

# A Proposed Litmus Test of Literacy Instruction (Part 1): Theory and Practice

Peter Bowers, May, 14, 2015

Here are two interrelated assertions about instruction that should be completely uncontroversial.

- Instruction should accurately reflect the content it addresses.
- Instruction should be able to facilitate *understanding* of the content studied.

Given these premises, it is revealing to test how well common literacy instruction meets these minimal expectations in responding to the following questions.

- Why does <really> have two <l>s instead of one?
- How am I supposed to remember the letter-sound correspondences in words like <does> <business> and <sign>?
- Why don't we spell <please> \*<pleese>?

Also consider Robb's story in the panel at right about the time his student asked about the word <know>.

Imagine that, like Robb and most teachers, your literacy training has focused on helping children understand phonological cues for spelling and reading instruction. You have little or no training to help you understand and teach how the interrelation between morphology, phonology and etymology makes sense of spelling. Can instruction restricted to phonological cues offer an understanding of any of these spelling questions?

The only answer I can see to this question is no.

Almost 50 years ago, linguist Richard Venezky explained an incontrovertible fact about English spelling that explains why this is the case.

## "Know More Explosions"

### Excerpt from a Grade 4 teacher's email

My program is for junior students identified with behaviour problems, problems which make their full-time participation in "standard" classrooms problematic for everyone involved. Most of our students have ADHD identifications, often coincident with LDs and other difficulties, and virtually all of them read more than two grade levels lower than they should. In many instances, the students' behaviour difficulties and their language deficits pose a chicken-and-egg question.

In a guided reading session I was doing with a burly and eager Grade 4 student reading at PM 9, the student pointed to the work "know" and asked what it said. Knowing my students, I prepared him for my answer with "OK, this is going to blow your mind, but . . ." When I finished with "It says /no/," he didn't miss a beat. He tore the book off the table and flung it across the room. And then he started: "It does not f\*#!ing say 'no!' " - giving the whole class a language lesson as he tore a path toward the classroom door - "<k> says /k/ and <w> says /w/, so it does not say f\*#!ing 'no' !" How am I supposed to learn this sh\*!t when the rules change? <K> f\*#!ing says /k/!"

After the student de-escalated - and being told that <knight> says /night/ DIDN'T help, I promised him I'd find out why that word is pronounced as it is.

Robb

Based on his professional training, Robb has offered this child everything he possibly can regarding the spelling of this word. Contrast that with the understanding offered by lessons using <know> as a launching pad for learning [here](#). Structured word inquiry lessons do not target individual words. They use questions about a particular word to build systemic understanding. Teachers and students use the matrix and the word sum to identify, collect and analyze the structural relations of members of a morphological word family. In a morphophonemic language, understanding of phonology can only occur within the context of morphological structure.

“The simple fact is that the present orthography is not merely a letter-to-sound system riddled with imperfections, but instead, a more complex and more regular relationship wherein phoneme and morpheme share leading roles.”

(Venezky, 1967, p. 77)

The implications of this well-established description of English spelling are straightforward but profound.

- Literacy instruction that arbitrarily restricts itself to phonological features of the written word violates the premise that instruction should accurately represent the content of study.
- Literacy instruction that fails to accurately represent how the writing system works cannot build a generative understanding of that system.

From these assumptions, a litmus test for literacy instruction can be proposed.<sup>1</sup>

👉 ***For literacy instruction to facilitate understanding about how English spelling works, it must address the interrelation of morphology and phonology.***

The spelling questions listed on page 1 offer a context in which to try out the proposed litmus test. As it predicts, instruction that is isolated to phonological influences on spelling cannot explain these spellings. Even instruction that includes some reference to morphology, but fails to specifically address the *interrelation* of morphology and phonology, cannot make sense of these spellings.

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<sup>1</sup>To be clear, the proposed litmus test does not signal everything that is required for instruction to build understanding of the written word. For example, it fails to address the crucial role of etymology. Instead the proposed litmus test highlights instruction about the interrelation of morphology and phonology as a necessary, but not sufficient feature of such instruction.

By contrast, let’s see how a structured word inquiry approach to instruction (Bowers & Kirby, 2010) *can* build understanding in response to these questions. Structured word inquiry applies the principles of scientific inquiry to the study of the written word. In the analyses of the spelling questions that follow, you will see that an inherent aspect of this instruction is the targeting of the interrelation of phonology and morphology in spelling with the help of the matrix and the word sum.

### **Why does <really> have two <l>s?**

This question has special personal importance to me as it was central to the moment I first sensed that -- counter to everything I had ever been told -- *English might make sense after all*. Unfortunately, I was not offered this understanding until my 9th year as a teacher. This needless delay was especially frustrating to me given that I had always been a terrible speller. I have not been formally identified, but I am surely dyslexic. The informal identification from the director and participants at a talk I gave at a Children’s Dyslexia Center did not surprise!

With that background, here is my story about learning from the spelling <really>...

One day in that 9th year as a teacher, I tried to write <really> in a student’s homework book, but I had to stop to check it in a dictionary first. I didn’t know if it had one or two <l>s. After finding the correct spelling, I remember closing the dictionary and thinking to myself, “If I have to spell that word tomorrow I’ll have the same question!”

A few days later, I shared this story with a teacher friend. She responded (rolling her eyes), “Come on Pete, it has to have two <l>s, it’s /ril/ /li/” (syllabifying the word between the <l>s.).

I responded, “How do I know it’s /ril/ /li/ and not /ril/ /li/?”

My teacher friend had no answer because there is none. She knew how *she* syllabifies <really> because *she already knew how to spell it.*<sup>2</sup> That syllabifying strategy, however, can’t possibly help someone who doesn’t know the spelling in the first place! In fact, it’s the perfect way to frustrate poor spellers like me.

Soon after, I was introduced to one of my first matrices. It happened to represent members of this word family.

|     |             |     |    |
|-----|-------------|-----|----|
| sur | <b>real</b> | ist | ic |
| un  |             | ity |    |
|     |             | ize |    |
|     |             | ly  |    |

When I saw the word sum <real + ly → really> built from this matrix, I instantly knew I would never have to look up that word in a dictionary again. I *understood* the spelling so there was no need to “memorize” it. Both <real> and the adverbial suffix <-ly> have <l>s, so <really> *has* to use two <l>s.

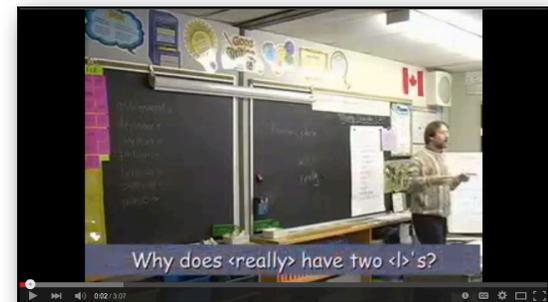
<sup>2</sup> As evidence that syllabification cannot explain the number of <l>s in <really>, apply the same syllabification to the word <steely>. How could my friend know to syllabify this word differently from <really> *unless she already knew the spelling?* Note that <really> uses the common <-ly> suffix, but <steely> uses the common adjective suffix <-y>.

But it was seeing the link between <real> and <reality> that *really* got my attention. The matrix and word sum allowed me to perceive, for the first time, that a base or stem uses consistent spelling across related words despite changes in pronunciation -- and that this *made sense*. The spelling of <real> in <reality> made sense *because* it can represent the pronunciation shift across these words. The homophone <reel> could not be used in this matrix. The <ee> digraph can not be used to represent the pronunciation of <reality>.

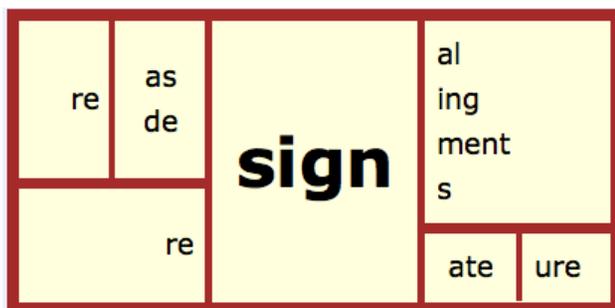
In that moment, I recognized that I was at the beginning of a fundamental change in how I could look at the written word. For the first time, I considered the possibility of *understanding* spelling.

Analysis with the matrix and word sum in my 9th year as a teacher was my introduction to how English spelling works in the morphophonemic system that Venezky described.

Click [here](#) to see an old video (screen shot at right) of me teaching about the spelling of <really> with an elementary class in Kingston.



## Deepening understanding of phonology by studying the morphology of the <sign> family



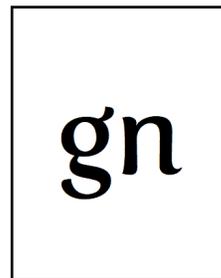
The first lesson in my intervention study (Bowers & Kirby, 2010) highlights how spelling marks the interrelation of morphology and phonology with the help of a matrix and word sums for relatives of the base <sign>.

Word sums constructed from that matrix help us understand the grapheme-phoneme choices better:

sign + al → signal  
de + sign + ate → designate

These, and other word sums from the matrix show the <g> in <sign> is not evidence of spelling being crazy. These linguistic tools help us see the underlying spelling structure that links meaningfully related words with the consistent spelling of morphemes.

Teachers trying to help children understand grapheme-phoneme correspondences need references for orthographic phonology which reflect the interrelation of phonology and morphology. For example, consider the information from Gina Cooke's [LEX grapheme cards](#) (above). With this guidance, we can investigate the



|      |  |     |
|------|--|-----|
| gn   |  |     |
| 1. ñ | <i>gnaw, gnome, sign, deign</i>  | /n/ |
|      | - may be initial or final to a base  |     |
|      | - may sound as /gn/ between two vowels when affixed: <i>sign / signal gnostic / diagnostic</i> |     |
| 2. ñ | <i>gnocchi, lasagne, poignant</i>  | /ɲ/ |
|      | - usually occurs in Italian or French loanwords  |     |

possibility that <sign> and <signal> do not use a <g> grapheme or a silent <g>, but instead a <gn> digraph. The information presented with this reference offers a way to understand how the phonology of this grapheme could operate across morphologically related words.

### Deepening vocabulary through studying the morphology and etymology of the <sign> family

Once we learn to [reference etymology in testing our morphological analysis](#), we will find that all the words on this matrix relate to the Latin root '*sign(um)*' for "mark or token". This discovery invites rich vocabulary discussions. A class can talk about how a subway token has the right "marks" to stand in the place of money, which itself is a token for value! A *design* of a flower, is not actually a flower, but the marks that *stand in the place* of a flower. A *signature* has the marks that allows a parent to give permission for a child to go on a field trip without having to go to the office in person. The signature *stands in the place* of the parent's oral permission.

## Introducing suffixing conventions with a matrix and the word sum

One reason I included <signature> in the first matrix for our intervention<sup>3</sup>, was to spark student questions about suffixing changes. Constructing a word sum for this word from the matrix reveals a spelling change between the morphemes and the resulting word (the missing <e>).

sign + ate + ure → signature

I prompted students' curiosity about this spelling change further by following up with matrices and word sums from other word families that included the same suffixing change. This provided a set of word sums showing this change only happens in some words. From this evidence bank I guided the process of developing, testing, and ultimately confirming the hypothesis that only vowel suffixes replace final, single, non-syllabic <e>s. I also showed a way to explicitly mark spelling changes on the word sum:

sign + ate/ + ure → signature

Together, the matrix and word sum reveal the underlying spelling of morphemes and how that structure relates to the surface spelling of words. In Part 2, I expand on the essential role of these tools for scientific inquiry that can confirm or reject hypotheses about spelling. We cannot apply the principles of scientific inquiry to the process of developing understanding of English spelling without a means to falsify hypotheses about how spelling works. The matrix and the word sum provide this essential function to enable scientific inquiry of the written word.



See an example of this lesson being taught in a Grade 5 class in the video at this [link](#) (screen shot above right).

With some background orthographic knowledge established, we can move more quickly through the other spelling questions...

**<business>: busy/i + ness → business**

The word sum above helps us understand that there is nothing irregular about the spelling <business>. The connection in meaning and spelling ([while applying the <y> / <i> suffixing conventions](#)) shows that the base is <busy> with an <-ness> suffix.

Without the matrix and the word sum, my brain could never remember this spelling. I would have been pretty sure there was an <ss> somewhere, but I would never know where. I knew there was a <u> and an <i>, but I couldn't remember where, so I might throw in a <ui>.

This confusion disappears with the word sum. The base is <busy> and the suffix is <-ness>. Of course one needs to know the grapheme-phoneme correspondences of the base and suffix. Now the <s> for /z/ in <business> or <busy> is unsurprising given the background of the <s> studied in <sign> / <design>, and coming up in <does>!

<sup>3</sup> The lessons in that intervention, including this first one on <sign> are provide the main lessons for my teacher resource book (Bowers, 2009).

## <does>

|    |     |                  |                  |
|----|-----|------------------|------------------|
| do | ing | go + ing → going | do + ing → doing |
| go | es  | go + es → goes   | do + es → does   |
|    | ne  | go + ne → gone   | do + ne → done   |

Perhaps the interrelation of orthographic morphology and phonology addressed in the previous investigations means that the matrix and word sums for <do> and <go> are enough to explain the spelling of <does>. In line with English spelling conventions, these bases use consistent spellings that can represent the pronunciations of related words. How can we justify describing <does> as irregular but not <goes> given this parallel structure?

## Why <please> not \*<pleese>?

|     |        |     |    |
|-----|--------|-----|----|
| dis | please | ant | ly |
| un  |        | es  |    |
|     |        | ing |    |
|     |        | ure |    |

Inspecting words in the matrix for <please> helps us understand why \*<pleese> cannot be the spelling of this word. The <ee> digraph could work for this base *if* grapheme-phoneme correspondences *only* concerned the pronunciation of words in isolation, but that is not how English spelling works. It turns out that <ee> digraph can only represent the “long e”. That means that base cannot use this digraph. That spelling could not represent the pronunciation of the morphological relatives <pleasant> or <pleasure> that the matrix reminds us to account for.

By contrast, the <ea> digraph can represent both the “long e” and “short e”. Given the phonology of members of this word family, we can understand (and teach!) why the base can use the <ea> digraph, but not the <ee>.

As all of the matrices used so far reveal, English spelling cannot be understood by studying the grapheme-phoneme correspondences for words in isolation. By definition, instruction restricted to phonological factors does not take the pronunciation of morphological relatives into account. Analysis of words with the matrix and word sum, however, *requires* attention to morphological relations -- and thus highlights the *phonology* of morphological family that constrain spelling choices.

Ironically, this means that instruction that is arbitrarily restricted to phonological features of words misrepresents how phonology works. As linguist Carol Chomsky (1970) pointed out, a morpheme does not have a pronunciation until it is in a word. Instruction with the matrix and word sum (including [spelling-out word structure](#)) is a means to structure instruction so it accurately reflects how spelling represents *phonology*, let alone morphology.

## Assessing the proposed litmus test for literacy instruction

We can see that instruction which fails to meet the minimal standard set by this proposed litmus test cannot offer an understanding in response to the questions about the spelling of <really>, <sign>, <business>, <does> or <please>. By contrast, instruction that does reflect the interrelation of morphology and phonology can make sense of these same questions. Of course the claim is not that such instruction will *necessarily* result in

understanding for every learner. Instead, the point is that instruction that fails to reflect how the writing system works has *no chance* of building accurate understanding for anyone.

The proposed litmus test identifies whether or not instruction has *potential* for facilitating understanding of the written word. There is rich anecdotal evidence about the nature of learning inspired by this instructional content from the beginning of schooling. The links on the following page offer a window into some examples of the learning going on around the world right now through structured word inquiry with the matrix and word sum.

### Introducing Part 2: What is research evidence?

Part 1 presented evidence that only instruction that meets the criteria of the proposed litmus test has the potential to develop generative understanding about how English spelling works. The next page offers links to anecdotal evidence that this type of instruction is effective and motivating. But what does the instructional research have to say about this type of instruction?

I address this question in Part 2, a follow-up document that I will link here when it is ready. That document will show that the evidence over the last decades of research can be summarized with the following statement which should not be surprising, and which is perfectly in line with the proposed litmus test for literacy instruction.

**👉 *The more accurately literacy instruction represents how the written word works, the more effective it is.***

Pete Bowers, May 5, 2015

### Links to Structured Word Inquiry Videos



Click [here](#) for a tutorial video showing how beginners can use the Word Microscope to guide an investigation through a study of the word <discovery>.



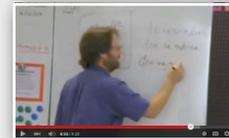
Click [here](#) for an inspiring video on Lyn Anderson's "[Beyond the Word](#)" blog. It shows 5-year-old students investigating the word <carnivore> and some of its surprising relatives in Etymonline.



Click [here](#) for a video of Dan Allen beginning the school year by having students dive into etymological families. Glorious vocabulary instruction.



Click [here](#) for an inspiring video / post from a Grade 5 public school with students describing their experience learning through structured word inquiry. See a WW Update on this post [here](#).



Click [here](#) for a video of me teaching a young class about the spelling of <does> with the matrix and word sum.



Click [here](#) for a Grade 7 student explaining his understanding of the political world through linguistic analysis of the word <dissent>.

Explore a large bank of videos of structured word inquiry in classrooms at this [YouTube page](#).

## Further to examples of structured word inquiry

- Explore the [About WordWorks](#) page for an introduction to key resources and research on this instruction.
- Click [here](#) for a recent webinar I conducted with the Upper Midwest Branch of the IDA addressing this content.
- Click [here](#) for Lyn Anderson's blog for structured word inquiry in the early grades.
- Teacher Blogs with Videos, Investigations etc:
  - [Dan Allen's Grade 5 Blog](#)
  - [Ann Whiting's Grade 7 Blog](#)
  - [Skot Caldwell's Grade 4/5 Blog](#)
  - [Mary Beth Steven's Grade 5 Blog](#)
  - [Jen Munnerlyn's Literacybytes Blog](#) (See Jen teach from the Real Spelling Theme "Learning From Love" in K-5 classes at this [link](#).)
- Click [here](#) for WordWorks Newsletters and Updates sharing stories of structured word inquiry from around the world.
- Click [here](#) for Real Spellers, a forum where educators share their questions and learning while working with structured word inquiry.

## Links to references supporting understanding English Orthography

- Click [here](#) for the Real Spelling website. This is the most comprehensive reference I know of explaining how English spelling works.
- Click [here](#) to explore the tutorial videos on English orthography in the Real Spelling Gallery.
- Click [here](#) for LEX, Gina Cooke's rich blog on understanding orthography, and its instruction.
- Sign up for on-line courses to learn more about orthography with Real Spelling "[Spellinars](#)" or Gina Cooke's "[LEXinars](#)".

## References & Recommended Reading

- Bowers, P. (2009). *Teaching how the written word works*. (Available from [www.wordworkskingston.com](http://www.wordworkskingston.com))
- Bowers, P.N., & Cooke, G. (2012, Fall). [Morphology and the common core building students' understanding of the Written Word](#). *Perspectives on Language and Literacy*, 31-35.
- Bowers, P.N., & Kirby, J. R. (2010). [Effects of morphological instruction on vocabulary acquisition](#). *Reading and Writing: An Interdisciplinary Journal*, 23, 515-537.
- Chomsky, C. (1970). [Reading, writing, and phonology](#). *Harvard Educational Review*, 40, 287-309.
- Venezky, R. (1967). English orthography: Its graphical structure and its relation to sound. *Reading Research Quarterly*, 2, 75-105.
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