My Foray into Structured Word Inquiry

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Is this daring and bold or reckless and foolhardy? This is a question I seriously contemplated before making fundamental changes to my literacy courses. For 13 years, I have been teaching in higher education to enthusiastic pre- and in-service teachers interested in learning the best strategies to develop proficient readers and writers.

WordWorks Newsletter #96:

A Professor Takes the Leap into SWI in her Faculty of Education Course

When I give structured word inquiry (SWI) workshops, I am almost always asked some version of the following question:

"Is this in education courses yet?"

It's a pretty obvious question. Those tasked with the responsibility of literacy instruction should have the benefit of an education that has taught them how the writing system they are teaching works.

Kathryn provides a rich account of her experience being introduced to the ordered, meaning-based nature of English spelling after years of working from the wide-spread assumption that spelling is mainly a sound-based system with many exceptions.

After reading her account, I offer my own reflection on Kathryn's story with reference to context of literacy research and practice - and the long-established understanding of English orthography from the field of linguistics. But let's begin with Kathryn's inspiring account!

Peter Bowers, Dec. 14, 2018

I love teaching literacy concepts and my students have responded positively. In course evaluations, students frequently comment that they "learn so much," and the information is "practical," "real life," "hands-on" and "engaging." Moreover, students feel they have the confidence to teach reading and writing as a result of my courses, yet despite this positive feedback, I took a leap of faith and completely altered not only the content of my courses, but also my teaching methodology.

The reason for this leap, began with a creative "Onion" video by Gina Cooke that contained a statement about the English language that sent me into disequilibrium: the video contradicted everything I believed, was educated about, and educated others about concerning the English language. The statement was that English language makes perfect sense when considered in combination with morphology, etymology, and phonology. Gina's video went on to show concrete examples of how meaning and history explain such "irregular words" such as <one>, <two>, <onion> and others. Consequently, I desired to learn more about this. In searching the internet, I came across Pete Bower's literacy website, and was intrigued by his many videos demonstrating his approach to teaching spelling.

Prior to higher education, I had the honor of teaching first grade children at the beginning of their literacy journey, and I was a reading specialist instructing students for whom learning to read was difficult. Throughout this time, I'd been successful in teaching many children how to read and write; however, there have always been children who continued to struggle despite my implementation of a variety of instructional approaches. It is these children who are responsible for my continuing quest for alternate methods and are what ultimately led me to LEX with Gina's valuable resources and Pete.

Sparked by this new understanding about English spelling, I signed up for Pete's four-day workshop on Structured Word Inquiry (SWI) ([Bowers & Kirby, 2010](#)). To say that the workshop was transformative is an understatement. I was engaged in countless formidable learning experiences premised on the notion of inquiry and making meaning. Some profound learning moments came from discovering that the English language is morphophonemic and makes sense. There are logical reasonings behind so many supposed "irregular words." This astounded me because throughout my teaching career, I had been teaching from a "phonics first" position. I was unaware of the vital role morphology and etymology played in the English language. I knew about morphemes, prefixes, and suffixes, but I did not know that it was the morphological structure that was retained in English spellings; moreover, I rarely considered a word's history. Since I was unaware of the importance of morphology and etymology in a word's spelling, I focused on phonics. Moreover, whenever I taught phonics patterns, I always let students know that the patterns only worked some of the time. There were countless "irregular words" that did not follow the patterns. In my classes, we called these words "outlaw words" and considered them rebels for not conforming to the rule of the pattern. When students and I encountered outlaw words, we would say, "that's just our crazy English language." Through SWI, I learned how to investigate these words and discovered there were good reasons for why words did not follow the rules I was taught. For instance, when I inquired about why the grapheme <i> in the word <give> was not pronounced like the <i> in the word <hive>, I found out that in English words do not end with the letter <v>. Thus, the letter <e> is used as an "orthographic marker" to avoid letting the word end with the letter <v>. This <e> is not even a grapheme, as it is not there to spell a

phoneme. In addition, the <e> represents the relationship between <give> and <gave>. I learned that this kind of spelling connection between words is an example of synchronic etymology. Synchronic etymology also explains the <w> in <two>, to link it to words like <twin>, <twice> or <twenty> and in the spelling-meaning connections between <ear> and <hear>. [Gina Cooke](#)'s linguistic research points to influences of synchronic etymology on grapheme choice such as the double vowel-letter graphemes in related words like <feet> and <foot> or <goose> and <geese>!

Another insightful revelation was about the supposed alphabetic principle that I had been teaching my entire career. The alphabetic principle is based on the idea that the job of alphabetic letters is to represent sounds, so teaching children to read is about teaching the letter-sound associations. One problem with this principle is that children are typically taught some "sounds" (phonemes) for each letter or "letter team" (digraphs and trigraphs) but not others. For example, students are often taught the "s sound" in words like "snake" and "seal" and the "z sound" for "zoo." Such instruction sends a message that is in direct contrast to the fact that the most common way to spell the phoneme /z/ (the "z sound") is with the <s> grapheme as we see in words like <is> and <was> that are in the earliest texts children read. I had been teaching those words as "outlaw words" in large part because they both spelled the "z sound" with an <s>. My instruction was misleading because I did not know better, I came to the major realization that throughout my entire teaching career, I had been lacking the foundational knowledge about how the English language works – this was in spite of my degrees and the many literacy courses I had taken. As a result, I had mistaught all of my many, many students.

Sadly, mis-teaching of students is not novel for me. Fortunately, I was not as distraught as I could have been. During my doctoral studies, I discovered I had been responsible for inaccurately portraying the history of Columbus to many groups of first grade students. At the time, I was devastated by my mistake; however, that transgression led me to learn about critical literacy. That experience is recounted here. Ever since then, I've been on a mission to teach students more than just the basic literacy of decoding and comprehension; I want students to acquire critical literacy abilities.

Critical literacy is about seeing and identifying unjust situations and using the tools of literacy to act, either by making people aware of or changing and transforming inequities. Paulo Freire, a critical theorist and educator, claimed that the American education system did not foster critical thinking because instruction was based on the "banking concept" of education. That is where the "all-knowing" teacher deposits knowledge into students' minds. Students aren't taught to question and analyze whose knowledge is this; instead, they're expected to passively accept, memorize, and regurgitate information back on a test. Freire believed in a problem-posing curriculum, where students question everything; their inquisitiveness will lead them to "read the word and read the world." I now realized that even though my course evaluations were positive and I taught students about critical literacy, my teaching methods still mirrored a banking concept of education, and I was transmitting incomplete and inaccurate knowledge. My absolute acceptance, without ever questioning, the history of Columbus or the information about how the English language works are consequences of a banking system of education. Encountering and experiencing SWI not only provided me with alternate possibilities, but it also became the means for me to practice critical pedagogy and enabled me to learn together

with my students as they posed questions about literacy and the English language.

One of my first obstacles incorporating SWI into my graduate and undergraduate classes was finding a book; I could not find a text that accurately reflected how the written word works. So, I incorporated Pete's manual *Teaching How the Written Word Works*. The text is geared for teachers but comes out of Pete's dissertation work with 4th and 5th graders but educators of all ages can use it to deepen their orthographic understanding to guide their instruction. Each week, my students and I completed the exercises while reflecting on our new knowledge and noticing questions and confusions we had.

In class, we would go over our learning. Often times, questions and perplexities arose that I did not have immediate answers for. That felt uncomfortable but turned out to be fortuitous – because I had no other option but to be vulnerable and admit I did not know. I was putting myself in the same position I was encouraging my students to take when they entered their own classrooms. I was modeling the process of guiding the scientific inquiry about spellings *before* I knew "the answer." I was modeling moving from "teacher-led inquiry" to "inquiry-led teaching."

We either put our question on the "wonder wall" to investigate later or began an initial investigation with the "4 Questions of SWI" right then and there. Investigations became the heart of our curriculum. Why is there a <b> in the word <plumber>, why is there an <l> in the words <would> and <could>, why isn't <said> spelled *<sed>, what is with the <ugh> in <enough>, <though>, <daughter>? And countless other rich, insightful questions.

One of my graduate students had been an undergraduate student of mine two years prior. She had graduated in May and was now pursuing her master's degree in reading. She would repeatedly ask me, "I just graduated; how can it be that I never learned this before?" I could not teach her what I did not know.

At first, teaching each class not knowing what questions would arise or where we would be heading was terrifying, but gradually I became more comfortable in the not knowing, and I began to trust the process of inquiry. My students' reflections also demonstrate their own initial discomfort with not knowing, confusion, and taking on a questioning stance, as they had all been educated in a banking concept as well. One student who is also a teacher wrote,

> *"I sometimes feel as though I'm failing if I sense my students are confused or not fully grasping something, but I'm learning to be a little more comfortable with moments of confusion, as they're an inevitable part of the learning process."*

Another student speculated on whether or not she even had the right to be learning along with her students,

> *"I am still wondering about times when I am unsure. It makes sense to be honest and say, 'I don't know' because I'm still learning and I think it is okay for me to be learning too."*

However, SWI influenced students' recognition of the important concept that learning rarely is linear nor immediate:

> *Our work with SWI has effectively reminded me that learning doesn't occur when we directly instruct our students. No matter how much we try to create an organized, clear path through our subject matter, we can't*

> *fully control when our students synthesize ideas and make important connections... When I attend class every week, I always walk away with an understanding of the importance of some concepts within SWI. (i.e. Spell the words out, don't just say them. Show that the <y> becomes an <i> when you write the word sum. Say the phrase "is rewritten as . . .") I always believe that those things matter, but admittedly I don't always fully understand why. It isn't until later, perhaps even weeks later, that one of the exercises or readings will prompt a recollection of something that was said in class. In those moments, I'll grasp the importance of these aspects of SWI on a more meaningful level. Sometimes we make connections immediately, but mostly they take time and space, so I think we all need to maintain our language explorations long enough to allow those connections to emerge.*

Additionally, another student wrote:

> *After doing activity #9, I feel I was left with more questions than answers! I had previously thought I was starting to get a good grasp on word structure, but now I am second-guessing a lot of things. As much as this is throwing a loop in my progress, I am enjoying the challenge of it. I am still questioning if that is alright. I am the type of person that likes black and white, right and wrong answers. This inquiry has stretched my thinking and pushed me out of my comfort zone because there isn't always a glaringly correct answer.*

Equally important, inquiry learning supports the notion that learning is a lifelong process, as a student in her fifties noted:

"One of the things I am finding so interesting about SWI, is that I am gaining insights about my own learning. I never expected that! To learn something completely new (at my age, ha ha) and not have any schema for it, is unusual."

Another unexpected boon was how the collaboration and cooperation inherent in SWI positively impacted the classroom environment, as a student observed:

As our class is progressing, I am noticing more and more how we are helping each other with word challenges, cheering each other on, and celebrating when someone figures a challenge out! It's a really nice part of the SWI process and brings us closer as a class community."

Lastly, one student eloquently sums up the value, growth, and inquisitiveness that occurs through engaging in a critical inquiry practice and provides evidence that my decision was daring and bold:

"I might leave this class with more questions than answers, but if it wasn't for the work that we've done, I wouldn't even be asking these questions. I think that's progress!"

As a result of this leap, I recognize, that like my student, I have more questions than answers and am still in the early phases of learning about how the English language works. To continue my learning journey and be a more effective teacher-learner, I am currently enrolled in a year-long Lexinar with Gina on "Linguistics for Non-Linguists". I am also getting ready to begin two seminars, one on Etymology given by Gina and Douglas Harper. (See details on these and other LEXinars HERE.) and a Latin I for Orthographers seminar given through Real Spelling (See information on Spellinars HERE.) This

sounds like a lot of work; it is, but I have never been more eager to learn because like Pete says, "nothing motivates like understanding."

The science of how English spelling works and the science of literacy instruction

Kathryn's reflection provides an inspiring look at what can happen in teacher training when it builds on the orthographic understanding and instructional theory behind structured word inquiry (SWI). What makes this story particularly exciting is that she has been able to offer this rich learning experience to her teachers-in-training with linguistic resources she found on-line and a 4-day workshop to get started. Imagine what we can expect as she deepens her orthographic understanding and experience with teaching that content through an inquiry approach year after year.

(See this video of another inspiring teacher educator, Dr. Timothy Houge, with Sue Hegland.)

The necessary first step in Kathryn's transformative experience was taking time to carefully consider the linguistic evidence of how English orthography works. That linguistic study brought her to a challenging conclusion:

I came to the major realization that throughout my entire teaching career, I had been lacking the foundational knowledge about how the English language works – this was in spite of my degrees and the many literacy courses I had taken. As a result, I had mistaught all of my many, many students.

As Kathryn expresses so well, accepting the linguistic evidence about how orthography works requires accepting that one's own long-held basic assumptions -- and those of the wider research are -- deeply flawed.

One of my favourite aspects of Kathryn's reflection is her observation that it was easier for her to accept the linguistic evidence that countered her previous assumptions because of a similarly major reframing of understanding in another domain. Her experience encountering evidence showing that she had long been teaching a false history about Christopher Columbus was difficult -- but in the end -- freeing. That experience created her passion for critical literacy. Having made a fundamental change in her thinking in one domain based on encountering irrefutable evidence made it easier to do the same in another.

Contrast the description of English orthography from linguistics to the description in educational research

Kathryn's account reflects the long-standing, wide-spread assumption about how our spelling system works as is typically presented in educational research and in schools. It is usually treated as a system that is primarily about letters representing the sounds of words -- the alphabetic principle -- with an unfortunate number of exceptions. Byrne (1998) provides a good reflection of that view when he wrote "inconsistencies and irregularities in English spelling abound. . . . Nevertheless, English is fundamentally an alphabetic language" (p. 2). As Kathryn's account shows, that assumption is foundationally flawed. See our recent publications (Bowers & Bowers 2018 a, b) for a detailed description of this case.

It is important to note that many researchers argue that English spelling makes more sense than most people think and that teachers who have a better understanding of how the writing system works will be better literacy teachers. Louisa Moats, for example, has long made this case. Moats and colleagues are on the right track when they argue that English spelling makes much more sense when morphological and etymological information is taken into consideration, (Joshi, Treiman, Carreker, & Moats, 2008–09, winter; Moats, 2005-06, winter). However, these accounts still reveal foundational orthographic misunderstandings.

For example, consider this statement:

> "…[M]ost of our irregular spellings come from Anglo-Saxon… Because the spelling of a word usually changes much more slowly than its pronunciation, some of our oldest and most common words (such as *said*, *does*, *friend*, and *enough*) have retained spellings that represent how they were pronounced eight or 10 centuries ago" (Moats, 2005, p. 15-16)

Do you see the assumption that drives this conclusion? If the pronunciation of a word changes dramatically over time, but its spelling remains consistent, that results in an "irregular" spelling. The assumption is that spellings *should* represent phonemes consistently. As we will see, this conclusion directly contradicts the long-established linguistic understanding of how spelling works.

Ironically, all of these words -- *said*, *does*, *friend*, and *enough* -- have completely conventional spellings. These are not "irregular" spellings. Rather, they provide evidence which falsifies the hypothesis that the *primary* function is the consistent spelling of phonemes.

In fact, because these words are so misunderstood, they are regularly used as launching pads in SWI classrooms to teach the logical way our spelling *system* works.

Consider how much we can learn about the *logical* way English spelling works by studying just the spelling of <does> with the help of matrices and word sums. The parallel structure of <go> and <goes> makes it clear that it is incoherent to treat <goes> as "regular" and <does> as "irregular." The grapheme-phoneme correspondences in <does> make perfect sense -- but only when studied in the context of morphologically related words. (See a video of a lesson on <does> here.)

Studying the spelling of <does> in the context of these matrices and word sums is not "morphological instruction." It is spelling instruction that reflects the *morphophonemic* nature of our language. Such instruction *requires* explicit instruction about the conventions by which graphemes represent phonemes in English orthography. SWI uses explicit instruction about "orthographic phonology." To understand grapheme-phoneme correspondences it is necessary to understand how they are inherently constrained by morphology.

This understanding is not new. As Venezky (1967) pointed out:

> "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" (p. 77).
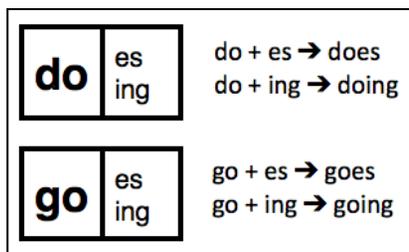
Linguist, Carol Chomsky's "lexical spelling" concept captures the primacy of consistent spelling of meaning structures over the consistent spelling of pronunciation.

> "Lexical spellings represent the meaning-bearing items directly, without introducing phonetic detail irrelevant to their identification. Thus on the lexical level and in the orthography, words that are the same look the same" (C. Chomsky, 1970, p. 294).

Venezky (1999) explained the advantage of a system that prioritizes consistent spelling of morphemes over consistent spelling of phonemes:

> "We might respell *boys* as *boyz* and *matches* as *matchiz* to improve translation to speech, but this would remove the visual identify of the noun plural morpheme. Similarly, *sane* might be respelled as *sain* to make it parallel with *rain,* but this would obscure its relationship with *sanity.* The present system, short of misleading the voice, favors the eye over the tongue and glottis." (Venezky, 1999, p. 8)

These are the exact foundational orthographic principles that guide teachers working with SWI from the beginning of formal instruction. *(See examples of SWI in early literacy instruction from this WordWorks Newsletter and examples from Lyn Anderson's Beyond the Word.)* These same principles make it clear that <does> is a completely regular spelling. SWI takes words phonics dismisses as "irregular sight words" as rich opportunities to teach the logic of the whole spelling system. (See Gina Cooke's "InSight Word Decks.")

do | es / ing — do + es ➔ does / do + ing ➔ doing

go | es / ing — go + es ➔ goes / go + ing ➔ going

Bowers and Cooke (2012) argued that the matrix and word sum provide a concrete representation of Chomsky's lexical spelling. Based on this understanding, Chomsky suggested (almost 50 years ago!) that children could be productively introduced to the fact that a morpheme doesn't have a pronunciation until it is in a word. This insight is the basis of a central practice in SWI instruction: morphemes are identified by their spelling, not a pronunciation. When teachers and students refer to morphemes outside of the context of a word, we don't attempt to pronounce it, *because it does not yet have a pronunciation*. Consider the following morphemes: <-ed>, <-s>, <re->, <de->, <do>, <heal>, and <rupt>. If we want to refer to any of these morphemes without pinning them down to a specific word, we do not know how they are pronounced. Thus we refer to these morphemes by their most consistent feature -- their *spelling.*

> *"The fact that most graphemes can spell multiple phonemes in English is not a bug; it is a feature."*

In her review of morphological interventions, Carlisle (2010) lamented the failure of educational research to build on the linguistic and educational insights Carol Chomsky offered so long ago.

> "In rereading Chomsky (1970), I realized that I had forgotten how detailed and thoughtful her suggestions were for ways that students might benefit from instruction in morphological awareness. I was further struck by how little has been done since 1970 to investigate the nature and value of instruction in morphological awareness" (Carlisle, 2010, p. 481)

The instructional practices SWI support build directly on Carol Chomsky's suggestions.

SWI is not about "adding" morphology to phonics instruction. It is instruction that reflects the fact that we can't understand how grapheme-phoneme correspondences work in our orthography system (orthographic phonology) without reference to morphology. Kathryn showed multiple examples of why etymology is crucial to understanding grapheme-phoneme correspondences as well.[1]

SWI instruction simply reflects the established linguistic fact that English spelling represents the interrelation of morphology, etymology and phonology. If we try to teach these concepts as though they are isolated features of orthography, we misrepresent how the writing system works. As Venezky put it:

> "English orthography is not a failed phonetic transcription system, invented out of madness or perversity. Instead, it is a more complex system that preserves bits of history (i.e., etymology), facilitates understanding, and also translates into sound." P. 4

The fact that most graphemes can spell multiple phonemes in English is not a bug; it is a feature. Multiple ways to write a phoneme is a *necessary* condition for a spelling system to link meaningful structures

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[1]*It is important to understand that it is not possible to safely analyze which words are in the same morphological family without understanding the role of etymology. See a description of that relationship here.*

(morphemes) across related words. Similarly, the homophone principle (Venezky, 1999) means we need phonemes that can be spelled by multiple graphemes in order to distinguish homophones with different spellings.

Instruction that describes <does> as irregular doesn't just misrepresent the spelling of that word; it misrepresents how our spelling system works. Kathryn's moment of truth was the realization that if there were linguistic principles that explained her "outlaw words," the whole spelling system did not operate the way she had been taught.

It is not enough to say that morphology and etymology are important to make better sense of spelling. The only way that we can investigate spelling scientifically is to do so with a clear understanding of how these linguistic features *interrelate* with phonology. Keep in mind, the account of English orthography that shocked Kathryn in 2018 has been available to the research community for decades (C. Chomsky, 1970; N. Chomsky & Halle, 1968; Pinker, 1999; Venezky, 1967, 1970, 1999).

The word sum and the matrix are crucial tools for understanding orthography - *including grapheme-phoneme correspondences*

The morphological word sum is a necessary tool for orthographic analysis. The morphological matrix is an elegant and effective tool for representing how morphemic elements of a morphological family interrelate, and thus a powerful tool for building understanding of grapheme-phoneme correspondences in our

morphophonemic language. Some brief orthographic investigations are needed to clarify why this is.

The assumption of *<-tion> suffix is so prevalent that it is listed in the Oxford English dictionary with the words <completion> and <relation> cited as words that use this suffix. However, any attempt to confirm that hypothesis with word sums fails. There is no evidence of a morphological structure *<comple> or *<rela> to which a *<-tion> suffix could be added. Analysis with a word sum makes it clear that both of these words have an <-ion> vowel suffix that replaces the final, non-syllabic <e>:

complete/ + ion ➔ completion
relate/ + ion ➔ relation

Once we understand that morphological structure, we can safely investigate the most interesting aspect of the orthographic phonology of these words:

What grapheme spells the /ʃ/ phoneme in <completion> and <relation>?

It is not uncommon for phonics resources to present a *<ti> digraph for the "sh sound" (the /ʃ/ phoneme)[2]. However, word sum analysis rejects this hypothesis. Graphemes are constrained within morphemes. No digraph or trigraph can ever cross a morphemic boundary. The word <hothouse> has no <th> digraph (<hot + house>), <react> has no <ea> digraph (<re + act>). The plus signs in the word sums for <completion> and <relation> show that the < t > and < i > are not in the same morpheme.

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[2] *Notice how misleading it is to refer to a phoneme by letter names? There is no <sh> in countless words that have the /ʃ/ phoneme!*

Since this is scientific inquiry, I encourage the reader to be skeptical and look for counter evidence. Find a word with a < tion > sequence that can be analyzed coherently as a suffix in a word sum. Find a word where the < ti > spells a /ʃ/ phoneme with no plus sign between those letters in a fully analyzed word sum. If there is a better way to understand any of those orthographic conclusions, I'm happy to have my current understanding falsified.

Having rejected the < ti > digraph hypothesis with evidence from the word sum, we can consider another hypothesis reflected in this grapheme-phoneme chart. It shows three common phonemes that the < t > grapheme can represent and circumstances under which those associations can occur. We've seen < t > spelling /ʃ/ in <relation> and <completion>. Words like <actual> (structure: <act + u + al>) and <question> (structure: <quest + ion>) are examples of words in which the < t > grapheme can spell the /tʃ/ phoneme that is often described as the "ch sound" in schools.
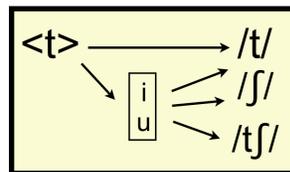
These orthographic concepts are not restricted to "upper elementary vocabulary." The interrelation of orthographic morphology and orthographic phonology that makes sense of <completion> and <relation> can be introduced by [studying the word <does> with the matrix and word sum in early literacy instruction](). In fact, I regularly use diagrams like the one above to teach the phonology of the < t > in young classrooms with the word <action>.

The image above and to the right right is from a Grade 1 SWI lesson. I was asked to investigate the word <transition> because the teacher was working on smooth
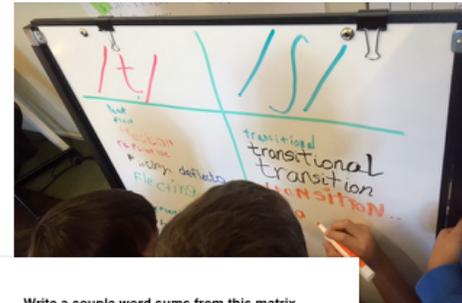
"transitions" between activities in class. I started by looking at the word <act> and <action> and then moved on to <transit> and <transition>. Once they learned about possible grapheme-phoneme correspondences of the < t > in this context, they went on a "treasure hunt" for words where the < t > grapheme spells /t/ and when it spells /ʃ/.

Teaching abstract relationships with concrete representations

When we introduce children to the concept of addition, we don't start with the abstract representation of the number sentence such as 2 + 3 = 5. We use counters to represent the abstract numbers to help make sense of the abstract symbols mean.

The matrix for <does> helps us see the interrelation of the meaning-bearing morphological structures that are combined to form the words <doing> and <does>. We get a concrete representation of the written morphemes, how they relate in (1) *meaning* and (2) *orthographic structure*. In that context we can attend to (3) the *pronunciation* of the base in <do> and <doing> in contrast to <does>.

The interrelation of *meaning, orthography* and *phonology* is represented in the standard "triangle model of reading" (see Seidenberg, 2005). Kirby and Bowers (2017) adapted that model to highlight the fact that that morphology is the one language feature that is directly related to each of these aspects of learning to read. (See figure below.)
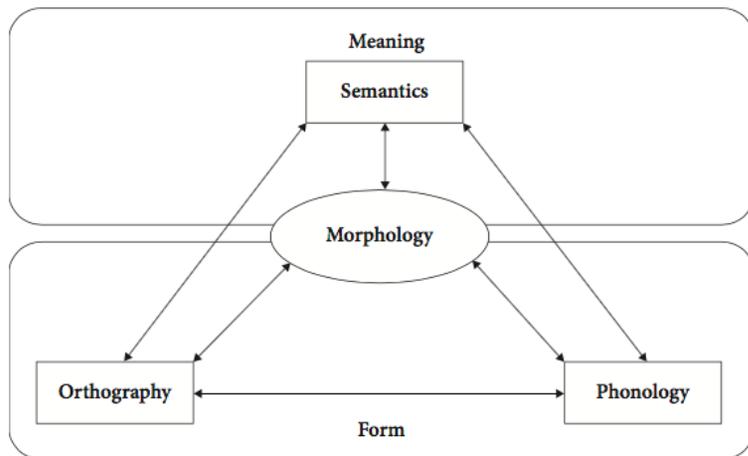
Building on Perfetti's (2007) lexical quality hypothesis, we put forward the idea of morphology as a "binding agent" that relates these components to each other, strengthens those connections, and increases the quality of lexical representations.

Because phonics instruction targets grapheme-phoneme correspondences *without* reference to morphology it cannot explain the spelling of <does> and countless other words (e.g., *give, two, one, business...*). Thinking of such words as "exceptions" keeps us from recognizing them as *falsifications* of our assumptions about how spelling works. The morphological word sum and matrix are needed to falsify such hypotheses, and to facilitate seeing the interrelation of meaning, orthography and phonology. Without the matrix and the word sum, even researchers who emphasize the importance of morphology and etymology can mistake words like <does> as irregular.

SWI instruction doesn't target morphological families to "teach morphology." It targets morphological families because this is necessary to understand English spelling. Studying the morphological families of words from the beginning of formal schooling is necessary for explicit instruction that reflects the fact that English orthography favours consistent spelling of morphemes over consistent spelling of phonemes. It highlights the semantic and orthographic connections between bases and related words. The phonological focus of phonics encourages the teaching of lists of words that happen to use the same "letter-sound" correspondences. This means children study lists of words with no meaningful connection. By contrast, studing words linked by morphology ensures a meaningful context for the study of how abstract grapheme-phoneme phoneme correspondences work. The phonology of the < t > grapheme is more interesting in the context of studying <act> and <action> *because* it makes sense of the spelling-meaning connection. In line with recommendations from cognitive load theory, the matrix and word sum provide concrete representations of

the complex and abstract ways meaningful orthographic structures work across related words.

Explicit instruction about grapheme-phoneme correspondences is an essential aspect of SWI. The grade 1 lesson on the previous page shows a lesson emphasizing the orthographic phonology of < t >. This lesson was not imposed on the class due to a set scope and sequence. The word "transition" was relevant to the class at the time, and the family of this word offered a perfect context to target this grapheme-phoneme correspondence. As teachers' orthographic knowledge grows, they see rich opportunities for orthographic investigation in words related to whatever is being studied. See Skot Caldwell's Gr. 1 class in a lesson focused on grapheme-phoneme correspondences -- but, as always, through inquiry, in a morphological context and growing from class studies.

Getting started with SWI

As Kathryn and many others would tell you, the first time someone attends an SWI workshop, the content can feel quite overwhelming. Ironically, the main challenge is not the complexity of the content presented. The main challenge is beginning the process of unlearning ideas that have been assumed for so long. When I teach model lessons in classrooms, teachers are regularly astonished at the level of content we address with young children. My response is always the same - they have less to unlearn!

In my last WW Newsletter, I shared stories from a pre-school class with teachers who have been working with SWI for years. One of those teachers, Carolee Fucigna, described her first response to SWI as seeming totally

inappropriate for her young students. However, she was willing to respond to the evidence she saw in her students' engagement during a little 20 minute lesson I taught. That motivated her to attend a one-day workshop -- and thus began her journey. Each year the sophistication of her orthographic understanding grew. Each year the level of orthographic content she and her teaching partners introduced to their students deepened. The barrier to the orthographic content Carolee taught was not what young children can understand -- just the understanding and practice of their teacher.

This is one of the most exciting things about Kathryn's story of her first year of teaching SWI in her teacher-training-course. It provides an account of the powerful learning someone brand new to SWI can inspire. Like Carolee, the understanding of Kathryn and her teacher-candidates will grow each year. The potential for a powerful ripple effect for student learning has begun.

Investigating what we don't yet understand and challenging what we think we do understand is the essence of learning through scientific inquiry

Kathryn jumped into making structured word inquiry central to her literacy instruction based on a brief introduction to the linguistic conventions of English orthography. Her experience convinced her that she should introduce her students to the matrix and the word sum to analyze morphologically and etymologically related words. She knew she needed to study examples of synchronic etymology to make sense of the spelling of homophones and "orthographic markers" that made sense of the spelling of words she used to treat as irregular. She knew that grapheme-phoneme

correspondences made sense in the context of morphology and etymology. She knew that all of that was on the right track, but she definitely knew she didn't yet have a firm grasp on all of it.

Her new orthographic understanding helped her realize that if she continued with her previous practice she would definitely be misrepresenting English orthography. She would make "mistakes" with this new learning. However, those mistakes would be made while headed in the right direction -- on a journey that recognized meaning as the centre of gravity of spelling, not phonology. Her previous experience with critical literacy helped her forge ahead with SWI before feeling confident about knowing "the answers." Encountering questions without immediate answers became central to their experience. With the guidance of the word sum, matrices, references about the [suffixing conventions](#) and the "[4 Questions of SWI](#)," they were able to gain the experience of acting as scientists to build their own understanding. Kathryn was modeling the opposite of the banking model...

> "...where the 'all-knowing' teacher deposits knowledge into students' minds. Students aren't taught to question and analyze whose knowledge is this; instead, they're expected to passively accept, memorize, and regurgitate information back on a test. Freire believed in a problem-posing curriculum, where students question everything; their inquisitiveness will lead them to "read the word and read the world".

I would argue that this message Kathryn first encountered in her experience with "critical literacy" is exactly the same dynamic we need to more effectively apply in educational research.

There are many open questions about how best to teach literacy. Is there evidence to support instruction emphasizing certain aspects of orthography over others at different points in a learner's literacy development? Are some instructional practices more effective than others for facilitating literacy learning? There is much scientific inquiry needed to improve literacy instruction. However, there is no real debate about the basic conventions of English orthography.

It should go without saying that scientific investigation of how best to teach reading and writing in English should reflect a clear understanding of those conventions.

The hypothesis presented by SWI is very simple. It is based on the assumption that literacy instruction should reflect how the writing system works from the beginning. (See Bowers & Bowers [2017](#), [2018 a](#), [b](#).)

This is exactly the point Rayner, Foorman, Perfetti, Pesetsky, and Seidenberg (2001) made when they wrote, "The child learning how to read needs to learn how his or her writing system works" (p. 34). However, they made this point in support of phonics instruction over whole language. It is clear that SWI provides a more coherent representation of how our writing system works than does phonics. If the principle stated by Rayner et al. stands up, it is an argument for structured word inquiry over phonics.

The current scientific debate on literacy instruction in English should be grounded in the best understanding of how English orthography works

The basic facts of how English orthography works -- as described by linguists for decades -- should inform any

scientific recommendation about literacy instruction, or theory of learning to read or write.

Kathryn taught Grade 1 for years and is now a Director of Reading Programs at a faculty of education. She had to encounter Gina Cooke's TEDEd talk on-line and attend a 4-day workshop on Wolfe Island to be introduced to the well-established linguistic facts about English orthography. Kathryn's story is indicative of a system of educational research which has failed to arm the research community and educators with a clear understanding of basic facts about how our writing system works.

This state of affairs means that there is a dearth of instructional research on literacy learning in the context of students who -- from the beginning of formal schooling -- receive instruction which represents how our writing system works. We have a mountain of research on phonological awareness, but I am aware of no data on the predictive nature of phonemic awareness for children who are taught the interrelation of morphology, etymology and phonology throughout formal literacy instruction. We have no direct evidence of the effect of such instruction for dyslexic children or for English language learners.

We do have some early research findings regarding SWI instruction and instruction which at least includes morphology. The results are promising. Devonshire, Morris and Fluck (2013) compared an SWI condition to a phonics condition with 5- to 7-year-olds and found statistically significant gains on standardized measures of reading and spelling. Meta-analyses of morphological instruction (Bowers, Kirby & Deacon, 2010; Goodwin & Ahn, 2010; 2013) found benefits over all, but the greatest benefits were for the younger and less able. Goodwin and

Ahn (2010, 2013) reported that the outcomes with the greatest effect sizes in both their meta-analyses were phonological awareness outcomes, with morphological awareness outcomes having the second greatest effect. They wrote,

> "Similar to Bowers et al. (2010), results suggest that early morphological instruction may be particularly helpful perhaps because of the synergistic relationship between phonology and morphology and the larger repertoire of root [base] and affix meanings available for use. If a reciprocal relationship exists between morphological knowledge and literacy...it makes sense to jump start this knowledge from an early age" (Goodwin & Ahn, 2013, p. 23).

This analysis is in line with our hypothesis of morphology as a "binding agent" (Kirby & Bowers, 2017). It also counters a common fear that including morphology early on may reduce learning about grapheme-phoneme correspondences.

These are promising findings, but much more research is needed. This means we need more educators and researchers who understand and can teach how orthography reflects the interrelation of morphology, etymology and phonology.

This is one reason I'm so excited that Kathryn has joined the latest in a small but growing group of professors at faculties of education addressing SWI and a linguistic understanding of English orthography in their literacy courses. Dr. Houge has been studying and teaching SWI for a number of years as an associate professor of elementary and secondary reading at Northern State

University. Drs. Rauno Parrila and George Georgiou made it possible for me to work with education students at the University of Alberta and to start doing direct training in local public schools. Rauno first invited me to do work with education students at U of A in 2012 (video here). This has also led to me running recurring workshops with Edmonton Regional Learning Consortium (ERLC) including my next workshop starting Jan 23! Rauno Parilla has now brought his experience and knowledge to McQuarie University in Australia. George Georgiou has continued working on SWI projects at the University of Alberta including an intervention that I was able to support. Gina Cooke brought her deep linguistic understanding to her English education students she taught at the English department at Illinois State University.

This is an incomplete list of such work going on in educational faculties, but it is still a small group. We are obviously in the very early days of using the linguistic understandings of Carol Chomsky (1970) Richard Venezky (1967,1970, 1999) and others to guide literacy instruction in faculties of education. Given the growing interest in SWI in the research, I expect Kathryn's leap into this work will be followed by many others in coming years.

The response you see in the quotes from Kathryn's students show how transformative and empowering this leap into orthographic inquiry was. This is the case even though Kathryn had such a limited background in her new understanding of orthography. What Kathryn did have were tools and resources to apply scientific inquiry to their orthographic investigations. With these tools, every year

Kathryn's confidence in orthography and SWI instruction will deepen. And that is also true for the teachers who studied with Kathryn and keep investigating with their students. Her willingness to begin to use scientific inquiry to investigate spelling with her class meant that she didn't delay the process of making sense of orthography with her students. It also meant that she and her students gained the experience of *learning through scientific inquiry* and the culture and community of learning that can bring to a classroom. From two of her students:

> *"I am still wondering about times when I am unsure. It makes sense to be honest and say, 'I don't know' because I'm still learning and I think it is okay for me to be learning too."*

> *"As our class is progressing, I am noticing more and more how we are helping each other with word challenges, cheering each other on, and celebrating when someone figures a challenge out! It's a really nice part of the SWI process and brings us closer as a class community."*

I'm so thankful that Kathryn was open to having her assumptions challenged, and that she had the courage to jump in and offer this learning to her teachers-in-training. I hope her reflection encourages more researchers and teacher-trainers to take this same leap.

Not only is it an important part of pushing forward our understanding of literacy instruction -- as her students' comments show -- it's a lot of fun.

Peter Bowers, Jan. 5, 2019

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