written expression and spelling seemed to play a major role in his skill development. He seemed to be disinterested in the remedial tuition she offered and much preferred to express himself orally.

**Changes in David’s attitude to writing.**

The changes in his attitude to writing were gauged by comparing his oral responses to the semi-structured interview questions conducted pre- and post-study (see Appendix B). David did not appear to make substantial progress in his written expression with letter formation, vocabulary usage and editing being significantly below grade level. His written language did not reflect his spoken language. When asked to write it always appeared to be a chore although he seemed able to write for longer towards the end of the study, but he never did so willingly. He had difficulty with single syllable and multi-syllable words alike. Appropriate use of periods appeared more evident in his later pieces.

There was no change in this student’s attitude to writing. His negative attitude to writing remained the same throughout the study. He always found writing difficult. In the beginning it was boring, “not fun, hard”, but he found once he got going it was not so difficult. He disliked certain topics, for example, writing book reports which could be “boring.” He linked his personal enjoyment of a topic to his ability to write about it. He found it aggravating when he did not know how to spell a word and the software Word did not help him or did not notice when he spelled it incorrectly. Mostly he found his spelling
“annoying”. He believed his writing on the computer to be longer and more detailed. “I hate handwriting—on the computer it’s easier. He reported that he was “not bothered” about his punctuation. He “hates” writing essays because they are “too long.” He referred to a strategy he had been taught by his teacher called SEE, which stands for statement, elaboration, example. An essay is three times a SEE paragraph and there are beginning and concluding paragraphs. “I don’t think I can write that long on a topic.” In answer to the question why should he improve his writing, he said so that he can “exceed” and the teacher corrects this to “excel”. He said writing is important for everyday communication, for example, e-mails. Later in the post-study survey he listed the same reasons and added that if he improved his writing he could have more time to devote to learning in other areas.

With regard to the list words in the research study, he commented that some of the words were “too easy” and others were “hard” and there did “not seem to be anything in between.” The teaching of word meanings to enhance vocabulary acquisition had an insignificant impact as the student knew all but 6 of the 60 word meanings of the Tier 2 words, those were: afar, angle, baton, check, drain.

David’s self-rating on spelling dropped from a 5 to a 4 on a scale of 1 to 10 where 1 is the lowest score and 10 the highest. He would give himself a 4 for spelling because “I am not that good at spelling, but I am not terrible.” He thought it would depend on the subject he was trying to write about and that in science he was less likely to spell “big words.” He admitted that he thought about spelling rules more than he used to in English class “or whatever”. His reading accuracy, fluency and comprehension scores measured on
the GORT-IV all dropped (see Table 4.2).

**Jack**

**Background information.**

Jack is a Grade 7 student identified with a Learning Disability. He worked hard with good concentration during lessons. He was eager to learn, but often struggled to learn new concepts. It was difficult for the teacher to give him enough time to work things out as the other student in his class often gave the answer ahead of time. He had difficulty remembering his schedule and when he came to the first few lessons, he seemed to think he should have been in math. This student was ill during March and missed 15 lessons out of the scheduled 32.

**Range of teaching methods used to teach Jack Tier 2 vocabulary.**

This student was often confused that two words that meant the same were spelled the same, such as, different meanings taught for the word “block”. The teacher gave several contrasting examples for the student to see how the word could be used in different ways.

For the word “booth” the student wrote “boof” confusing th/f and words had to be articulated carefully for him and he was asked to repeat the words dictated to ensure he had heard them correctly. The teacher would ask him to look at her mouth when she pronounced the word and drew attention to the mouth parts involved in making the different sounds: tongue, teeth, and lips. She followed this up by asking Jack to trace the
letters on a rough surface and linked this movement to the letter names, keywords and sounds.

He remembered the procedures for the Orton-Gillingham lesson plan (see Appendix A), but became distracted with his letter formation and the reversals that he noticed in his writing while he was writing. He was often so preoccupied with his letter formation and spelling that he forgot the meaning of the word that was being discussed or the sentence that he was writing from dictation. The teacher would spend some time explaining letter formation and encouraging the student. She demonstrated letter formation and the student would rewrite the word. This student lagged behind David, who was also in the lesson. The teacher had to explain phonetic elements to him while David was given an activity, but as David was easily distractible he would join in and answer questions posed to Jack. This made for a challenging teaching environment and not all the elements of the lesson plan could be completed.

**Jack’s use of Tier 2 words taught in various writing assignments.**

The classroom teacher noted that the student’s spelling is at times phonetic and believed him to have “perfectionist” tendencies as he often interrupted his draft writing to ask the teacher the correct spelling of a word. She did notice that skills were improving and attributed this improvement to his work in the special education support centre. She noticed that he avoided assistive technology and needed reminders to use the “autocorrect” and “speech function” in Word to find his errors. She also noted that he had difficulty maintaining focus and he took a long time to complete assignments. She was not sure
whether he was daydreaming, worrying about spelling or off task. She reported that he had a “great vocabulary” and she encouraged him to “take risks” and use this vocabulary in his writing. She believed he received editing help at home, but it was not consistent and ultimately not helpful. The student needed prompting and conferencing to include appropriate elaboration in his narrative writing.

The special education teacher had a high opinion of this student’s ability and willingness to learn. She viewed him as a diligent student who applied his newfound knowledge but required scaffolding of activities in order to be successful. He could use the Tier 2 words if they were presented in an exercise, such as, a cloze passage or given specific instructions. He wrote creatively for pleasure, but did make use Tier 2 words taught in the samples we obtained.

**Change in quality of Jack’s writing over time.**

When comparing the pre- and post-study changes in Jack’s writing, three areas of change are noted in the post-study sample: words are easier to decode as they are more phonetically correct; punctuation is evident and used more appropriately; and inflected verbs are used. Jack’s ability to communicate clearly in the pre-study writing sample was severely compromised by his weak spelling skills and lack of punctuation. He omitted words, syllables and spaces between words. He was unable to break down his speech into discrete words, which may stem from processing weaknesses in visual and/or phonological areas. Sometimes, it appeared that apart from the first phoneme he was guessing the rest of the letters in a word, such as, “mon” for “mountain”. This student showed no hesitation
when asked to write and sustained concentration during the writing task.

His post-study writing sample was created on a computer with the “spell checker” function turned off and although still containing errors, his spelling was significantly closer to the correct version, for example, “wacking” for “walking”. His use of inflections showed that he did not know or did not know how to apply the spelling rule of doubling the final consonant. For example, he wrote “graped” for “gripped”. Short vowels and vowel digraphs continued to be a problem for Jack. He continued to omit syllables and words, but to a lesser degree. He also chose, like David, to use the words on the lists to create a narrative passage. The older students seemed to prefer the structure of a given vocabulary rather than start with completely open-ended writing task.

The summative test shows that Jack spelled Tier 2 words more accurately in their inflected form and that his spelling was mostly correct in sentences dictated using Tier 2 vocabulary. His errors reflect ongoing difficulties with applying doubling rules, correct letter formation and spelling of syllable types (see Appendix F).

**Changes in Jack’s attitude to writing.**

This student’s enjoyment of writing stories was consistent throughout the duration of the study. When asked how he felt about writing, Jack answered that it depended on the topic he was writing about. He added that he did not like his handwriting and that when he wrote in cursive his work was neater than when he printed, adding that when he wrote, he worried about spelling. He believed spelling to be more important than neatness, and preferred to write on the computer because it helped him with spelling. He
articulated his enjoyment of several genres, such as, poetry, narrative and book reports adding that since he was about 6 years old, he has enjoyed writing. He thought that cursive had helped with his spelling. He commented that he had particular difficulty with words that he could not sound out or nonphonetic words. He admitted that then he would switch to a simple word that he could spell. When asked if there was a difference between writing by hand and using the computer, he said, “If I write by hand, I don’t see my mistakes—the red line, but even without the red line, I can see errors because it is clearer.” Much of his response to what he liked or did not like about writing focused on his spelling or handwriting. He found the list words helpful in some ways because they were new and others provided a good review of spelling.

He could not give a reason for why it is important to improve his written expression. He would like to be able to read his own writing and be able to organize his thoughts on paper. He said that sometimes it took him over one hour to put his thoughts down, but sometimes it “goes really quickly.”

Jack initially rated himself at a 5 level in spelling, saying that he could spell “most words”, and easy or common words, but complex words were more difficult for him. He says referring to spell checker software, “If it wasn’t for the red line I’d have 100 mistakes.” His self-rating improved slightly to a 6 at the end of the study “because I feel that I’m getting better at spelling, but I still feel that there are some things that get in my way. He finds that the schwa vowel sound causes him to make mistakes saying, “[I am] I am not sure what prevents me from getting the word correct. When I’m working on my computer and I get a word wrong, I use the dictionary feature on the computer to help me
spell a word correctly. This can help but it also gets in my way because I have to stop and check and then my focus is off the topic that I am working on and it takes a long time.”

Despite his absences, Jack improved his reading fluency, accuracy and comprehensions as measured by GORT-IV.

As with the other students in the study, Jack knew almost of the Tier 2 words taught so that there was not a significant increase in vocabulary knowledge as a result of the study. He did not know the following Tier 2 words: braid, clip, branch, boost, booth, brood, drain which were different to David’s taught words with exception of “drain.”

**Did the Formative Design Method Enable Effective Teacher Mentoring?**

From the notes of the weekly meetings that occurred between the teacher and the researcher, the teacher’s journal, lesson plans and diagnostic comments made by the teacher after each lesson, the teacher appeared to have had four realizations.

Firstly, the teacher was aware that her lesson plans were more “carefully” planned and rigorous due to the supervision by and collaboration with the researcher. She paid more attention to the use of time in her lessons and ensured that several areas would be addressed: teaching phonemes necessary for decoding the words; teaching morpheme inflections; teaching the application of vocabulary in sentence writing. The teacher felt participation in the study improved her record keeping of the children’s performance due to the close observation by the researcher. Usually no one other than the teacher looked at her lesson plans.
The planning of the lessons for the students in the study seemed to affect the overall effectiveness of the lesson planning including for those students not involved in the study. She paid more attention to the relationship of individual components of her lesson to the overall goals of the lessons and this attentiveness transferred to her lesson planning for other students.

Secondly, the focus on teaching Tier 2 vocabulary ensured that a broader range of strategies were employed that incorporate teaching word meaning as opposed to her normal practice of teaching phonics exclusively. There were significantly more writing assignments in the OG lessons teaching Tier 2 vocabulary than other lessons, although the content was the same “because we weren't working specifically on vocabulary words, the words that we were working on were not always conducive to writing great sentences/paragraphs----in other words, using the vocabulary lists, helped make the study of phonics more meaningful.”

She became aware that the students could make progress in areas that she thought they could not, for example, developing morphological awareness. By teaching morphology, the teacher realized that the students in the study knew a lot more morphology than she realized. They recognized and used affixes appropriately with different parts of speech. She gained confidence in teaching morphology as this area was relatively new for her. She ascribed her own reticence to teaching morphology to her lack of knowledge in this area and found the collaborative process to be helpful in overcoming this avoidance.
Thirdly, time, or the lack of it became an area of concern for her as the study progressed and she often felt torn between addressing the needs of the study and the need to teach to a specific scope and sequence of a phonics program she had used previously. At first, the attention she paid to planning the lesson was useful in that she incorporated more phonics strategies, ensured the students spelled, wrote and demonstrated understanding and applied knowledge. Later, she found that focus on these aspects meant she could not address other issues she was concerned about, such as, teaching new phoneme and grapheme correspondences and spelling rules. She felt conflicted by the many different goals she thought she should be addressing and the limited time available.

The teacher was frustrated by the brevity of the lessons and by not having a clear sequence to follow. The teacher liked to feel that she knew what had been taught and what remained. She worried that she was not teaching the usual sequence dictated by the Wilson program which the school followed and instead “I was teaching my ‘phonics’ using the [phonetic] components that came up in the vocabulary words and that made me feel ‘scattered”’. She added that it was difficult to record progress of 12 -16 students who came to see her inconsistently without a specific sequence to follow. She recognized the value of an OG structure, but missed the traditional scope and sequence of the prescribed Wilson program she was using before, even though she did not like all aspects of the Wilson program.

In planning the lesson, the teacher found that there were lots of good vocabulary activities and writing activities to plan for, but the spelling rules that were involved with these words took precedence. It was often too much for the student to cope with in one
lesson. When teaching vocabulary and the derivations, the doubling rule, dropping “e” rule had to become a focus and this tended to overload the student. The teacher came round at the end of the study to a realization that she had become more flexible in teaching morphology and derivations—more adept at teaching the spelling rules and doing so earlier on than she otherwise would have. By the end of the study, she felt it “did balance out in the end because the students learned more spelling rules and morphology than I would normally teach, so things were simply in a different order, but actually probably a more efficient sequence.”

Fourthly, teaching vocabulary acquisition seemed to make the students more engaged. When she was asked how the teaching and lesson content differed in the study, she replied that “sometimes the students feel that the "phonics" are boring and the rules are mundane...the vocabulary focus helped to engage them [the students] and help them attach the rules to some ‘real words’.” The students enjoyed the success of working with words that they knew the meaning of because their oral vocabulary was a relative strength. While using the vocabulary in their own writing, other issues such as spelling concepts, punctuation, grammar and mechanics emerged.

The teacher noticed that the older students appeared to recall vocabulary meanings and spellings over long periods and wondered if it was possible that teaching meanings and spellings of Tier 2 words simultaneously helped recall of both areas. At the end of the study, the summative tests were disappointing; however, the teacher offered this possible explanation, “I think the summative results were also a function of the students not performing to their potential. The older kids [David and Jack] had
'checked out’ before I had given them the summative tests; also, they were working on studying for exams in their classes which they were very focused on and therefore less focused on the work that I was doing.”

How Useful is Teaching Tier 2 Vocabulary?

The teacher believed that teaching Tier 2 the vocabulary was a worthy focus for the lesson as this helped her determine which phonetic elements to address. There was relevance and application to teaching the phonetic element based on words the student needed and then used in writing passages. Some words were too easy to spell, but she felt it was good to have easier words to spell as the students continued to make mistakes on these “easy” words especially if attention was not paid to the spelling. By focusing on the procedures in the SOS section of the lesson plan, the words become “easy”.

The teacher had some frustration with the words selected for the study saying that the focus was only on single syllable words which appeared too easy rather than on multisyllable words, which she felt she should be addressing. The formative study design allowed these concerns to be addressed and morphology teaching was introduced allowing inflections of Tier 2 words and the appropriate spelling rule to be taught when adding suffixes.

In conclusion, teaching vocabulary in isolation was difficult for the teacher. The students do not seem any more “familiar” with the words or more likely to use the words in their own writing at the end of the study than they were in the beginning. The activities requiring the students to create derivations using prefixes and suffixes worked in isolation
and were successful, but when the students were asked to perform the same tasks in the summative test, they did not fare as well. This indicates they had not been taught the concepts to mastery and therefore made errors.
Teaching Tier 2 Vocabulary: The Impact on Student Writing Performance

Each student in this study was identified with a Learning Disability and all had difficulty spelling and expressing themselves in print. It was hoped that after spending several months focusing on teaching vocabulary, the students would use these words in their writing or use the vocabulary as a springboard to create sentences of their choosing. The picture that emerged was more complex and other factors distracted the students from this goal. Teaching vocabulary is more than teaching individual words and is part of a complex planning and instructional program (Graves, 2006, p. 89).

Interfering factors

Handwriting.

Some students were distracted by issues relating to letter formation in cursive and the appearance of their writing. This was true of both younger and older students. Time was spent addressing cursive writing issues that came up and encouraging the students to continue regardless of the appearance of their writing. Eventually the younger students were allowed to print and the older students were allowed to use the computer. This did not solve all the issues for the younger group, as cursive letter formation concerns were replaced by reversals of “b/d” and reversals of letters within the word. The older group used the computer, but the students switched off the “spell check” function as they did not like to see the red line. This did help them write more fluently and eliminate the concern
for the way their writing “looked”.

**Attitude to writing.**

Four out of the five students did not write at home and engaged in no spontaneous writing in their regular homeroom classroom. They resisted writing and did not like being told what to write. They referred to teacher imposed subjects as “boring”. They all mentioned that they preferred to write about subjects that interested them; however, when given the opportunity to do so, the students in the younger group (Mick, Fred and Greg) could not write without significant help from the teacher and often had to be given a subject to write on. In fact, several students including the older students used the vocabulary lists to create their own passages when asked to write on a subject of their choosing. Thus, it is difficult to evaluate just how much the freedom to choose their own subject matter actually affects their writing output. The students might perceive that they could write more easily if they chose their own subject matter, but other factors override their ability to make use of the opportunity.

Additionally, it might be easier for the students to cite “boredom” as a socially and academically acceptable reason, rather than admit to others, including themselves that they are at a loss for ideas or elaborated ideas. In fact the word “boredom” might have a different meaning to the one it has for adults. For the students “boredom” might mean a subject of no relevance.

One student in grade 8, Jack, was very resistant to writing and said that he had not liked writing since he was very young. The intense teaching of the Tier 2 vocabulary
enabled him to choose these words for a writing sample, but although making the assignment easier, it did not bring about a change in his attitude, which was well entrenched. Conversely, the student, Jack, had always liked writing and this continued to be the case. He found the list words useful as bringing interest to the lesson and helping him review his spelling rules. These attitudes affected the readiness to engage in the writing practice, but also reveal how long-standing many of these attitudes are as the students remember their feelings towards writing as early as the age of 6.

The students seemed to realize the value of improving their writing skills but did not know how to go about it nor did they appear motivated to practice writing spontaneously outside of the special education class. The classroom teacher did note that they seemed to be able to sustain their writing tasks and approached them more readily. Alternatively, the students might have commented positively on the importance of improving their writing skills because this is what they perceived as being the correct answer. Thus, this might not be an opinion that originates from their own motivation and/or thinking.

The Spelling and writing connection.

The younger students, when commenting on improving their writing, frequently mentioned their spelling as part of the endeavour. Spelling rather than content, structure, vocabulary, mechanics and punctuation was seen as a powerful way of increasing their ability to write well. Whether this was because of the emphasis on spelling in the special education class or awareness of their frequent mistakes and difficulty in this area is unclear. What is clear, is that all of students recognized the importance of spelling
correctly, but their efforts to improve in this area varied widely. This correlates with findings that “poor spelling is associated with a poor concept of the self as a writer” (Moseley, 1994).

**Unintended consequences of teaching Tier 2 vocabulary.**

Over the course of the study, some students' reading skills improved markedly. Whether this was a result of the study is hard to determine as the students were gaining instruction using computer assisted technology to write in Language classes and the amount of new word meanings taught was not significant enough to bring about change in reading rate and comprehension. Other learning was taking place and the students were maturing during the term, which might also have contributed to the improved reading scores. It is possible that reading skills were indirectly affected by the emphasis on morphology which becomes increasingly important from Grade 4 onwards (Nunes & Bryant, 2006). Improvement in reading scores may have occurred due to the emphasis on the teaching of phonics and the incorporation of more writing in the lessons (Berninger et al., 2002).

**Changes in the quality of written expression.**

When teaching the selected Tier 2 vocabulary words to both the older and younger group, it became clear that most of the word meanings were known and that at the rate of approximately 55 words introduced in four months, there would be no significant increase in vocabulary knowledge even if all word meanings were new. Taking into account the
phonetic concepts learned by the students, choice of words was limited to one-syllable words with short vowels for the younger group and one- and two-syllable words for the older group with a variety of vowel combinations. This resulted in an arbitrary list, which was not associated with any meaningful experience or narrative. These words presented in isolation were difficult for the students to later recall or use in a meaningful way in their own writing. If one accepts the students’ comments that they enjoy writing about what interests them, it would seem this would be a more relevant starting point. Even though Tier 2 words are designated necessary to be taught, it seems that arbitrarily teaching words allocated to this category is not enough to promote writing and spelling skills.

Alternatively, the amount of words taught might have been the issue as teaching these words addressed phonetic difficulties, but did not impact vocabulary knowledge due to the small number taught.

The most marked change that occurred over the course of the study was the quality of writing in the scaffolded spelling dictation of single words and sentences and the free choice exercise. In the case of the former, the student could spell longer words both in isolation and in sentences. In the free writing passage sentences were clearer, spelling was more accurate and sentence structure much improved. One student appeared to regress, but on the day he was to write his free choice passage, his friend became ill and he was very upset. He wrote about this topic.
Benefits and Constraints of Formative Case Design for the Teacher

From the special education teacher’s perspective, she benefitted from the mentorship process in several ways: her lesson planning was more thorough, she learned subject matter, and she taught new subject matter incorporating more strategies into her lessons. Indeed, these benefits had a carry over effect in her lesson planning for other students not in the study. On the other hand, the nature of the collaboration meant that the study was time consuming and the possibilities in terms of new strategies and goals was only limited by the time allocated for the lessons. Originally optimistic, the researcher and teacher drew up detailed plans to address the issues that came up during the study. The optimism was modified by the reality that time was limited and there was much less of it than anticipated for a variety of reasons (see Table 3.1). Due to the collaboration and formative nature of the study, there were several attempts to address the different issues of each student, which were ultimately unrealistic given the constraints on programming imposed by other events and educators in the school.

The formative design of the study produced a useful working model which allowed the researcher to address the teacher’s concerns and students’ needs to produce a more flexible approach. The formative design allowed for adjusting to the needs of the students, so that when the teacher or researcher felt the students were not receiving adequate practise or skill instruction, changes in strategies could be incorporated to suit both the needs of the children and the teacher. This encouraged the teacher to persist with the goals of the study and helped address the needs of the students. Using vocabulary to create a focus for the lesson has been very interesting and useful, it has taken the focus away from
teaching the basic spelling rules and sounds. However, the drawback left the teacher with the impression that the students did not have a chance to master the sounds and rules required to decode and encode.

**Using a Tier 2 Vocabulary Intervention Program: The Teacher’s Perspective**

After the novelty of working collaboratively had become routine, the special education teacher began to feel “unanchored” from a clear scope and sequence common to phonics programs. The focus on word meanings that appeared to be arbitrarily selected meant a doubling up of issues to address in one lesson, that is, not only did she investigate word meanings with the students, but she also addressed spelling and spelling rules when inflections were added. The students presented with multiple difficulties: letter formation, phoneme-grapheme correspondence, syllable identification, and application of spelling rules. She did not have a feeling of progress as one does when working through a program with a clear sequence. The focus on the selected Tier 2 words did not seem to be relevant to the children’s work or writing, where teaching word meaning and spelling did not seem to address their difficulties with planning, organization of thought, elaboration, and subject knowledge. Students with Learning Disabilities need help with goal setting, self-monitoring, and exploration of subject matter in depth (Troia, 2006, p. 324). These words were taught without a clear purpose other than the knowledge they had been identified as “worth teaching”. The students appeared to know most of these word meanings before they were introduced.
The teacher commented that vocabulary taught should be linked to either narrative or to other text the student was interested in. Teaching words in isolation was not effective in her opinion and not rewarding for the teacher as she had no sense of goal accomplishment or completion. Graves (2006) has stated that vocabulary instruction and spelling are two separate goals and should not be addressed simultaneously.

Although teaching word meanings was very time consuming in that it involved checking understanding and providing numerous examples of usage, the teacher found the focus to be refreshing and pleasantly challenging. She did point out that without the support of the researcher who created the lists, provided sentence examples, summative tests and reading passages, she would not have had the time to prepare lesson plans addressing the semantic component of the words introduced. In future, she will teach vocabulary and sees the value in the process, but will draw the selection of words from relevant text or academic literature in the curriculum. It seemed that the researcher played a role in fostering specific subject knowledge and its implementation, which enhanced the teacher’s belief in her effectiveness. This is an area that is seen as valuable but overlooked in teacher education currently (Kosnik & Beck, 2009, p. 124).

Little attention is paid to the teaching of vocabulary *per se* in schools (Biemiller, 2002) and the study reveals two possible causes: time and criteria for selection. It seems to be very difficult for the teacher to “wear two hats”. The teacher seemed to vacillate between her need for the structure of phonics programs, which her students obviously need, and the realization that teaching meaning is also important. She realized that meaning needs to be related to relevant experiences or curriculum materials.
The special education teacher predicts that other teachers, whether in the regular classroom or special education classroom, will be unlikely to select words from Biemiller’s book *Words Worth Teaching* unless the words are placed in a literary context or in a non-fiction text so that they have a wider relevance and interest for the students. Random word lists are just that—“random”—and have no purpose for the child and the writing stories or non-fiction pieces for the words is too time consuming for the teacher.

**Conclusions**

In conclusion, the focus on the teaching of word meanings appeared to enhance the remedial program not because of the actual word meanings taught, but rather because of the teaching strategies that were incorporated into the lesson. Special education lessons became “richer” as a result. More discussion about word meaning took place and words were viewed not solely from the point of view of their phonetic composition, but from the semantic role they played in communication. When considering usage of words, it became important to consider their parts of speech and the necessary inflections that change the base word. Words are viewed in multiple terms: parts of speech, syllable types, derivations and inflections. The scope of teaching is therefore wider and more challenging. The challenge can be met if teachers have more time to prepare and select a relevant context in which to situate the words. The teacher needs to feel that the words are relevant and useful as do the students.
Limitations

The duration of the study limited the investigation to relatively few words. Also, the selection of words which was based on phonetic elements the students knew meant that more challenging vocabulary was excluded from the study. This resulted in the selection of words that the students already knew for the most part. Thus, it was difficult to draw conclusions about the impact of teaching word meanings when the students learned a relatively small amount of word meanings.

The frequent absences of the students resulted in fewer remedial lessons with the special education teacher and this may have contributed to her concern that she was not addressing her students’ needs adequately.

The students came to the study with well-entrenched, mostly negative attitudes as they had already experienced several years of difficulty at school. The study would have benefitted from incorporating younger students who have not yet experienced consistent failure.

Implications

There is clearly a value to incorporating the teaching of word meanings in a phonics program. We learn to spell and read words for a purpose—to communicate and therefore we should know the meanings of the words we wish to spell and read. The question then arises: Which words do we teach? Biemiller’s lists are helpful in providing a guide, but the lists are too extensive to be used by a special education teacher who is the most likely candidate to implement the vocabulary curriculum suggested. In order to teach new word
meanings, the teacher has to check which words are already known and pass on to words that are not. This is a time consuming process. It would be valuable to determine a set of criteria that can help teachers select vocabulary to teach and to provide relevant literature and language exercises that incorporate this vocabulary.

One of the reasons students missed their remedial lessons with the special education teacher was due to activities in the regular grade classroom. The teacher informed the special education teacher on the day of the lesson that they were staying with her to continue class work. If remedial intervention is to be consistent, then consistent attendance should be mandatory and a clear protocol for decision making should be established. The school administration needs to prioritize remedial intervention and the decision for when a student attends special education support sessions should not be left to the classroom teacher’s discretion.

Finally, the issue of time and scheduling is central to the successful implementation of a special education program. The students who came first period were often late because of assemblies. Those lessons that were scheduled for 30 minutes often turned into 20 minutes due to the fact that the students had to walk to the special education teacher’s room and once there needed time to settle down. Scheduling longer lessons of 45 minutes each might be more effective.

Questions for Further Research

When considering the notion of teaching vocabulary, the question still remains: Which vocabulary should be taught? Although Biemiller has listed several thousand word
meanings, it is still not known what order they need to be taught in for specific reading and writing disabilities. It is clear from this study that word meanings are known and with scaffolded instruction can also be spelled, yet the words are not used in everyday writing. Further investigation is needs to determine if vocabulary instruction is necessary for students with dyslexia who have strong receptive and expressive vocabulary. If attitude to spelling and handwriting are of such overriding importance to the students with Learning Disabilities in this study, is this true for other students with different Learning Disabilities? Does having good printing correlate with clearer and more skilled written expression in this community?

With regards to improvement in spelling and the student who knows their spelling is poor, will improved spelling lead to more skilled written expression or will the anxiety transfer to another area, for example, grammar?

The issue of lack of time is ubiquitous in teaching special education and this study is no exception. Would a longer study, taking place over several years with coordination between grade level teachers have a more marked impact on the usage of vocabulary “worth teaching” in the writing of special needs students. Students value the activities of the homeroom differently compared to those of the special education resource classroom. If vocabulary were reinforced and taught here in addition to the special education class, more usage might be seen.

Finally, formative design is a flexible and collaborative way of conducting research where the desire to bring about a positive outcome for the student is valued. It would be
advisable to see more research driven by this form of academic inquiry, which is flexible enough to change and adapt to the needs of the classroom.
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Appendix A

ORTON-GILLINGHAM LESSON PLAN

Name: ___________________ Date: _____________________ #: ______

OBJECTIVE: __________________________________________________________

READING PHONOGRAMS: Student is shown White and Salmon cards: asked to give the letter name, sound(s), and key word(s) while tracing them with two fingers on a tactile surface.

Completed: ___________________ Comments: ________________

______________________________ ________________________________

______________________________ ________________________________

______________________________ ________________________________

______________________________ ________________________________

SPELLING PHONOGRAMS: Teacher gives sounds of individual phonograms on Yellow Cards: Student listens, repeats the sound, states the letter name(s) and key word(s) and writes the letter(s).

Completed: ___________________ Comments: ________________

______________________________ ________________________________

______________________________ ________________________________

______________________________ ________________________________

BLENDING: Use White and Salmon Cards: blend consonants and vowels to form real and nonsense syllables/words. Student must sound out letters and/or sweep across to read words.

Completed: ___________________ Comments: ________________

______________________________ ________________________________

______________________________ ________________________________

______________________________ ________________________________

ORAL READING OF WORDS: Student reads list of words containing previously taught phonograms.

Completed: ___________________ Comments: ________________

______________________________ ________________________________

______________________________ ________________________________

______________________________ ________________________________
Orton-Gillingham Lesson Plan continued

SIMULTANEOUS ORAL SPELLING DICTATION (SOS): Teacher: dictates words that reflect previously learned phonograms. Student: repeats the word, segments it into sounds using finger spelling, tapping out, segmenting with coloured blocks, or tracing on a tactile surface, writes the word while sounding it aloud, proofreads, then rereads.

Words Completed: ___________________________ Comments: ___________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

SENTENCE SPELLING DICTATION: Teacher: dictates phrases or sentences. Student: repeats the sentence, segments each word into sounds using: finger spelling, tapping out, segmenting with coloured blocks, or tracing on a tactile surface, writes the words while sounding it aloud, proofreads, then rereads sentence.

Sentences Completed: ___________________________ Comments: ___________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

INTRODUCTION OF NEW MATERIAL:
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
Completed: ___________________________ Comments: ___________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

ORAL READING: Student reads aloud from various reading materials.
Completed: ___________________________ Comments: ___________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

HOMEWORK: _______________________________________________________________________
__________________________________________________________________________________

COMMENTS: _______________________________________________________________________
__________________________________________________________________________________
Appendix B

Semi-Structured Interview for Student

Do you enjoy writing?

How long have you felt this way?

How would you rate your spelling on a scale of 1 to 10?

What do you like best about writing?

What do you like least about writing?

When do you do your best writing?

When is it difficult for you to write?

What types of writing do you like best? least?

Why is it important to improve your writing?

Semi-Structured Interview for the Teacher

Did this intervention bring about the changes you expected?

What did you find challenging about implementing the intervention?

Did your students make progress? If yes, in which ways? If no, what factors were implicated in the lack of progress?

What aspects of the students’ writing would you like to see improved?

Will you continue to use Tier 2 words as a basis for vocabulary instruction?

How does teaching Tier 2 words differ from teaching vocabulary based on texts you select?
Appendix C

Protocol for Teaching Vocabulary

1) Carry out pre- and post-test for understanding.

2) Identify phonetic components of words: phonemes, clusters, digraphs, trigraphs, spelling patterns evident (ff-ll-ss, silent “e”, 111, “-tch”, “-dge”, soft “c,” soft “g”, use of “k” in front of “e, i, y”). student articulates and recalls rules, patterns, phonetic elements.

4) Identify syllable type: closed, open, vowel-consonant-e, r-controlled, vowel team, consonant-l-e.

5) Verify if student knows the meaning of words by asking the student to explain or use word, give a synonym, and/or recognize an example. The student can link the word the his own personal experience and provide an example of what the word does not mean, that is, a non-example.

5) Teach meaning if not understood, provide definition and give an example of usage in a phrase or sentence: orally and written. Link the meaning to student experience.

8) Add inflections to base word: third person “s”, “es” and “-ed”, “-ing”.

9) Create derivations -ful, -ness, all closed and most common; closed prefixes: un-, in-, im-, dis-, mis-) with the older group.

10) Follow up activities and application:
    
    • Cloze
- Use in own sentences
- Find synonyms
- Add affixes
- Create concept maps, mind maps, associations—then use with other activities, e.g.
  - make up own sentences
- Find words in stories, short passages and identify collocations in context
- Antonyms
Appendix D

Tier 2 Words Taught to Sam, Mick, Fred and Greg

act, any, as, back, bad, ball, ban, band, bash, bit, blast, block, blush, brim, but, by, call, can, cast, chart, check, clip, clot, come, cock, cool, cost, could, craft, cramp, crop, cross, crush, crust, curse, dab, deep, den, dent, depth, disc, ditch, dodge, drench, drill, drip, drift, drip, drool, drop, drug, drum, dull, dummy, duty

(55 words)

Tier 2 Words Taught to David and Jack

adapt, aim, age, gent, above, abuse, absorb, ail, afar, adjust, ahead, alert, alley, ambush, among, amuse, angle, around, aside, auction, away, baby, baffle, base, basic, bag, bail, bank, bar, barbecue, bare, bargain, balance, ballot, ban, basin, batch, baton, bay, bawl, beacon, bead, beam (2), bear, beat, before, belong, bellow, beaver, band, braid, booth, brood, boost, branch, block, clip, blot, check, bolt

(60 words)
Appendix E

Additions and Changes to the Lesson Plan for the Third Term

1) Drop cursive requirement for those students who are struggling with it.

2) All list words taught are to be inflected using common tense and plural suffixes: -ing, -ed, -s, -es

3) Apply “111”, “y to i”, “drop silent e” rules when adding suffixes. A matrix grid will be used to make a new word, which the student will then copy into a notebook or use to make a sentence.

4) The matrix grid is also used to create derivations using affixes and base words and roots for the older students.

5) Use more non-examples to explore meaning, e.g.
   • A crop is a bunch of corn.
   • I crop the field.
   • The crop carrots are ready. (non-example)
   • The carrots were cut croppingly. (non-example)

6) Continue to use passages which show use of vocabulary in context as part of summative activities.

7) Have teacher model by using “think aloud” when determining word associations while creating semantic webs, analyzing idiomatic use, determining connotations.

8) Teacher and researcher will journaling.
9) Create “What’s in a Word” Teacher places a word on the board and it is the first activity, which starts each lesson. Teacher writes word on the board which analyzed according to phonetic elements, syllable types, affixes, root, origin (swimming = swim + ing).

10) Sort activities: according to common root, common suffix, common prefixes

11) Play “What’s My Rule?” Using sentences or single words make inflections by adding suffixes or auxiliary verbs and ask what rule am I applying? For example, “Susan run(s) fast.” “Raj step(s) up?” etc. Teacher adds the “s” in brackets and asks “Why am I doing this? Why is this “s” important?

12) Provide grid or matrix and ask students to complete by adding affixes. “Fill the Box”

<p>| | |</p>
<table>
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<td></td>
<td>act</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

13) Play “Word Wizard”. What part of word gives you the clue to the etymological origins.

14) Ask one question about a word. “Question of the Day” e.g. “Why do we say /sh/ in ‘composition’?”

15) Researcher will provide new lists and one page summary of clues to etymological origins.

16) Above activities will focus on 4 words in every list due to time considerations.
Appendix F

Summative Test Results for Jack

Read all 60 words in the list correctly in the inflected and uninflected form.

Spelling uninflected: 4/10 words correct
Spelling inflected: 8/10 words correct
Dictation of sentences composed of Tier 2 words:
Sentence 1: 2/14 words incorrect. “ailling” due to inappropriate doubling and “baffuled” due to the schwa sound added by a representation of “u”. He does not have a strong understand of the -Cle syllable type.
Sentence 2: 2/14 words incorrect. “steped” which is incorrect because the doubling rule was not applied; “satered” is incorrect due to omission of “t” in the initial cluster or end cluster.
Sentence 3: 2/8 incorrect due to reversal of “w” for “m” and he wrote “awused” instead of “amused”. Another reversal occurred in the word “sorry” and he wrote “sroorry”.

Summative Test Results for David

David read the 60 Tier 2 words correctly and he read the passage based on the words correctly.
Dictation of uninflected words 4/10 correct.
Dictation of inflected words 4/10 correct.
Dictation of sentences composed of Tier 2 words:
Sentence 1: 3/14 incorrect. “rabit” not “rabbit” which follows the VCCV pattern where the double “bb” keeps the previous vowel short; “allyway” not “alleyway” where the long /e/ at the end of alley is spelled with an “ey” the lesson common ending; “aiing” not “ailing” shows the omission of the “l” attention to visual detail and orthographic English string of letters—we don’t see double “i” letter in words. Sentence 2: 1/14 incorrect. The word “stoped” was not spelling with a double “p”, which shows that the doubling rule has not been mastered.

Sentence 3: 1/8 incorrect. The word “fellt” instead of “felt” shows overuse of the ff-ll-ss rule.

Letter formation in printing very irregular with many “u’s” looking like “a’s”. The letter “b” and “d” are capitalized in the middle of words or at the beginning where it is not called for. He spelled “baffled” correctly in the sentence but not in isolation. This is a word he had trouble spelling originally. 10/36 words in the sentences were taken from the lists and of these he got 8/10 correct. The two incorrect were inflected and the other 8 included inflected and base form words.