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model of developmental word knowledge (Henderson, 1990; Templeton & Bear, 1992; Templeton & Morris, 2000).

Subsequent studies confirmed this developmental model across many groups of students, from preschoolers (Ouellete & Sénéchal, 2008; Templeton & Spivey, 1980) through adults (Bear, Truex & Barone, 1989; Massengill, 2006; Worthy & Viise, 1996), as well as across socioeconomic levels, dialects and other alphabetic languages (Bear, Helman & Woessner, 2009; Cantrell, 2001; He & Wang, 2009; Helman, 2009; Helman & Bear, 2007; Yang, 2005). The power of this model lies in the diagnostic information contained in students' spelling inventions that reveal their current understanding of written words (Invernizzi, Abouzeid & Gill, 1994). In addition, the analysis of students' spelling has been explored independently by other researchers (e.g., Bahr, Silliman & Berninger, 2009; Bissex, 1980; Ehri, 1992; Foorman & Petscher, 2010; Holmes & Davis, 2002; Larkin & Snowling, 2008; Nunes & Bryant, 2009; Richgels, 1995, 2001; Treiman, 1993; Treiman, Stothard & Snowling, 2013; Young, 2007).

Henderson and his students not only studied the development of children's spelling, but also devised an instructional model to support that development. They determined that through an informed analysis of students' spelling attempts, teachers can differentiate and provide timely instruction in phonics, spelling and vocabulary that is essential to move students forward in reading and writing. We call this efficient and effective instruction **word study.**

Why Is Word Study Important?

Becoming fully literate depends on fast, accurate recognition of words and their meanings in texts, and fast, accurate production of words in writing so that readers and writers can focus their attention on making meaning. This rapid, accurate recognition and production depends on students' written word knowledge—their understanding of phonics and spelling patterns, word parts and meanings. Planning and implementing a word study curriculum that explicitly teaches students necessary skills, and engages their interest and motivation to learn about words, is a vital aspect of any literacy programme. Indeed, how to teach students these basics in an effective manner has sparked controversy among educators for nearly two hundred years (Balmuth, 1992; Carnine, Silbert, Kame'enui & Tarver, 2009; Mathews, 1967; Schlagal, 2013; Smith, 2002). But helping students learn about words should not be controversial.

Many phonics, spelling and vocabulary programmes are characterised by explicit skill instruction, a systematic scope and sequence and repeated practice. However, much of the repeated practice consists of drill and memorisation, so students have little opportunity to discover spelling patterns, manipulate word concepts or apply critical thinking skills. Although students need explicit skill instruction within a systematic curriculum, it is equally true that "teaching is not telling" (James, 1899/1958).

Students need hands-on opportunities to manipulate words and features in ways that allow them to generalise beyond isolated, individual examples to entire groups of words that are spelled the same way (Joseph, 2002; Juel & Minden-Cupp, 2000; Templeton, Smith, Moloney, Van Pelt & Ives, 2009; White, 2005). Excelling at word recognition, spelling and vocabulary is not just a matter of memorising isolated rules and definitions. The best way to develop fast and accurate recognition and production of words is to engage in meaningful reading and writing, and to have multiple opportunities to examine those same words and their features in and out of context. The most effective instruction in phonics, spelling and vocabulary links word study to the texts students are reading, provides a systematic scope and sequence of word features, provides multiple opportunities for hands-on practice and application and promotes active thinking. Word study teaches students how to look at and analyse words so that they can construct an ever-deepening understanding of how spelling works to represent sound and meaning. We believe that this word study is well worth 10 to 15 minutes of instruction and practice daily (Carlisle, Kelcey & Berebitsky, 2013).

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What is Word Study?
In this video author Marcia Invernizzi explains why word study is important.

What Is the Purpose of Word Study?

The purpose of word study is twofold: it examines words in order to (1) reveal the logic and consistencies within our written language system and (2) help students master recognising, spelling, defining and using specific words. First, students develop a *general* knowledge of English spelling. Through active exploration, word study teaches students to examine words to discover generalisations about English spelling, such as the role of final silent *e* to mark a long vowel sound. They learn the regularities, patterns and conventions of English orthography needed to read and spell. This general knowledge reflects what students understand about the nature of our spelling system. Second, word study increases *specific* knowledge of words—the spellings and meanings of individual words.

General knowledge is what we use when we encounter a new word, when we do not know how to spell a word or when we do not know the meaning of a specific word. The better our general knowledge of the system, the better we are at decoding unfamiliar words, spelling correctly or guessing the meanings of words. For example, if you know about short vowels and consonants you would have no trouble attempting the word *brash* even if you have never seen or written it before. The spelling is straightforward, like so many single-syllable short vowel words. The general knowledge that words that are similar in spelling are related in meaning, such as *compete* and *competition*, makes it easier to understand the meaning of a word like *competitor*, even if it is unfamiliar. Additional clues offered by context also increase the chances of reading and understanding a word correctly.

To become fully literate, however, we also need specific knowledge about individual words. The word *rain*, for example, might be spelled *rane*, *rain* or *rayne*; all three spellings are theoretically plausible. However, only specific knowledge allows us to remember the correct spelling. Likewise, only specific knowledge of the spelling of *which* and *witch* makes it possible to know which is which! The relationship between specific knowledge and general knowledge of the system is *reciprocal*—each supports the other. Conrad (2008) expressed this idea in noting that "the transfer between reading and spelling occurs in both directions" (p. 876) and that "the orthographic representations established through practice can be used for both reading and spelling" (p. 869).

What Is the Basis for Developmental Word Study?

Word study evolves from four decades of research exploring developmental aspects of word knowledge with children and adults (Henderson, 1990; Henderson & Beers, 1980; Templeton, 2011; Templeton & Bear, 1992). This line of research has documented the specific kinds of spelling errors that tend to occur in clusters and reflect students' uncertainty over certain recurring spellings or orthographic principles. These "clusters" have been described in terms of (1) errors dealing with the alphabetic match of letters and sounds (FES for *fish*), (2) errors dealing with letter patterns (SNAIK for *snake*) and syllable patterns (POPING for *popping*) and (3) errors dealing with words related in meaning (INVUTATION for *invitation*; a lack of knowledge that *invite* provides the clue to the correct spelling of the second vowel). The same cluster types of errors have been observed among students with learning disabilities and dyslexia (Bear, Negrete & Cathey, 2012; Sawyer, Lipa-Wade, Kim, Ritenour & Knight, 1997; Templeton & Ives, 2007; Treiman, 1985; Worthy & Invernizzi, 1989), students who speak in variant dialects (Cantrell, 2001; Dixon, Zhao & Joshi, 2012; Stever, 1980; Treiman, Goswami, Tincoff & Leevers, 1997) and students who are learning to read in different alphabetic languages (Bear, Templeton, Helman & Baren, 2003; Helman, 2004; Helman et al., 2012; Yang, 2005). Longitudinal and cross-grade-level research in developmental spelling has shown that developmental progression occurs for all learners of written English in the same direction, and varies only in the rate of acquisition (Invernizzi & Hayes, 2004; Treiman, Stothard & Snowling, 2013).

Word study also builds on the history of English spelling. Developmental spelling researchers have examined the three layers of English orthography in the historical evolution of English spelling and students' developmental progression from *alphabet* to *pattern* to *meaning* layers. Figure 1.3 illustrates how the layers of written English are arranged. Each of the three layers of the English spelling system is built on the one before: to the straightforward alphabetic base of Old English was added the more abstract letter patterns in Middle English, and to that layer were added the Greek and Latin meaning units such as prefixes, suffixes and roots in early Modern English. For mature readers, upper level word study examines interactions among the three layers.

Figure 1.3   Three Layers of English Orthography
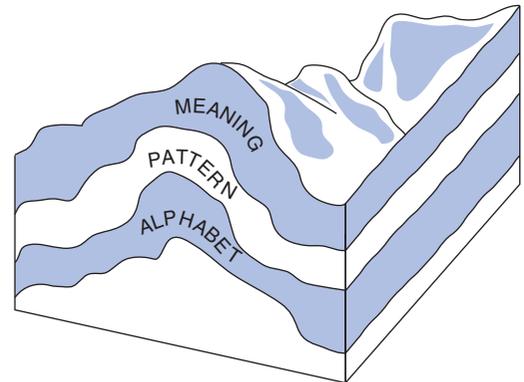
Alphabet

Our spelling system is **alphabetic** because it represents the relationship between letters and sounds. In the word *sat*, each sound is represented by a single letter; we blend the sounds for *s*, *a* and *t* to read the word *sat*. In the word *chin*, we still hear three sounds, even though there are four letters, because the first two letters, *ch*, function like a single letter, representing a single sound. So we can match letters— sometimes singly, sometimes in pairs—to sounds from left to right and create words. This **alphabetic layer** in English spelling is the first layer of information at work.

The alphabetic layer of English orthography was established during the time of Old English, the language spoken and written by the Anglo-Saxons in England between the Germanic invasions of the sixth century B.C.E. and the conquest of England by William of Normandy in 1066 (Lerer, 2007). Old English was remarkably consistent in letter–sound correspondence and used the alphabet to systematically represent speech sounds. The long vowels were pronounced close to the way they are in modern Romance languages today, such as Spanish, French and Italian (i.e. E is pronounced as long A as in *tres* and I is pronounced as long E as in *Rio*).

The history of the alphabetic layer reflected in the story of Old English is relevant to teachers today because beginners spell like "little Saxons" as they begin to read and write (Henderson, 1981). Armed with only a rudimentary knowledge of the alphabet and letter sounds, beginning spellers of all backgrounds use their alphabet knowledge quite literally. They rely on the sound embedded in the names of the letters to represent the sounds they are trying to represent (Invernizzi, 1992; Read, 1971; Young, 2007). This strategy works quite well for consonants when the names do, in fact, contain the correct corresponding speech sounds (*Bee*, *Dee*, *eF*, *eS* and so forth). It works less well for letters that have more than one sound (*C: /s/ and /k/*), and it does not work at all for consonants with names that do not contain their corresponding speech sounds (*W*: *double you*; *Y*: *wie*; and *H*: *aitch*). Short vowel sounds are particularly problematic for novice spellers because there is no single letter that "says" the short vowel sound. As a result, beginning readers choose a letter whose name, when pronounced, sounds and feels closest to the targeted short vowel sound (Beers & Henderson, 1977; Read, 1975). For example, beginning readers often spell the short *e* sound in *bed* with the letter *a* (BAD) and the short *i* sound in *rip* with the letter *e* (REP).

Pattern

Why don't we spell all words in English "the way they sound"—at the alphabetic level, in other words? If we did, words like *cape*, *bead* and *light* would look like *cap*, *bed* and *lit*—but these spellings, of course, already represent other words. Therefore, the **pattern layer** overlies the alphabetic layer. Because there are 42 to 44 sounds in English and only 26 letters in the alphabet, single sounds are sometimes spelled with more than one letter or are affected by other letters that do not stand for any sounds themselves. When we look beyond single letter–sound match-ups and search for **patterns** that guide the groupings of letters, however, we find surprising consistency (Hanna, Hanna, Hodges & Rudorf, 1966; Venezky, 1999).

Take, for example, the *ain* in *rain*: we say that the silent *i* is a **vowel marker**, indicating that the preceding vowel letter, *a*, stands for a long vowel sound. The *i* does not stand for a sound itself, but marks the vowel before it as long. The *ai* group of letters follows a pattern: when you have a pair of vowels in a single syllable, this letter grouping forms a pattern that often indicates a long vowel. We refer to this as the "AI pattern" or as the consonant-vowel-vowel-consonant (CVVC) pattern—one of several high-frequency long-vowel patterns. Overall, knowledge about orthographic patterns within words is considerably valuable to students in both their reading and their spelling.

Where did these patterns originate? The simple letter–sound consistency of Old English was overlaid by a massive influx of French words after the Norman Conquest in 1066. Because these words entered the existing language through bilingual Anglo-Norman speakers and writers, some of the French pronunciations and spelling conventions were adopted, too. Old English was thus overlaid with the vocabulary and spelling traditions of the ruling class, the Norman French. This complex interaction of pronunciation change on top of the inter-mingling of French and English spellings led to a proliferation of different vowel sounds represented by different vowel patterns. The extensive repertoire of vowel patterns today is attributable to this period of history, such as the various pronunciations of the *ea* pattern in words like *bread* and *thread*, *great* and *break*, *meat* and *clean*. It is uncanny that students in this pattern stage of spelling spell like "little Anglo-Normans" when they write *taste* as TAIST or *leave* as LEEVE.

Meaning

The third layer of English orthography is the **meaning layer.** When students learn that groups of letters can represent meaning directly, they will be much less puzzled when encountering unusual spellings. Examples of these units or groups of letters are prefixes, suffixes and Greek and Latin roots. These units of meaning are called **morphemes**—the smallest units of meaning in a language.

One example of how meaning functions in the spelling system is the prefix *re-*: Whether we hear it pronounced "ree" as in *rethink* or "ruh" as in *remove*, the morpheme spelling stays the same because it directly represents meaning. Why is *sign* spelled with a silent *g*? Because it is related in meaning to *signature*, in which the *g* is pronounced. The letters *s-i-g-n* remain in both words to visually preserve the meaning relationships that these words share. Likewise, the letter sequence *photo* in *photograph*, *photographer* and *photographic* signals spelling–meaning connections among these words, despite the changes in sounds that the letter *o* represents.

The explosion of knowledge and culture during the Renaissance required a new, expanded vocabulary to accommodate the growth in learning that occurred during this time. Greek and Latin were used by educated people throughout Europe and classical roots had the potential to meet this demand for meaning. Greek roots could be combined (e.g., *autograph* and *autobiography*), and prefixes and suffixes were added to Latin roots (*inspect*, *spectator* and *spectacular*). So, to the orthographic record of English history was added a third layer of meaning that built new vocabulary out of elements that came from classical Greek and Latin.

The spelling–meaning relations inherent in words brought into English during the Renaissance have important implications for vocabulary instruction today as students move through the intermediate grades and beyond (Templeton 2011/2012, 2012). When students explore how spelling visually preserves meaning relationships among words with the same derivations (e.g., note the second b in *bomb* and *bombard*), they see how closely related spelling is to meaning and vocabulary. The seemingly arbitrary spelling of some words—in which silent letters occur or vowel spellings seem irrational—is in reality central to understanding the meanings of related words. For example, the silent *c* in *muscle* is "sounded" in the related words *muscular* and *musculature*—all of which come from the Latin *musculus*, literally a little mouse (the rippling of a muscle reminded the Romans of the movements of a mouse!). Such words, through their spellings, carry their history and meaning with them (Venezky, 1999; Templeton et al., 2015).

Figure 1.14 **Developmental Stages, Characteristics and Word Study Instruction**

i. eMer geNT STAge—CHAPTer 4

Characteristics
1. Scribbles letters and numbers
2. Lacks concept of word
3. Lacks letter–sound correspondence or represents most salient sound with single letters
4. Pretends to read and write

Reading and Writing Activities
1. Read to students and encourage oral language activities
2. Model writing using dictations and charts
3. Encourage pretend reading and writing

Word Study Focus
1. Develop oral language with concept sorts
2. Play with speech sounds to develop phonological awareness
3. Plan activities to learn the alphabet
4. Sort pictures by beginning sound
5. Encourage finge point memory reading of rhymes, dictations and simple pattern books
6. Encourage invented spelling

ii. LeTTer NAMe–ALPHABeTiC STAge—CHAPTer 5
eAr LY LeTTer NAMe–ALPHABeTiC STAge

Characteristics
1. Represents beginning and ending sounds
2. Uses letter names to invent spellings
3. Has rudimentary or fi m concept of word seen in accurate finge pointing and word knowledge
4. Reads word by word in beginning reading materials

Reading and Writing Activities
1. Read to students and encourage oral language activities
2. Develop concept of word by plenty of reading in predictable books, dictations and simple rhymes
3. Record and reread individual dictations
4. Label pictures and write in journals regularly

Word Study Focus
1. Collect known words for word bank
2. Sort pictures and words by beginning sounds
3. Study word families that share a common vowel
4. Study beginning consonant blends and digraphs
5. Encourage invented spelling

MiDDLe TO LATe LeTTer NAMe–ALPHABeTiC STAge

Characteristics
1. Correctly spells initial and final onsonants and some blends and digraphs

2. Uses letter names to spell vowel sounds
3. Spells phonetically, representing all salient sounds in a one-to-one, linear fashion
4. Omits most silent letters and preconsonantal nasals in spelling (*bop* or *bup* for *bump*)
5. Fingerpoints accurately and can self-correct when off track
6. Reads aloud slowly in a word-by-word manner

Reading and Writing Activities
1. Read to students
2. Encourage invented spellings in independent writing, but hold students accountable for features and words they have studied
3. Collect two- to three-paragraph dictations that are reread regularly
4. Encourage more expansive writing and consider some simple editing procedures for punctuation and high-frequency words

Word Study Focus
1. Sort pictures and words by different short-vowel word families
2. Sort pictures and words by short-vowel sounds and CVC patterns
3. Continue to examine more difficult onsonant blends with pictures and words
4. Study preconsonantal nasals and digraphs at ends of words
5. Sort pictures comparing short- and long-vowel sounds
6. Collect known words for word bank (up to 200)

iii. WiTHiN WOr D PATTer N STAge—CHAPTer 6

Characteristics
1. Spells most single-syllable short vowel words correctly
2. Spells most beginning consonant digraphs and two-letter consonant blends
3. Attempts to use silent long-vowel markers
4. Reads silently and with more fluen y and expression
5. Writes more flue tly and in extended fashion
6. Can revise and edit

Reading and Writing Activities
1. Continue to read aloud to students
2. Guide silent reading of simple chapter books
3. Write each day, writers' workshops, conferencing and publication

Word Study Focus
1. Complete daily activities in word study notebook
2. Sort words by long and short vowel sounds and by common long-vowel patterns

Figure 1.14 Developmental Stages, Characteristics and Word Study Instruction (*continued*)

3. Compare words with *r*-influen ed vowels
4. Explore less common vowels, diphthongs (*oi, oy*) and other ambiguous vowels (*ou, au, ow, oo*)
5. Examine triple blends and complex consonant units such as *thr, str, dge, tch, ck*
6. Explore homographs and homophones

iV. SYLLABLeS AND AFFiXeS—CHAPTer 7

Characteristics

1. Spells most single-syllable words correctly
2. Makes errors at syllable juncture and in unaccented syllables
3. Reads with good fluen y and expression
4. Reads faster silently than orally
5. Writes responses that are sophisticated and critical

Reading and Writing Activities

1. Plan read-alouds and literature discussions
2. Include self-selected or assigned silent reading of novels from different genres
3. Begin simple note-taking and outlining skills, and work with adjusting reading rates for different purposes
4. Explore reading and writing styles and genres

Word Study Focus

1. Examine plural endings
2. Study compound words
3. Study consonant doubling and infle tional endings
4. Study open and closed syllables and other syllable juncture issues
5. Explore syllable stress and vowel patterns in the accented syllable, especially ambiguous vowels
6. Focus on unaccented syllables such as *er* and *le*
7. Explore unusual consonant blends and digraphs (*qu, ph, gh, gu*)
8. Study base words and affixes
9. Focus on two-syllable homophones and homographs
10. Join spelling and vocabulary studies; link meaning and spelling with grammar and meaning

11. Explore grammar through word study
12. Sort and study common affixes (prefi es and suffixes)
13. Study stress or accent in two-syllable words

V. Deri VATiONAL re LATiONS—CHAPTer 8

Characteristics

1. Has mastered high-frequency words
2. Makes errors on low-frequency multisyllabic words derived from Latin and Greek
3. Reads with good fluen y and expression
4. Reads faster silently than orally
5. Writes responses that are sophisticated and critical

Reading and Writing Activities

1. Include silent reading and writing, exploring various genres
2. Develop study skills, including textbook reading, notetaking, adjusting rates, test taking, report writing and reference work
3. Focus on literary analysis

Word Study Focus

1. Focus on words that students bring to word study from their reading and writing
2. Join spelling and vocabulary studies; link meaning and spelling with grammar and meaning
3. Examine common and then less common roots, prefi es and suffixes (e.g., *ion*)
4. Examine vowel and consonant alternations in derivationally related pairs
5. Study Greek and Latin word roots and stems
6. Focus on abstract Latin suffixes (*ence/ance; ible/able; ent/ant*)
7. Learn about absorbed or assimilated prefi es
8. Explore etymology, especially in the content areas
9. Examine content-related foreign borrowings