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Research into Practice

New Perspectives in Learning Vocabulary: Generative Vocabulary

BY ELFRIEDA "FREDDY" H. HIEBERT, Ph.D.

For decades, vocabulary instruction in the majority of English/Language Arts classrooms has followed a rather rigid structure, having to do with the memorization of unfamiliar words and their definitions from dictionaries. For example, a typical pattern is to present students with ten words a week to learn. Here is an example of ten words, provided for a week of preparation for a college-board exam: *profundity, moribund, refine, massacre, irksome, anguish, ebullient, abhor, fragile,* and *picaresquei*. A short definition is given for each of the words.

But, if we consider that English has approximately 300,000 active words and likely a million or more words (when the individual meanings of words are considered), have the students truly made a dent in what they need to know about these words?

The digital era has led to new understandings about vocabulary because scholars now have access to large numbers of texts and a new array of tools for analysis of texts and vocabulary. To date, few of these insights have informed vocabulary instruction of students in schools. **The generative vocabulary approach in myPerspectives, however, is the first to draw on this expanding body of knowledge about vocabulary.**

Why *generative*? To be able to figure out the many unknown words that students will encounter in their reading, they need to be able to apply previous knowledge to generate the meanings. Unlike the older approach, in which students learned one word at a time and were over-reliant on dictionaries for unlocking meaning, the generative approach enables students to study groups of words and to draw on their previous knowledge to unlock and confirm meanings.

WHY are there new perspectives on vocabulary?

Literally millions of pages of text have been digitized in the last decade. In the past, scholars needed to do complicated computer analyses or resort to analyzing texts by hand to get a sense of the vocabulary patterns in texts. With the digitization of texts, linguists and educational researchers can study

ELFRIEDA "FREDDY" H. HIEBERT, Ph.D.
Dr. Hiebert is President and CEO of TextProject, a nonprofit that provides resources to support higher reading levels. She is also a research associate at the University of California, Santa Cruz. Dr. Hiebert has worked in the field of early reading acquisition for 45 years, first as a teacher's aide and teacher of primary-level students in California, and subsequently, as a teacher and researcher. Her research addresses how fluency, vocabulary, and knowledge can be fostered through appropriate texts.

large databases of text almost instantaneously. Our knowledge about the nature of vocabulary in texts and the relationships across words has changed dramatically as a result. This knowledge has trickled down from linguistic experts to curriculum designers and, finally, to educators.

Four resources that are open-access on the Internet illustrate the material that is now available to researchers and curriculum designers.

- **Databases of word features:** Databases in which one or more features of texts are categorized have proliferated.
- **Thesauruses:** Even in the ubiquitous Microsoft Word® application, users have the opportunity to finesse their use of words with a thesaurus function. A variety of other thesauruses are available, including ones that visually present the relationships among words. Still other online thesauruses provide antonyms as well as phrases in which words appear.
- **Word Net:** Word Net permits quick insight into the number of different meanings of words, including the meanings taken on as words shift parts of speech. This project provides the definitions of words in relation to the word's grammatical function. Word Net assists educators in seeing how many meanings words have and the different roles that words take on.
- **The use of words in texts:** Google Ngrams® makes it possible to search the use of a word in texts over a 200- year period. In addition, numerous websites provide uses of words. Some may be from classical literature, others from contemporary sources, and others with sentences that have been generated to illustrate vocabulary use.

WHAT are the new perspectives on vocabulary?

MANY WORDS

English has many words. No exact count of the number of words in English can ever be obtained. After all, how do you count a word? Is it the individual meanings of a word? The word set, for example, has at least 45 meanings—13 as a noun, 25 as a verb, and 7 as an adjective. Further, one group of words shares the same spelling but has distinctive meanings and histories (e.g., ***lead, bass, bank, wind***). In a typical analysis of the number of words in English, these words are counted as a single word, despite these dramatic differences in meaning and use.

The recent work from digital databases gives a sense of the number of unique word forms (i.e., without the distinctions of meaning). According to the Global Language Monitor, the number of unique words in English is 1,025,110ii. To attain this number, highly technical words, archaic words, acronyms, and phrases were likely included. In terms of active words in written English, a typical figure that is given is approximately 300,000 (Nagy and Anderson, 1984)[iii]

Whatever the system of counting words, the bottom line is that English has a considerable number of words, and most words have at least several distinct meanings. All of the words in the language simply cannot be taught over a school career of 13 years. Further, the Global Language Monitor estimates that approximately 15 words are added to English daily. Again, the inclusion of acronyms and phrases is important to keep in mind when considering these figures. What is clear, however, is that English vocabulary continues to grow, especially as it becomes the language of the global marketplace.

If students are to be proficient readers and thinkers, they need to be able to act on language—generating the meanings of words. For this to happen, students need to be taught about the underlying systems of English vocabulary, not just the regimented information found in dictionaries.

MANY MORPHOLOGICAL CONNECTIONS

Morphemes are the smallest meaning units in language. Morphemes take one of two forms: (a) free morphemes or root words are the smallest meaning unit that can occur 3 independently (e.g., *fine*) and (b) bound morphemes—morphemes that change the function and meaning of root words but can't occur on their own (e.g., *re--*).

One of the challenges in American literacy instruction is that a lion's share of reading instruction in the elementary grades is devoted to ensuring that students become adept at letter-sound correspondences. Understanding how letters and sounds connect to form words is critical, but English is also a morphological language where meaning units are important. For example, fine is a root word that helps with recognizing the meaning of numerous words—*finery, fines, refine, define, confine.*

Nagy and Anderson (1984) estimated that every new word encountered in grades 3 and higher was a member of a morphological family of 1-3 words. Nagy and Anderson's analysis was based on a selective sample because, at the time of their studies in the early 1980s, the digital resources were not available to make conclusions about the body of English words as a whole.

As a result of digital databases, the critical role of morphology in written words has become even clearer: It is simply a more efficient way to learn and explore word meanings. For example, the lead words in the 2,500 morphologically complex families account for approximately 11,000 words in all.

Understanding about the linguistic systems contributing to English is not new knowledge, but access to digital databases has made it possible to understand what the different systems mean for morphology. This paper is not the place to review the morphological systems of the primary languages contributing to English, but a brief overview is important because of the role it plays in myPerspectives. The three morphological systems of English are summarized in Table 1.

An understanding of the historical roots of English ensures that the morphological connections of English to other languages are emphasized in an English/Language Arts program. Spanish, a sister language to French (which provided the Romance layer of English), retains close ties to Latin. There are many close cognates between English and Spanish. Cognates are words that look and sound the same in two languages such as the word gratitude in English and *gratitud* in Spanish.

It's also important to know that words from all three layers are frequently combined into phrases with very specific meanings, as in these examples:

- *Kin availability* (Anglo-Saxon + Romance)
- *Carbon time dating* (Romance + Anglo-Saxon + Romance)
- *Theoretical physics* (Romance + Greek)

MANY MEANINGS

Most words have multiple meanings. Sometimes these meanings are obvious—homographs such as lead (to go in front of) and lead (a metal), and bass (low, deep sound) and bass (a type of fish). But even words that are not homographs can take on quite different meanings in different contexts.

For example, when the word channel is used as a noun in geology, it refers to the bed of a river or other waterway; a navigable route between two bodies of a wide strait; or the deeper part of a waterway. When used as a noun in the field of communication, it refers to the specific, official course or means of discourse. Further, when *channel* is used as a verb in psychology ("channel your energy"), economics ("channel money into the program"), or geology ("channel water in the fields"), its meaning changes yet again.

Typically, as words become more rare in written English, their meanings decrease, whereas in high frequency words, multiple meanings increase. In fact, one reason for high frequency is that highly frequent words have multiple meanings. Two of the words on the college-board exam list given earlier—*picaresque* and *irksome*—illustrate rare words with specific meanings. Picaresque is so rare that it does not appear in a listing of English words that drew on a 450 million database, while irksome is predicted to appear .3 times per million words. Each of these words has one distinctive use: (a) picaresque: describing a rough or dishonest but appealing character and (b) irksome: irritating. Contrast these two words with *state* and *part*, two words that are predicted to appear approximately 600 times in every million words. *State* has 8 meanings as a noun and 3 as a verb (Word Net 3.1), while part has 13 meanings as a noun, 5 as a verb, and 1 as an adverb. Further, *state* is used in phrases such as state of matter or Department of State that have specific meanings in content areas. *Part*, too, appears in phrases such as parts of the body in anatomy and *equal parts* in mathematics. When morphological family members of 4 *state* and part are considered, the use and meanings increase even more.

The multiple meanings of words are critical in literature, not just in content-area texts. In narrative texts, authors often use language colloquially. In colloquial language, there can be many idioms and phrases with unique meanings. For example, the word *part* might be used in a idiom such as looked "the part" or a character may be described as "in a state".

THE MAJORITY OF WORDS IN TEXT COME FROM A SMALL GROUP

A small group of words accounts for the majority of the words in texts. The words in approximately 2,500 morphologically complex families account for approximately 92% of the words in complex texts from grades K to college-andcareer- ready. By middle school, all but the lowest 1-2% of students can recognize the core vocabulary—although their ability to understand the multiple meanings of words may be poor. And students are often not automatic enough with this core vocabulary to read at the rate that is needed.

Within this group of highly frequent words is a ubiquitous group of words that has come to be called general academic words. Among the 25 most-frequent general academic words identified by Gardner and Davies (2013)[vi] are the following: *study, develop, group, system, relate, research, social, results, use, provide, however, increase, experience, level, process, culture, history, active, support, individual, inform, important, include, form,* and *require*.

The potential consequences of placing students in groups do not mean eliminating small group work in classrooms. Small groups are a necessity if teachers are to provide the specific support students need. The issue is the groups' longevity and the permanence of the groups' descriptors. The nature of talk with which teachers communicate with students can also make a difference.

With only one or two exceptions (e.g., *however*), general academic words are Romance in nature and are highly prolific in their morphological families. Most general academic words are also quite abstract and can take on numerous different meanings. Consider the word *study*. As a noun, study has 10 meanings and, as a verb, 6 meanings. General academic words also have extensive morphological families, as the words that are part of the morphological family of the word *study* illustrate in Table 2.

RARE WORDS IN INFORMATIONAL AND NARRATIVE TEXTS DIFFER

The percentage of words in texts accounted for by rare words (i.e., words that occur less than nine times every million words of text) is relatively small—from 5% in the primary grades to 13 or 15% in high-school texts. But the actual number of words that fall into the rare category in English is huge—approximately 289,000 words. Students can't be taught all of these words, but they can be taught to use their knowledge about how words work and their knowledge of the more common words to figure out unknown words in complex texts.

By middle school, when students can recognize the core vocabulary, they acquire a fundamental understanding about unknown words in texts: that rare words in narrative and informational texts function uniquely.

Rare words in narratives. In describing characters, settings, and the problems characters confront, skilled authors rarely repeat the same word. Instead, authors use different words to create an interesting style. For instance, in The Wizard of Oz, L. Frank Baum describes what Dorothy and her companions see on arriving in the Emerald City with these words: brilliance, dazzled, glittering. Word variety also helps authors build characterization in jobs (actor, lawyer, expert) and roles (adult/relative, female, male).

In narratives, the more complex the text, the more rare the words that describe a particular concept. For example, rather than describing a character as nervous, an author might use the word disconcerted, perturbed, or flustered. Or, rather than using the word calm, an author of a complex literary text may use the word *phlegmatic*.

Instruction of the rare vocabulary typical of literary texts needs to emphasize the semantic networks of words. An example with the rare word *sluggish* appears in Table 3. This semantic network illustrates that there are distinct meanings of words. Further, particular members of a semantic network are used in specific contexts. One meaning of *sluggish* is often applied to the movement of water, as in the following example:

> Hillsden stopped by a window and gazed down at the sluggish twaters of theThames below. [viii]

Some of the words in the first meaning of *sluggish*, such as unhurried or creeping might be used in this context but words from the second meaning as dull would not. Water is typically not described as *quiescent* or l*ethargic*. But if an author described a character as sluggish after a big meal, words such as *lethargic* might be used.

Rare words in informational texts. In informational texts, the rare words are typically not synonyms, but rather are connected by topic. For example, in a research article on *The Return of the Multi-Generational Family Household*[iii], critical words include *demographic, trend reversal, resources, financial incentive,* and *kin availability*. These words are not synonymous, but are connected to the topic and to one another.

In the case of the critical vocabulary in informational texts, words are organized around shared concepts that are part of the topic, such as the example for Multi-Generational Families in Figure 1.

EXPERIENCING WORDS IN THE CONTEXTS OF TEXTS

Context refers to reading concept words in sentences. These sentences come from texts that are part of *myPerspectives*, as well as excerpts of texts from various sources. Encountering target words in multiple contexts supports a robust vocabulary for use by readers and writers in several ways.

First, students are able to see how a word can take on different meanings. In the list of 10 words in the college-board exam preparation, the word refine is defined as: "make or become pure." Consider the use of the word *refine* in the following two sentences:

> They refine crude oil at the plant.

> You'll find arguments on both sides of the coin, but can refine your searches until you get to the original articles.

Both of those are correct usages of "refine," but the first is better aligned to the definition of *refine*. The test preparation material gives only a single definition of *refine* and does not include *refine* as a means of improving a method by making small changes to it. The second sentence requires a bit of a leap, one that some students might not make easily, if they have only memorized the definition and are not aware that the second definition of the word. Reading words in multiple sentences, paragraphs, and texts enables students to learn about the ways the meanings of words are nuanced and shift in different contexts.

Second, multiple contexts also provide exposure to different morphological forms of a word. *Refine* may be used to convey the fine-tuning of a process or strategy, while *refined* may mean "cultured."

Third, reading words in context also supports students in a focus on relevant words in context and on word choice for rhetorical effect. Word choice shapes meaning, tone, and impact. In the following sentence, the phrase *near-comatose* conveys an image that would not be communicated with the word bored. Similarly, the phrase *gym-obsessed warrior* communicates an image quite different than the phrase *young man*.

> She'd watched him go from a near comatose state, through his teenager stage that nearly drove them all mad, to the gym-obsessed warrior trying tounderstand his place in the world. [ix]

Exposure to the ways in which authors create moods and images through their word selection can go a long way in supporting growth in students' writing as well in understanding the styles and goals of authors.

What Might this Look Like in a Classroom?

A GENERATIVE STANCE TOWARD VOCABULARY

The focus of instruction when the goal is for students to have a generative vocabulary is knowledge and awareness of how English vocabulary works. Discussions about the features of vocabulary, the relationships among words, and the ways in which authors' vocabulary choices influence the power and the meaning of a text are important in teaching and learning vocabulary.

Within a generative approach, students should be taught that any new text is likely to have some words that they haven't encountered in the past. Students also should have a toolkit of strategies in figuring out the new vocabulary. They should be developing a solid foundation in how vocabulary operates in written English. Their knowledge about the morphological and conceptual networks among words, the diverse roles that many words take on, and the different kinds of rare words in different genres will put them in good stead whenever they encounter new words in texts.

CHOICE OF WORDS

Academic and selection vocabulary should be carefully chosen, so that students are building knowledge of words related by concept and by topic. The concept words should also support in-depth lessons on morphology, polysemy, and the prominent concepts in literary and academic texts.

Rare words should footnoted in texts, with on-the-spot definitions. But note that such as *picaresque* and *lachrymose* are not highly prolific in their morphology and polysemy and, consequently, may not receive the same level of instruction as words such as *discredit, relative* and *inevitable*.

Vocabulary words should be presented in relation to other words. Forging connections among related words, as opposed to teaching the words individually, allows students to approach new words with confidence and knowledge.

WORD NETWORKS

Word networks (also known as concept maps or word nets) are a technique used to help students learn about words. These are graphic organizers that assist students in grouping words together. They also help students focus on essential attributes, qualities, or characteristics of a word's meaning—which can vary depending on the type of word they help capture.

Vocabulary word networks enable students to learn, use, and retain a large number of useful words related to a particular concept. In addition, generating vocabulary in this way can help students appreciate the subtleties of an author's word choice and evaluate the effectiveness of an author's style. Using vocabulary word networks also helps students choose more precise words when they write and edit.

When students discuss the unit's theme, they can choose from a wide variety of related words, each with its own connotation, to create a word network. Word networks are also useful as students write responses to texts and participate in the performance assessments of a unit.

A unique form of word network involves students collecting words that collocate (i.e., occur side-by-side), for example:

- stormy weather
- adverse weather conditions
- a change in the weather
- to weather the storm

WORDS IN CONTEXT

Students should consistently have opportunities to encounter concept vocabulary in multiple contexts. Activities that foster multiple exposures to words in context include:

1. **Finding sentences in the text.** These activities help studentslocate sentences that use new vocabulary, or have them identify sentences where word choice truly influences the rhetorical power or meaning of the text. Locating concept vocabulary in the text is the center of discussion.
2. **Writing sentences with the concept vocabulary.** Students are encouraged to emulate the authors by writing sentences in which the concept vocabulary is used.

3. **Finding sentences in online vocabulary resources.** When students are learning new words, it is useful to see the word used correctly in a variety of contexts. Many online dictionaries provide contemporary and cross-curricular examples to help learners see the words in action.

THE USE OF DIGITAL RESOURCES

Building vocabulary activities should use digital resources whenever possible and guide students in the use of these resources. Digital resources are a means for students to develop the repertoire of proficiencies that give them generative vocabulary knowledge in:

- pronouncing the word
- recognizing other words that share the morphological family,
- distinguishing among the multiple meanings of a word, including the use of the word in different sentences
- reviewing the synonyms that are part of a word's conceptual network
- recognizing antonyms.

Students and teachers are encouraged to experiment with digital resources, such as:

- *Lexipedia*, a visual thesaurus. Users type in any word, and Lexipedia displays that word with others in the word network, color-coded by parts of speech and relationships. Hover over the word for a full definition.
- *Snappy Words* is similar, providing words arranged in networks.
- *Lingro* turns a website into a clickable dictionary, providing a variety of definitions. For example, clicking on the word "writing" on a website provides six different definitions.
- *Shahi*, another visual dictionary, melds Wiktionary content with Flickr images and more

Confidence and knowledge to be able to generate the meanings of unfamiliar words in texts result from numerous application and practice opportunities Vocabulary instruction should develop students' confidence and knowledge through a process called gradual release of responsibility[x] . Vocabulary instruction should be designed intentionally to move from teacher's explicit modeling to guided practices, followed by independent activities.

Teachers should provide explicit instruction about words and vocabulary strategies through resources such as concept vocabulary lists, point-of-use definitions, pronunciations, and so forth. In the guided practice phrase of teaching, words may be identified for students but they should use strategies to arrive at meaning and to confirm meaning. As students work on their own—developing self-awareness of how well they are comprehending/analyzing the text and taking ownership of clarifying definitions and recognizing word relationships is important for self-directed learning.

Vocabulary Learning in the Digital Age

Today's effective vocabulary instruction is quite different from how previous generations acquired word knowledge. Understanding the meaning of words, especially those that are unfamiliar to the student, is no longer about definitions and rote memorization. There is a better way. It begins with an understanding of how the English language is organized; the understanding that parts of words, such as morphemes, work together. The understanding that most words can have vastly different meanings based on the context in which they are found.

The digital revolution has resulted in new insights about vocabulary. These insights underlie effective vocabulary instruction in the classroom today, and make use of this new knowledge to open up a whole new set of perspectives for students. Students need to build a strong foundation in how words work. This knowledge enables them to successfully take on the tasks of readers, writers, speakers, and listeners in the workplace and communities of the 21st century.

Table I

Morphological systems of the three primary language sources contributing to English

Language Source	Nature of the Morphological Units	Examples
Anglo-Saxon	Compound words	greenhouse, beeline, cowboy
Romance	Affixes	constructive, construction, reconstructive, constructor, deconstruct
Greek	Compound words	geothermal, geodesic, geography, isothermal, electrothermal

Table 2

Compound words, inflected endings, affixes for the word study

Compound Words	Inflected Endings	Affixes
bedroom-study bible-study case-study home-study nature-study self-study work-study teacher-student studious-looking student-centered student-conducted student-council student-discipline student-faculty student-helper student-initiated student-led student-must-read student-name student-oriented student-originated student-owned student-parent-teacher student-run student-student student-talking-to-teacher student-teacher	study's studying studied student's students students' studied studies understudies understudy's	student restudy unstudied studious studiously understudy

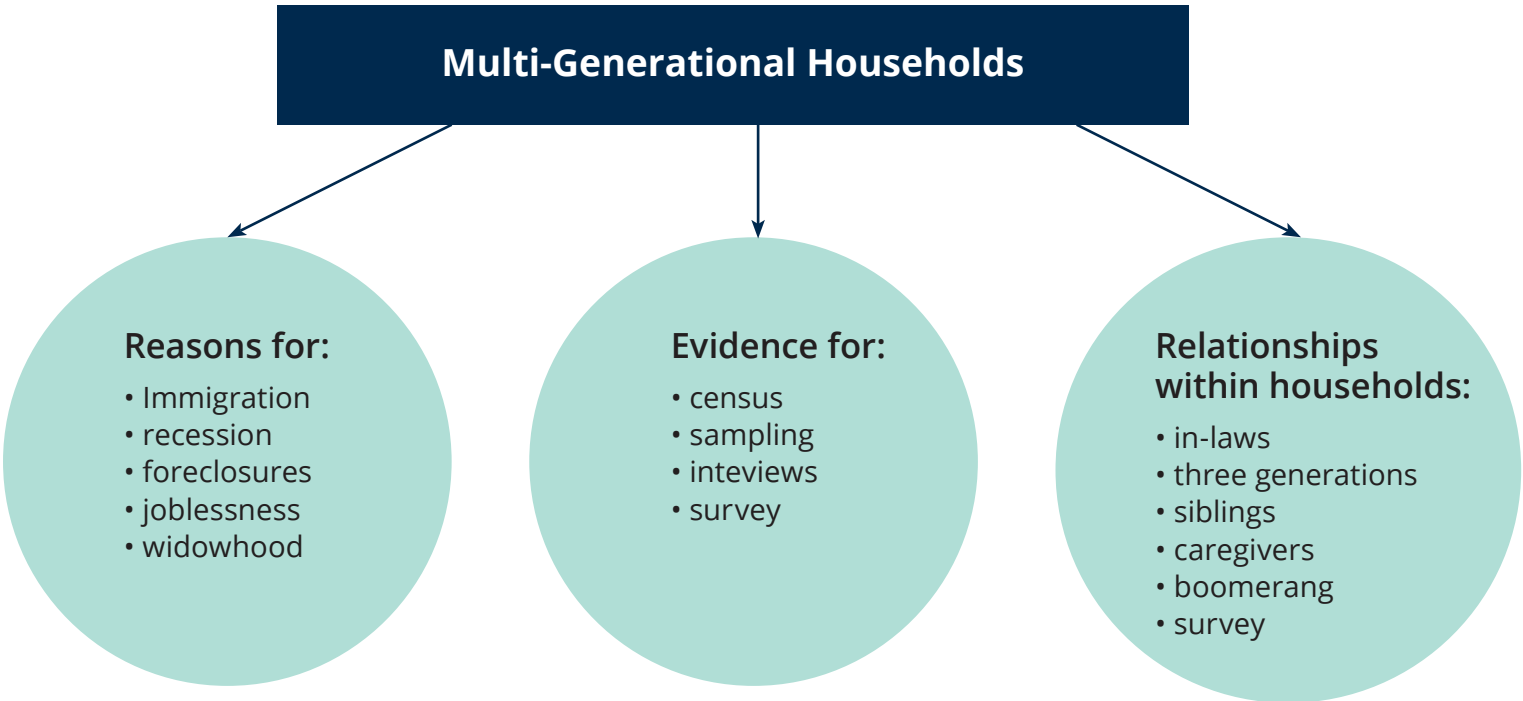
Table 3

A rich semantic network: Sluggish

moving slowly	dull
crawling	inert
creeping	lethargic
dilatory	quiescent
languid	sleepy
unhurried	torpid
leisurely	indolent

Figure 1.

Example of a word network for concept vocabulary in an informational text



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