

Applying the Principle of Backwards Design from UBD to Structured Word Inquiry: Enduring understandings of how the written word works

I am consistently impressed with the learning I have seen in schools that employ the principle of backwards design as presented by *Understanding by Design* (Wiggins & McTighe, 2005). According to this principle, the first step in preparing a lesson or unit is not to plan what the *teacher will do*, but instead to plan what *children should learn*.

In backwards design teachers first decide a) what *enduring understandings* (EUs) students should gain from a proposed area of study and b) what would constitute evidence that children have achieved the desired result. Only with the learning goals set and an established assessment scheme can teachers get on with the business of lesson planning.

As Wiggins and McTighe (2005) put it, “the best designs derive backward from the learnings sought” (p. 14).

What are some central EUs for structured word inquiry?

Here are some central learning goals I suggest teachers target when they design structured word inquiry lessons:

Students will understand that...

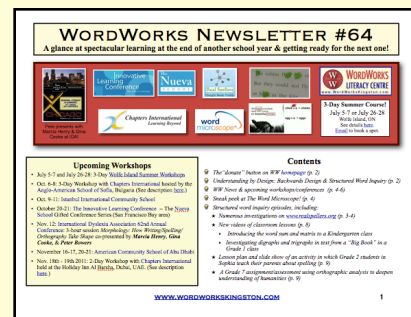
- 1. English spelling is a highly ordered system for representing meaning that can be investigated and understood through scientific inquiry.*
- 2. Scientific inquiry seeks the most elegant solution -- the deepest structure that accounts for the greatest number of cases. (See this [example](#))*
- 3. Analysis of word structure for meaning cues can be used to deepen understanding of concepts and terms in any subject area (Science [example](#), Humanities [example](#)).*

Another set of EU statements comes from Fiona Hamilton Sheridan and her team at the *International School of Beijing* (ISB). They identified the following statements as the most important EUs for their structured word inquiry curriculum:

- The English spelling system (English orthography) is based on meaning.
- The English spelling system has a high degree of order.
- Integrated understanding of language structure makes us better listeners, speakers, readers and writers.
- Studying the way words are built is a way to develop critical thinking.

Link to WW Newsletter #64

In part, this article was written as a way to help readers of WW Newsletter #64 consider the *enduring understandings* targeted by the varied structured word inquiries shared in that newsletter. Click [here](#) to find links to those instructional examples illustrating the concepts discussed in this article.



Note that the list of EUs from Fiona’s team teases out the learning goals I integrated into my first EU. Note also that all these statements meet the recommendations from Wiggins and McTighe (2005) that enduring understandings should

- remain relevant for years after instruction;
- be transferable to new situations;
- require “**uncoverage** through sustained inquiry rather than on-shot **coverage**” (p. 342).

Regardless of how they are stated, I would argue that the core concepts identified in my first EU statement should be a goal for *any* instruction about spelling. (These same ideas are represented in WordWorks’ basic principles for instruction that have been posted [here](#) since we went on-line.)

The assertion that English spelling is so well ordered that it can be investigated through scientific inquiry is not based on wishful thinking. The basic principles of English spelling have long been established in the field of linguistics (e.g., [Chomsky, 1970](#); Venezky, 1970, 1999). More importantly, linguistic tools -- including the word sum and [matrix](#) -- can be used by anyone to reveal that order. Regular visitors to WordWorks have seen countless structured word inquiries, all of which reinforce the conclusion that English spelling is ordered and can be investigated through scientific inquiry.

I invite you to test for yourself (and your students) the orderliness of English spelling by examining, for example, the flowcharts that have been produced to identify the vast majority of suffixing changes. One such flowchart from Real Spelling can be downloaded [here](#). A different suffix checker that reveals the same conventions is this [interactive suffix checker](#). (This

tool is part of Neil Ramsden’s website “[Word Building and Spelling Experiments in English Morphology](#)” that also includes the popular [Word Searcher](#).) Such tools would not work with a disordered system.

An illustration of the effects of applying backwards design to spelling instruction

The effectiveness of backwards design is revealed by considering the results of ensuring that instruction adheres to the learning goals in my first EU statement.

Consider a hypothetical scenario of a teacher who has started to see that English spelling makes much more sense than she had previously imagined. By working with [matrices and word sums](#), she has been given her first glimpse into the workings of morphological word families. She has learned that in English, the spelling of bases, prefixes, and suffixes is consistent despite pronunciation shifts. Her previous teacher training and resources did not address these features of English spelling. All of a sudden she is noticing interesting [meaning cues in words that she’d never considered before](#). Inspired by this new knowledge about words, she writes this EU statement and posts it prominently in her classroom with a determination to build on this understanding for herself and her students.

Enduring Understanding

English spelling is a well-ordered, reliable system that we can investigate and understand through problem-solving.

Posting this EU in the classroom provides a constant reminder to avoid contradicting this assumption with everyday messages she sends her students.

But how does that look in the classroom?

One day a student asks her why <rabbit> has a double <bb> but not <habit>. This teacher has not yet investigated this question, and no immediate answer presents itself to her.

Before she learned the basic principles about English spelling, she would have responded that English spelling doesn't always make sense and that these are some of those spellings that just have to be memorized.

This teacher, however, recognizes that this response would contradict the learning goal she was working so hard to develop. Her sign (and the learning that prompted it) reminds her not to fall back into her old habits of making untested assumptions about spelling.

But what can she do if she doesn't know the answer? She simply uses this question to start an *inquiry-led* investigation with a statement like this:

"Hmm... Good question! I'm not sure why, but I'm sure there is a good reason. Let's see if our 'Stuck on a Spelling?' chart can help us out."

Stuck on a Spelling?
Investigate with these questions...

- (1) What does the word mean?
- (2) How is it built?
(Can you identify any affixes with a word sum?)
- (3) What other related words can you think of?
(Can the [Word Searcher](#) help you make a matrix?)
(Can a word origin dictionary help you?)
- (4) What are the sounds that matter?
(What grapheme/phoneme correspondences can you find that fit in your hypothesized morphemes?)

morphological connections?

etymological connections?

"No experience is educative that does not tend both to knowledge of more facts and entertaining of more ideas and to a better more orderly arrangement of them."
John Dewey, (1938/1997). Experience and Education. p. 82

Inquiry-Led Teaching:

Teaching critical thinking by modeling how a scientist responds to an interesting unknown

Backwards design offers a self-correcting mechanism for instructional choices. Posting that EU statement in her class guides this teacher towards a series of educative actions with her students. Those actions reinforce the learning goals explicitly named in that same statement.

This teacher's recent experiences making sense of spellings like <sign> and <does> by investigating the structure and meaning of these words motivates the seeking of still more order. The EU statement itself reminds her that the best way to find answers to surprising spellings is through careful problem-solving. Her "Stuck on a Spelling?" chart reminds her of productive first steps to take in such a structured word inquiry.

Applying backwards design to spelling instruction guides this teacher and her students to respond to surprising spellings with scientific inquiry. Armed with their new knowledge about the basics of English spelling and strategies for investigating it, they are learning that failing to understand a particular spelling can be treated as evidence of a potentially rich learning opportunity. In the past a question like this one about the spelling of <rabbit> and <habit> would have been accepted as just more (untested) evidence that English spelling is unreliable and frustrating.

Learning goals determine assessment

Arriving at a clear and complete understanding of the spelling of <habit> and <rabbit> is *not* the criterion to determine whether students have achieved the desired outcomes stated in this EU. The explicitly stated desired result is that students understand that English spelling is reliable and that they can deepen that understanding by applying principles of scientific inquiry.

This inquiry-led teaching fosters exactly that learning goal. The teacher does not signal that spelling is irregular just because she could not explain a spelling off the top of her head. Instead, she models a strategic way to behave when faced with unknown. She applies scientific inquiry with the help of strategic questions to seek better understanding.

The “Stuck on a Spelling?” chart prompts them to use the [Word Searcher](#). Typing <habit> in the search field collects the list of 26 words shown to the right. This list provides the class an evidence bank to investigate for structure-meaning cues.

Students are presented with a word like <habitual> which may be new vocabulary word for them. This is a perfect opportunity to teach this word as closely related in meaning to their target <habit>.

But does <habitat> (a rich science term) have any meaning connection? Prompted by their reference chart, the teacher or perhaps a student suggests looking up <habitat> in a word origin dictionary. They would find this in [etymology on-line](#):

A tool for Assessment

The “Orthographic Analysis” disk in the [Real Spelling Tool Box](#) is a resource to help teachers assess student understanding of English spelling. This disk is currently being re-presented in the multi-media form of the Real Spelling Tool Box 2.

Search Results for "habit" (26 matches)

habit
habits
cohabit
habitat
habitué
inhabit
cohabits
habitats
habitual
habitués
inhabits
cohabited
habitable
inhabited
cohabiting
habitation
habitually
habituated
inhabitant
inhabiting
habitations
inhabitable
inhabitants
uninhabited
cohabitation
uninhabitable

habitat

1762, as a technical term in Latin texts on English flora and fauna, lit. "it inhabits," third person singular present indicative of *habitare* "to live, dwell," frequentative of *habere* "to have, to hold, possess" (see **habit**). General sense of "dwelling place" is first attested 1854.

This group of “word scientists” does not need to fully resolve the nature of the spelling-meaning connections between the words <habit>, <habitual>, and <habitat> to conclude that the meaning connections between these words explain the common single letter grapheme . Arriving at that conclusion through scientific inquiry deepens students’ understanding that English spelling is a well-ordered, reliable system that can be investigated using problem-solving techniques. They may not be able to explain why <rabbit> uses a double <bb> yet, but their investigation has definitely reinforced the desired learning goal stated in the EU.

Remembering that the primary purpose of spelling is to represent meaning reveals the false assumption embedded in the original question. The fact that <habit> and <rabbit> rhyme should never have been taken as evidence that they *should* be spelt the same!

Scientific inquiry to a question is never a guarantee of an answer to that specific question. Becoming effective at scientific inquiry, however, moves understanding about a domain forward. This effect of scientific thinking is reinforced again and again in

classrooms that take on the challenge of investigating the order of English spelling. As stated in the EU from the International School of Beijing, ***studying the way words are built is a way to develop critical thinking.***

Assessment possibilities

Rich assessment strategies can be designed to consolidate this learning and determine the extent to which students have achieved the stated learning goals. For example, a task could be assigned in which groups of students teach the details of this or planned similar investigations to an audience that was not part of the original investigation (e.g., parents and/or another class). Students would use word sums and matrices with words collected in their evidence bank from the Word Searcher. They would be instructed to explain their learning (using precise linguistic terms and citing references) and to identify which conclusions they are confident about and what questions still need further study.

See teachers at the International School of Beijing model this type of [presentation](#). See a Grade 2 presentation to parents [here](#). Student learning could also be posted on Real Spellers as a means of teaching a wider community and seeking further learning from that community. Just presenting a [student generated matrix and word sums](#) in this supportive learning community could be a part such an assignment.

Backwards design of content?

Understanding by Design is very commonly used especially in international schools. Why don't more schools apply these principles to spelling instruction?

When schools, teachers and curricula accept and reinforce the common but untested assumption that English spelling is unreliable, teachers have no choice but to resort to rote memory based instruction.

From this false starting point, spelling can be perceived only as an isolated topic that has little “educative” value in the sense

described by Dewey. Due to an assumption that turns out to be false, spelling instruction is exempted from the inquiry principles central to the UBD (and PYP) that we work so hard to establish in the rest of our curriculum.

Students lose out because *we* fail to apply the principle of backwards design to the *content* of spelling instruction.

Wiggins and McTighe (2005) define backwards design as “an approach to designing a curriculum or unit that begins with the end in mind and designs toward that end” (p. 338).

For most teachers, acceptance of the untested assumption that English spelling is irregular is supported by a lifetime of training and resources. This pernicious false assumption prevents teachers from conceiving that English spelling has educative ends to target with their instruction.

In the case of spelling instruction, the first priority has to be backwards design of content.

Only when teachers have access to resources and training that reveal the basic linguistic principles that drive English spelling can they identify appropriate learning goals for study about how the written word works. When English spelling is recognized as an ordered system, schools can apply the same principles of instruction to spelling that they apply to any other ordered system.

Visit www.wordworkskingston.com and www.realspellers.com to see countless examples of students and teachers engaged in exactly this kind of learning.

Pete Bowers June 5, 2011

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See [Chapters International](#) for upcoming workshops for international schools.