

# SPELLING PERFORMANCE EVALUATION FOR LANGUAGE & LITERACY

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## Spelling Performance Evaluation for Language & Literacy

Spelling has been fundamentally re-conceptualized in light of a large body of research conducted over the past 30 years. The often-held, traditional view of spelling as a rote, visual memory activity has been replaced with an understanding that spelling is one of the most complex forms of language.

With this understanding, we now know that spelling and reading share the same underlying language knowledge (Ehri, 2000; Templeton & Morris, 2001). Like reading, spelling draws upon an individual's phonological awareness, knowledge of orthography (sound-symbol relationships, letter patterns and spelling rules), vocabulary and morphology (knowledge of word parts and related words) and learned mental images of words (Masterson & Crede, 1999; Masterson & Apel, 2000; Apel & Masterson, 2001). Because reading and spelling share these common underlying language domains, systematic spelling instruction that targets one or more of these areas of language, or word study, knowledge can benefit both the spelling and reading performance of individuals (Ehri, 1997; 2000).

Spelling instruction to improve word study knowledge that underlies both spelling and reading is most effective when the instruction is performance-based, that is,

when it targets an individual student's specific deficits in word study knowledge (Wilson, Rupley & Rodriguez, 1999; Bailet, in press). Performance-based instruction begins with a prescriptive assessment that informs and directs the teaching process by identifying the most appropriate learning goals and instructional methods for each student. Student learning is accelerated because the teacher has identified an individual student's deficits in word study knowledge and can zero-in on that student's specific learning needs with the most appropriate lessons and activities to address those needs. By teaching only what a student needs to learn, time is available for explicit, systematic instruction and intensive, targeted practice.

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***“Simply put, looking closely at how students spell words offers powerful insight into the nature of their word knowledge and thus the types of information they use when they read and write words.”***

***Shane Templeton PhD***

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While standardized spelling tests can quantify spelling performance and spelling inventories can describe what letter patterns a student can and cannot spell, only the SPELL *Spelling Performance Evaluation for Language & Literacy*® prescriptive assessment software program determines *why* a student misspells words and

recommends precisely *what type* of word study instruction is needed.

## Historical & Contemporary Perspectives on Spelling Instruction

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The traditional view of spelling instruction as a rote, visual memory activity was based upon the early belief that English spelling is highly irregular and is best achieved through memorization. This perspective, which prevailed throughout the first half of the 1900s, was the genesis of the weekly spelling word list for study. Words were selected solely on the basis of frequency of use and students were expected to memorize a list of unrelated, high frequency words each week. Ironically, this instructional approach was in direct contrast to instruction in the previous century. In the 1800s, educators closely linked reading and spelling instruction based on their belief that these two skills were related and supportive of one another (Venezky, 1980).

The contemporary view of spelling as a complex language skill began to emerge in the 1960s. Early empirical studies revealed patterns of regularity in English spelling at the alphabetic, syllabic and morphological levels (e.g., Hanna, Hanna, Hodges, & Rudorf, 1966) and the call to shift emphasis in spelling instruction began. Isolated word lists continued to be used, but now words were selected for study based on frequency of use *and* letter spelling pattern. The selection and grouping of words according to spelling pattern highlighted the patterns of regularity in English spelling and facilitated spelling acquisition.

Later, research into the development of spelling revealed a common developmental process in the acquisition of spelling (Ehri, 1993; Templeton & Bear, 1992; Trieman,

1993). This developmental process of spelling acquisition is characterized by an individual's growth from knowledge of letter names, to association of sounds with letters, to knowledge of letter spelling patterns, and, eventually, to an understanding of how meaning is represented through spelling. This insight into the process of spelling acquisition encouraged an emphasis on the integration of morphology in spelling instruction.

Current views of spelling development emphasize the different types of language knowledge available to children (i.e., phonological awareness, knowledge of orthography, vocabulary and morphology and the learned mental images of words) as a repertoire of resources (Sulzby, 1996) from which children may draw when spelling a word. Thus, attention to all language knowledge across the developmental span of spelling acquisition is important (Apel, Masterson & Hart, in press; Bourassa & Trieman, 2001).

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***“When the linguistic challenges of spelling were uncovered by research, we could understand more easily why spelling is so difficult for so many students.”***

***Louisa Moats EdD***

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Adding to this growing understanding of spelling development, recent empirical studies have revealed that spelling and reading draw upon these same underlying types of language knowledge (Ehri, 1997). This research supports the instructional practices of the 1800s and brings spelling instruction full-circle. At this point it is well understood that systematic spelling instruction compels growth in language

knowledge that is important to both spelling and word-level reading and, in turn, enhances reading fluency and comprehension and writing composition skills.

The research of the past few decades has led to the contemporary perspective on spelling instruction: Systematic instruction in spelling - one of the most complex forms of language - rightfully belongs within the reading and language arts curriculum. This type of instruction can lead to success in reading and writing for all students when used as a method to foster word study knowledge. Additionally, spelling or word study instruction is most effective when integrated across the curriculum. It is often through the content of particular subjects that specific spelling patterns can be identified and practiced (Apel, Masterson, & Hart, in press).

## Description of the Spelling Process

As we have noted, spelling is a complex language skill that draws upon an individual's phonological awareness, knowledge of orthography (sound-symbol relationships, letter patterns and spelling rules), vocabulary and morphology (knowledge of word parts and related words) and learned mental images of words (Apel & Masterson, 2001). These different types of word study knowledge contribute to spelling in important and different ways (Derwing, Smith & Wiebe, 1995; Nation & Hulme, 1997; Treiman & Bourassa, 2000).

This understanding of spelling as a complex language process is the theoretical basis of SPELL *Spelling Performance Evaluation for Language & Literacy*®. The SPELL prescriptive assessment software program works by first collecting a representative

sample of a student's spelling at the word level through administration of the *Main Test* testing module. Then, a step-by-step, detailed analysis of the student's spelling sample is completed by the software program and the results of the analysis are used to automatically select and customize *Additional Testing Modules* for that individual student to collect additional performance data as needed (e.g., to probe a student's phonological awareness specific to the types of spelling errors made by that student). Taken together, these data reveal which language, or word study, knowledge a student is and is not using to spell.

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***“The study of spelling is the study of words – their history, meaning, grammatical rule and linguistic structure. SPELL will direct teachers toward these aspects of language and encourage the use of more enlightened instructional practices that truly educate students in word study.”***

***Louisa Moats EdD***

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### *Phonological Awareness*

Individuals use their phonological awareness skills in spelling by breaking words down into smaller units, such as syllables and phonemes (speech sounds), and then linking these smaller units to their written forms. For individuals who demonstrate difficulties in segmenting words into syllables and phonemes, language specialists can predict that spelling will be negatively affected (Nation & Hulme, 1997). In most cases, individuals with poor word segmentation skills will delete letters and/or syllables in the words

they spell (e.g., *pat* for *past*, *sop* for *stop*, *relize* for *realize*.)

The SPELL *Will-O-Wisp I* and *Will-O-Wisp II* testing modules probe segmentation skills specific to an individual student's spelling errors. This information reveals to what extent the individual student's spelling errors are due to poor word segmentation skills.

Spelling also requires the ability to discriminate between phonemes in a meaningful way. That is, individuals must be able to perceive a difference between sounds (e.g., between short vowels *e* and *i*), as well as recognize that the difference in sound signals a difference in meaning. Individuals then must link these different sounds to their written forms. If they cannot perceive a difference between two sounds - or if a difference between these two sounds is heard but does not signal a difference in meaning - individuals are likely to spell the two vowel sounds with the same letter.

The SPELL *Magical Pond I* and *Magical Pond II* testing modules probe discrimination skills specific to an individual student's spelling errors. This information reveals to what extent the individual student's spelling errors are due to poor discrimination of speech sounds.

#### *Sound-Symbol Relationships, Letter Patterns and Spelling Rules*

Individuals must acquire knowledge of specific sound-symbol relationships, letter patterns and spelling rules to convert spoken language to written form (Ehri, 2000; Treiman & Bourassa, 2000). These phonics skills, also known as orthographic knowledge, include recognizing sound-symbol relationships (e.g., the /k/ sound can be represented by the letters *c*, *k*, *ck*, *cc*, *ch* or *lk*), knowing which letter combinations are acceptable (e.g., the letter combination *str* is

acceptable but the letter combination *sdr* never occurs in the English language), and understanding syllable and word position constraints on spelling patterns (e.g., the /k/ sound in *cape* cannot be spelled with a *ck* because *ck* never spells the /k/ sound in the initial position of the word). Individuals with poor phonics skills are likely to spell words incorrectly, failing to recognize accepted spelling conventions.

SPELL's patent-pending *error analysis algorithms* identify specific deficits in sound-symbol relationships, letter patterns and spelling rules that are responsible for the individual student's spelling errors.

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***“Until recently . . . there have been few resources that offered guidance to educators and clinicians in applying . . . strong research in spelling assessment and instruction. SPELL provides this guidance in a focused and effective format.”***

***Shane Templeton PhD***

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#### *Vocabulary*

Individuals use vocabulary knowledge to correctly spell words. For example, understanding a particular word's meaning helps the student accurately store and recall the correct spelling of homophones, words that sound the same but have different meanings (e.g., *bare* and *bear*, *dear* and *deer*, *which* and *witch*). Individuals who fail to apply their vocabulary knowledge are likely to confuse the spelling of homophones. Confusion of spellings of homophones is an easily recognizable pattern and, therefore, not included in the SPELL assessment program.

### *Word Parts & Related Words*

Knowledge of word parts (prefixes, suffixes, base words, root words) and related words, including inflected or derived forms, is also important for successful spelling performance (Carlisle, 1995). Inflected words contain suffixes that provide information about time or quantity without changing the meaning or class of the word (e.g., walk – walked; hope – hoping). Derived words contain affixes (prefixes or suffixes) that change the meaning and/or the word class (e.g., cycle – recycle; friend – friendly).

When an individual is required to spell an unfamiliar word (e.g., *exception*), knowledge of the base word (i.e., *except*) and certain word endings (i.e., *-ion*) may aid in the spelling of the unknown word. A student also may draw upon knowledge of rules for modifying base words to correctly spell inflected and derived words. For example, the English language has a rule of dropping the silent *e* at the end of the verb *hope* before adding *-ed* to spell *hoped*. The need to use knowledge of word parts and related words to spell words becomes increasingly important as individuals spell words of greater length and complexity.

The *Spell Book I* and *Spell Book II* testing modules probe a student's knowledge of related words and readiness for spelling words with prefixes and suffixes. This information reveals which language, or word study, knowledge the individual student *is* and *is not* using to spell.

### *Mental Images of Words*

Finally, individuals must develop clear and complete mental representations of previously read words (e.g., *feet* rather than *fete*), common syllable structures (e.g., *en-* as in *enter*; *engrossed* and *envelope*) and word endings (e.g., *-sion* vs. *-tion*). These mental

representations, also known as mental orthographic images (MOIs), are stored in an individual's memory after repeated exposures to them in print (Ehri & Wilce, 1982; Glenn & Hurley, 1993). Clearly developed mental images of words allow individuals to quickly recall and spell common, well-known words. Inadequate mental images of words likely develop due to inappropriate reading strategies, such as when students read a portion of a word and make a guess regarding its meaning. Inadequate mental images of words may lead to misspellings when other language knowledge is insufficient for correct spelling (e.g., *buckit* for *bucket*).

SPELL's sophisticated *error analysis algorithms* identify to what extent the individual student's spelling errors are due to deficits in mental images of words.

## Why Teach Spelling?

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**Spelling** is a written language content area in its own right *and* a highly effective method for teaching the word study knowledge that will improve reading and writing skills, leading to success across and beyond the curriculum.

*Spelling ability is closely tied to reading and overall literacy development.*

Through direct spelling instruction, individuals gain insights into the language knowledge domains that improve their reading ability. As spelling ability improves and language knowledge that is important to both spelling and word recognition is acquired, an individual is likely to show gains in reading decoding, fluency and comprehension skills.

*Spelling ability affects written language production.*

The written work of individuals who struggle to spell is typically characterized by fewer sentences, more grammatical errors, less complex language and poor organization. The quantity and quality of written work is compromised because individuals must devote much of their cognitive resources to the process of spelling (Singer & Bashir, in press). As an individual's spelling ability improves, more cognitive resources are available for focusing on the semantic, syntactic and cohesion aspects of writing. Additionally, the quality and quantity of written work also may suffer due to an individual's avoidance of spelling unfamiliar words. This avoidance often precludes the use of more advanced, higher-level written language skills. With increased confidence in developing spelling abilities, written language products also may improve in complexity.

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***“Spelling knowledge is now understood as being central to learning to read and write and to the processes of reading and writing.”***

***Shane Templeton PhD***

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*Spelling ability affects academic performance across the curriculum*

When individuals struggle to spell, not only is quantity and quality of writing compromised, but also these students often are unable to adequately demonstrate content-area knowledge in their written work and may receive poor grades in different subject areas as a result (Hughes & Searle, 1997). As spelling ability improves, the student is able to more effectively

communicate an understanding of the content-area knowledge.

*Technology for correction of spelling errors has major limitations.*

It is tempting to assume that spelling instruction will become obsolete as technology tools, such as spell checkers, become readily available for use. While there is some evidence that spell checkers, speech synthesis and speech recognition programs may be helpful in intervention because they decrease the demands of the task at hand, such technology devices are not the panacea for spelling deficits. Research demonstrates that only 63% of spelling errors are detected with spell checkers (MacArthur, Graham, Hayes & De La Paz, 1996) and over-reliance on such tools actually may be detrimental to spelling development (Graham, 2000). Spell checkers, for example, emphasize orthographic patterns alone, and do not consider meaning. Additionally, they do not lead to strategic learning and use of all types of language knowledge sources available for spelling. Thus, they become ineffective in facilitating the type of knowledge individuals must develop to become accurate and consistent spellers.

*Spelling ability impacts job performance and career advancement.*

Most jobs demand extensive writing, from email correspondences to formal written reports. Spelling is not easily avoided and poor spelling skills are not easily disguised in the workplace. Because poor spelling skills reflect poorly on an individual and on the company that employs that individual, career opportunities and career advancement may be limited for individuals with poor spelling skills.

*Negative stigma is associated with poor spelling ability.*

In our society poor spelling skills are associated with limited intellectual ability. While there is absolutely no justification for this belief – some of the most gifted and successful people are poor spellers – this belief continues to permeate throughout our educational, social and work environments.

## A Performance-Based Teaching Plan for Word Study Instruction

A performance-based teaching plan for word study instruction requires a prescriptive assessment to determine *why* an individual misspells words and precisely *what type* of word study instruction is needed for that student.

- Individuals who demonstrate spelling errors caused by poor word segmentation will benefit from spelling instruction and practice that involves segmentation of speech sounds and mapping of letters to sounds.
- Spelling errors attributed to poor discrimination of speech sounds signal the need for spelling instruction that fosters recognition of meaningful sound contrasts and mapping of these sounds to letters.
- Individuals whose spelling errors reflect deficits in phonics knowledge will benefit from guided self-discovery of letter-sound relationships, letter patterns and spelling rules. They will also benefit from scaffolded instruction and practice using newly learned patterns and rules in controlled writing tasks.

- Individuals whose spelling errors indicate limited vocabulary knowledge will benefit from explicit instruction in word meaning, coupled with careful attention to the individual letters of correctly spelled words.
- Individuals whose spelling errors indicate a lack of knowledge about word parts and related words, as well as those who fail to apply this knowledge to spelling, will benefit from spelling instruction that explicitly teaches the meaning and spelling of prefixes and suffixes, the relationships between base words and inflected and derived words and the patterns and rules for modifying words when adding a prefix or suffix. These students will also benefit from structured practice in applying their knowledge about word parts, related words and modification rules in controlled writing tasks.
- Individuals with inadequately developed mental images of words will benefit from spelling instruction that fosters careful attention to the individual letters of correctly spelled words.

## Performance-Based Teaching Begins with a Prescriptive Assessment

The SPELL *Spelling Performance Evaluation for Language & Literacy*® software assessment program is the only prescriptive spelling assessment tool currently available. The research-based assessment method employed by the program was first published by Masterson & Apel (2000) and was further developed with testing and data

collected from individuals age seven through adult, including more than 100 elementary and middle school students attending a university lab school. This assessment method, which evolved during software development and field-testing, is implemented in the SPELL software program and was also published by Wasowicz, Apel & Masterson (2003).

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***“SPELL’s authors have studied the extant literature . . . and conducted the experiments necessary to produce a theoretically sound and useful tool.”***

***Louisa Moats EdD***

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The SPELL program directs the teaching process with its detailed recommendations for word study instruction. The software program – featuring an engaging multimedia format that holds student attention – requires little or no supervision during administration. SPELL automatically determines where to begin and end testing and which modules and test items to administer for each student.

Testing begins with a *Selector Module* to determine which of four levels from the *Main Test Module* is most appropriate for an individual student. The *Selector Module* collects and scores a preliminary sample of the student’s spelling and automatically proceeds to the appropriate level of the *Main Test Module*. The *Main Test Module* then collects a representative sample of the student’s spelling of developmentally appropriate spelling patterns at the word level. The domain of spelling patterns in the English language is quite large and several exemplars of each pattern must be collected to obtain a representative sample of the student’s spelling ability. Depending on which level of the *Main Test Module* is

administered, SPELL collects a spelling sample of 82 to 184 words for each student.

Additional testing modules are presented as needed to probe phonological awareness, sound discrimination, knowledge of related words and readiness for spelling words with prefixes and suffixes. An age-appropriate character guides the student through the entire test, explaining each task and providing corrective feedback during administration of the practice items for each testing module. An optional reward animation appears at varying intervals to hold student interest and provide general motivation during test administration.

When testing is complete, SPELL automatically scores and analyzes the individual student’s responses. The student’s spelling of each spelling pattern is examined to identify which spelling patterns are most frequently misspelled (i.e., those that do not meet the pre-determined performance criterion of >60%). These are the spelling patterns that will be targeted with explicit instruction at the word level to remediate specific language knowledge deficits. Spelling patterns that are infrequently misspelled (i.e., those that exceed the pre-determined performance criterion of >60%) are more appropriately addressed by facilitating and reinforcing the student’s consistent application of spelling knowledge and by developing the student’s self-monitoring and proofing of his or her own written work in the context of authentic writing tasks.

After scoring and analyzing the individual student’s performance data from the *Main Test Module* and any *Additional Testing Modules*, SPELL writes customized learning objectives for word study instruction, creates formal reports for the student’s portfolio and writes letter-style reports so

that results may be shared with parents and classroom teachers.

SPELL saves teachers countless hours of paperwork while achieving substantially more accurate results. During development of the SPELL software program, hundreds of spelling samples were collected and used to assess the performance accuracy of all components of the program. The collected data were hand-scored and analyzed by a language-literacy specialist highly skilled in the diagnosis and remediation of spelling and by the SPELL software program. The results of the human evaluation were then compared with the results from the software program to assess SPELL's accuracy of performance. When discrepancies were identified, the source of each discrepancy was investigated, identified and corrected. The final analyses revealed SPELL's accuracy of performance to be 98% versus the human's accuracy of performance of 75%.

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***“SPELL is a critically important resource at a time when literacy assessment and instruction are being considered in light of the degree to which they reflect solid research. SPELL helps educators and clinicians meet the critical challenge of providing effective and appropriate literacy instruction for all learners.”***

***Shane Templeton PhD***

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The SPELL *Spelling Performance Evaluation for Language & Literacy*® prescriptive assessment software program complements any spelling or reading instructional program by pinpointing a student's specific word study deficits, allowing the teacher to

zero-in and provide systematic, intensive word study instruction and practice where it is most needed. SPELL's recommendations for performance-based word study instruction will improve spelling and reading decoding, facilitate reading fluency and comprehension, and enhance writing accuracy, complexity and organization.

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