

THEORY AND RESEARCH INTO PRACTICE

Vocabulary: Questions from the classroom

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Both interest in and research on vocabulary knowledge and vocabulary instruction have waxed and waned over the years (Cassidy & Cassidy, 2005/2006), often in relation to other issues at the forefront of reading instruction. When instructional foci were skills based, an instrumental view of vocabulary, which focuses on the importance of learning discrete words, stimulated individual word-learning studies (Beck & McKeown, 1991). When the focus shifted to prior knowledge in reading, learning vocabulary through wide reading and context received more emphasis (Anderson, Wilson, & Fielding, 1988). Currently, interest stimulated by attention to at-risk readers and the “vocabulary gap” between groups of children that emerges in early childhood (Hart & Risley, 1995) and persists over the school years (Becker, 1977) has focused considerable concern on vocabulary development for at-risk readers (National Institute of Child Health and Human Development [NICHD], 2000).

Across this shifting landscape, two things have remained constant: the depth of the research emphasizing the importance of vocabulary to school performance, and the stability of the ways in which teachers have attempted to interpret and apply the research in their classrooms. Examinations of vocabulary instruction have revealed little change in classroom practice, or in the emphasis on vocabulary in commercial programs, over the years (Beck, McCaslin, & McKeown, 1980; Blachowicz, Watts-Taffe, & Fisher, 2006; Durkin, 1978–1979; Ryder & Graves, 1994; Scott, Jamieson-Noel, & Asselin, 2003; Walsh, 2003). The current burgeoning interest in vocabulary, coupled with documentation of less-than-robust classroom practice, has left conscientious teachers with many questions about how to design and implement effective instruction. This review of theory into practice rests on our belief that the dialogue between researchers and classroom teachers is an important and fertile one, both for instruction and for research. Therefore, we use the questions that teachers ask every day in their work to examine the theory and research on vocabulary learning and instruction. We begin by surveying the landscape of important

historical work in vocabulary. We then move to the central focus of the article, the questions that teachers have about vocabulary and vocabulary instruction and the related lessons learned from research that can be applied to practice. We conclude the article with a reflection on how we might move forward, as a community of researchers and teachers, in our understanding of vocabulary instruction.

Historical perspectives on vocabulary knowledge and instruction

One of the longest, most clearly articulated lines of research in literacy education describes the strong connection between readers' vocabulary *knowledge* and their ability to understand what they read (Davis, 1944, 1968; Terman, 1916). This relationship makes good, intuitive sense not only to a noneducator who might suggest, "You certainly will understand what you read better if you know the words!" but also to teachers and researchers who observe and study the ways in which complex, unfamiliar, or technical vocabulary makes reading difficult.

The history of research on vocabulary *instruction* is less straightforward. A topic of great interest in the early decades of educational research, it waned as a subject of investigation in the 1950s. Surveys of teaching practice (Dale, Razik, & Petty, 1973; Petty, Herold, & Stohl, 1967) suggested that vocabulary instruction through the early 1970s was little informed by prior research. In the mid-1970s, a review of reading research (Calfée & Drum, 1978) called vocabulary research a vanishing species. Indeed, the first *Handbook of Reading Research* (Pearson, Kamil, Mosenthal, & Barr, 1984) devoted only a few pages to research on vocabulary.

However, the 1970s and 1980s saw a remarkable resurgence in this area of work. In a seminal article, published in the *Harvard Educational Review*, Becker (1977) posed the notion that a major factor in the school failure of disadvantaged children was inadequate vocabulary knowledge. His argument stimulated a dialogue with formulations and counterformulations of vocabulary size and subsequent theorization about vocabulary development, its growth, and appropriate instruction. This well-documented dialogue continues as a rich debate today about the number of words students learn over the course of their school years (Cunningham & Stanovich, 1998; Nagy & Anderson, 1984; Zechmeister, Chronis, Cull, D'Anna, & Healy, 1995) and whether or not examining the generative

roots that underlie school vocabulary narrows the task to a more manageable one (Biemiller, 2004; Hiebert, 2005).

During the previous 25 years, numerous instructional investigations have taken place and rich summaries of research have been written. The second *Handbook of Reading Research* (Barr, Kamil, Mosenthal, & Pearson, 1991) contained two chapters on vocabulary, one dealing with vocabulary processes (Anderson & Nagy, 1991) and a second with vocabulary development (Beck & McKeown, 1991). These same topics were also addressed in the third *Handbook of Reading Research* (Blachowicz & Fisher, 2000; Nagy & Scott, 2000), in the *Handbook of Research on Teaching the English Language Arts* (Baumann & Kame'enui, 1991), in the revised *Handbook of Research on Teaching* (Calfée & Drum, 1986), and in other comprehensive reviews (Baker, Simmons, & Kame'enui, 1995; Graves, 1986; McKeown & Curtis, 1987; Ruddell, 1994) and meta-analyses (Mezynski, 1983; Stahl & Fairbanks, 1986). Further, several educators have surveyed this landscape of research and attempted to interpret it for practitioners in application volumes focused on instruction (Baumann & Kame'enui, 2004; Beck, McKeown, & Kucan, 2002; Blachowicz & Fisher, 2006; Dale & O'Rourke, 1976; Graves, 2006; Irvin, 1990; Johnson, 2000; Johnson & Pearson, 1984; Kamil & Hiebert, 2005; Nagy, 1988; Nation, 1990). Many articles on vocabulary have been published in instructional journals, and more than 400 dissertations with relation to vocabulary have been abstracted in *Dissertation Abstracts* (see <http://library.dialogue.com/bluesheets/html/bl0035.html>) since the 1960s. From this wealth of knowledge, often rich but sometimes confusing, we have teased out eight strands that address recurring questions from the classroom:

1. What do we know about vocabulary knowledge?
2. What do we know about good vocabulary instruction?
3. Which words should be taught?
4. Who should choose the words to be taught?
5. What approaches can bridge the early learning "vocabulary gap"?
6. What specific strategies or approaches can help English-language learners (ELLs)?
7. Can technology be used to enhance vocabulary learning?
8. What do we know about assessment and other little-researched issues?

What do we know about vocabulary knowledge?

There are several facts about the development of vocabulary knowledge that are well grounded in research:

- Vocabulary knowledge is one of the most significant predictors of reading comprehension (Davis, 1944, 1972). One of the many ways to view this connection is to regard vocabulary knowledge as a measure of general verbal ability that underlies all learning (Terman, 1916). From another perspective, the ability to make inferences is a critical component both in reading comprehension and in learning the meaning of new words (Sternberg & Powell, 1983). Both viewpoints have strong support in the research literature.
- There is a gap in vocabulary knowledge between economically disadvantaged and economically advantaged children that begins in preschool and persists through the school years and is an important correlate of poor school performance (Becker, 1977; Coyne, Simmons, & Kame'enui, 2004; Hart & Risley, 1995; Templin, 1957; White, Graves, & Slater, 1990). Given the importance of vocabulary knowledge to overall learning, word knowledge disparities among children have long been a concern of researchers (Chall, Jacobs, & Baldwin, 1990; Graves, Brunetti, & Slater, 1982; Hart & Risley). Whereas children with average or above-average verbal ability enter kindergarten with a receptive vocabulary of approximately 5,000–10,000 words, others enter school with knowledge of far fewer words, thus beginning their school careers at a disadvantage. Hart and Risley's long-term study of vocabulary development in children during the first three years of life revealed these significant differences as strongly related to parental income and welfare status. Children in economically disadvantaged households were exposed to significantly fewer words, which was related to their own vocabulary use as well as their rate of vocabulary growth during these formative years. To further emphasize the importance of early experiences with vocabulary, knowledge of vocabulary appears to be a critical correlate to the development of phonemic awareness in young children, an important emergent literacy skill (Goswami, 2001).
- Vocabulary knowledge is a critical factor in the school success of English-language learners (Carlo, August, & Snow, 2005; Folse, 2004; Nation, 2001). Research indicates that knowledge of English vocabulary is one of the strongest correlates of the discrepancy be-

tween the reading performance of native English speakers and that of ELLs. This correlation remains despite the fact that many ELLs possess a large vocabulary in their native language (Garcia, 1991; Goldenberg, Rezaei, & Fletcher, 2005; Verhoeven, 1990).

- Vocabulary knowledge also differentially affects comprehension in school reading and learning, depending on the nature of what is being read. Stories and literature are much less dependent on specific terms used by authors than informational texts used in science, social studies, and mathematics. Academic vocabularies consist of words with precise meanings that are often central to content area understanding and differ from general meanings of even the same terms, (e.g., *operation* has a very specific meaning in mathematics; Marzano, 2004). These academic terms and their specialized meanings often pose the greatest challenges for learners of English (Graves, 2006).

All of the points listed here suggest that attention to vocabulary is paramount. Yet many commercial vocabulary programs have been unsuccessful or limited in producing documented growth in word knowledge. The cost–benefit tradeoff of vocabulary programs has also been questioned, especially when programs have used considerable instructional time for what some consider a low return on the investment of time that could be used for reading or study (Nagy, 2005). On the other hand, working on their own to integrate research-based findings with their classroom practice, teachers have often constructed piecemeal approaches to instruction. Although one of the most durable findings of research is that some vocabulary instruction is usually better than no vocabulary instruction (Dale et al., 1973), teachers have begun to ask, “How can we make the most of vocabulary instruction?”

What do we know about good vocabulary instruction?

Although individual teachers may be successful in using a variety of strategies for vocabulary instruction, what is needed is a comprehensive, integrated, schoolwide approach to vocabulary in reading and learning. By *integrated*, we mean that vocabulary is a core consideration in all grades across the school and

in all subject areas across the school day. This perspective is especially important as content area teachers are faced with new vocabulary and new concepts on a daily basis. By *comprehensive*, we mean that vocabulary instruction encompasses much more than a list of words to teach at the beginning of the week. Rather, it involves a common philosophy and shared practices among teachers in a school or district based on a solid understanding of the knowledge base on vocabulary development and word learning. This shared vocabulary and understanding need to be supported by curricular considerations as well as by appropriate classroom and school organization. We believe that a consensus has emerged from research about the components of such a comprehensive and integrated program of instruction (Blachowicz, Watts-Taffe, & Fisher, 2006; Graves, 2006; Nagy, 2005). These formulations emphasize characteristics of good vocabulary instruction:

- It takes place in a language- and word-rich environment that fosters what has been referred to as “word consciousness” (see Blachowicz & Fisher, 2006; Graves, 2006).
- It includes intentional teaching of selected words, providing multiple types of information about each new word as well as opportunities for repeated exposure, use, and practice.
- It includes teaching generative elements of words and word-learning strategies in ways that give students the ability to learn new words independently.

In the following sections, we address each of these characteristics of strong vocabulary instruction in turn.

Creating language- and word-rich environments

A language- and word-rich environment is one in which children’s opportunities to read, hear, use, and talk about new vocabulary are many and varied. Naturally, these environments contain books and other reading materials, both narrative and expository, on a variety of topics appropriate for a variety of reading levels. Read-alouds contain rich vocabulary, and the teacher spends time discussing with students the words encountered in these selections. Teachers make a point of reinforcing new vocabulary in discussions with students and design instruction to promote students’ use of new vocabulary as they speak

and write. Teachers also model the use of new and sophisticated words and, along with their students, create a classroom environment filled with curiosity and excitement about new words and opportunities to have fun with words. These elements of a language- and word-rich environment promote both incidental and intentional word learning and, importantly, motivate students to develop new word knowledge on their own.

Incidental word learning, through listening or reading, is important to students’ general vocabulary development. Although the extent and nature of this learning are debated, the fact that it occurs is undisputed, and the importance of a word-rich environment has been often demonstrated. Reading to children has been shown to have an effect not only on their recognition knowledge of new words but also on their ability to use these words in their own retellings (Elley, 1988; Snow, Burns, & Griffin, 1998). Studies of students learning vocabulary from listening to storybook reading (Brett, Rothlein, & Hurley, 1996; Eller, Pappas, & Brown, 1988; Elley, Sénéchal, & Cornell, 1993; Stahl, Richek, & Vandevier, 1991), studies of family literacy (Beals & De Temple, 1993; Snow, 1991), studies of wide, independent reading (Jenkins, Stein, & Wysocki, 1984; Krashen, 1989), and more focused studies of incidental word learning from context (Nagy, Herman, & Anderson, 1985; Parry, 1991; Shu, Anderson, & Zhang, 1995) all support the importance of exposing students to rich language environments.

Wide reading is a hallmark of word learning, with many studies suggesting that word learning occurs normally and incidentally during normal reading (Herman, Anderson, Pearson, & Nagy, 1987; Nagy et al., 1985). Much controversy has surrounded the conclusion of the National Reading Panel (NICHD, 2000) that there is no research base to support wide reading. Cunningham (2005) addressed this issue compellingly when she argued that the differential volume of reading students do out of school is a powerful source of vocabulary learning. In her summary of a series of studies investigating the importance of encounters with words in written language carried out by Cunningham and Stanovich (1998), the volume of reading was found to be a powerful predictor of differences in both vocabulary and subject knowledge.

Scott (2005) and others (Blachowicz & Fisher, 2006; Graves, 2006) have defined *word consciousness* as an awareness of words and their meanings, an awareness of the ways in which meanings change and grow, and an interest in and motivation to develop new word knowledge, all of which support

both incidental and intentional word learning. Research studies in diverse contexts, and with learners of varying ages, all confirm that environments where language and word use are celebrated and noted encourage the development of word consciousness and attendant vocabulary learning.

Scott and her colleagues conducted a series of studies (Scott, Asselin, Henry, & Butler, 1997; Scott & Butler, 1994a, 1994b; Scott, Butler, Asselin, & Henry, 1996) examining the word learning of students in word-rich intermediate-grade classrooms. Special attention was given to encouraging interest in and the learning of new words, wordplay, playful word practice, and other techniques for motivating interest in vocabulary and word learning. Qualitative data overwhelmingly supported the effectiveness of such rich environments on students' use of interesting words in their writing and on students' awareness of, interest in, and attitude toward words. Lubliner and Smetana (2005) also investigated the effect of comprehensive metacognitive vocabulary instruction with fifth-grade Title I (federally funded U.S. program for disadvantaged learners) students and found a positive effect on vocabulary learning and reading comprehension. Further, discussion, both in the classroom (Stahl & Vancil, 1986) and around the dinner table (Snow, 1991), is another correlate of incidental word learning. Finally, in their study of 30 exemplary fourth-grade teachers across five states, Allington and Johnston (2002) found that these exceptional teachers treated language itself as a curriculum material, devoting attention to acquiring word meaning and interest in words.

Just as teachers use the phrase *flood of books* to talk about situations where students have many and varied opportunities to read, *flood of words* appears to be an important concept for general vocabulary development (Scott et al., 1997). Cumulatively, there is strong research evidence that students benefit from word-rich classrooms in which time is taken to stop and discuss new words and in which words, dictionaries, puzzles and word games, word calendars, books on riddles and rhymes, and, of course, a wide assortment of books form the environment for enthusiastic word learning (Blachowicz & Fisher, 2004).

Intentional teaching of selected vocabulary

Reviews of research investigating strategies for teaching individual words are many and varied (see, e.g., Baumann & Kame'enui, 1991; Beck & McKeown, 1991; Blachowicz & Fisher, 2000). These reviews clearly suggest that there is no single mode of

instruction that is uniformly effective. Because the context for learning even one new word meaning varies greatly depending upon factors such as the amount and type of prior knowledge students bring to the word-learning task, the depth of word knowledge needed for students to meet the goals for instruction, and the complexity of the word itself, effective vocabulary instruction requires a repertoire of teaching activities and instructional strategies coupled with the teacher's ability to choose appropriately within this repertoire. Fortunately, there are certain characteristics of effective instruction that are applicable across teaching contexts, as described in what follows.

- Learners are actively involved in the generation of word meanings rather than as passive receptors of information. This includes the integration of their prior knowledge with new information as well as building semantically related categories of words and concepts (Bransford, Brown, & Corking, 1999).
- Instruction provides both definitional and contextual information about the words to be learned as well as multiple exposures and opportunities to use them.

Active engagement and semantic relatedness

Active student engagement in learning is a hallmark of good instruction and a characteristic of competent readers (Bransford et al., 1999; Pearson & Fielding, 1991; Wittrock, Marks, & Doctorow, 1975). We see this active engagement as being important in relation to two aspects of vocabulary instruction: Active engagement plays an important role in learning the meanings of specific words—where it is important to make connections between and among words and concepts—and in learning strategies to become independent word learners. The major focus of studies in the first area is on techniques that encourage students to see how the words and concepts being studied are conceptually related, what we refer to as an emphasis on semantic relatedness.

Both semantic mapping and semantic feature analysis illustrate semantic relations among words. In semantic mapping, the relations among words are shown graphically, for example, in a clustered map of synonyms for a central concept. Where semantic mapping requires students to identify and to understand the relations between words, semantic feature analysis provides a graphic display that focuses on the features that distinguish words in a particular category from one another, such as various types of homes. Research from the 1980s (Pittelman, Levin,

& Johnson, 1985; Schewel, 1989) is conclusive on the benefit of semantic mapping and semantic feature analysis for vocabulary learning and has been supported by later research in a variety of classroom settings (Englert & Mariage, 1991; Finesilver, 1994).

Another form of instruction highlighting the relations among words and their meanings is the Concept of Definition map (Schwartz & Raphael, 1985) in which hierarchical, categorical, and semantic information related to a word's definition are displayed along with examples and nonexamples. MacKinnon (1993), working with ninth-grade students, found a Concept of Definition mapping approach to be superior to other methods of instruction stressing learning from definitions. Bos and Anders (1989, 1990, 1992) compared the effectiveness of three semantic relatedness techniques (mapping, semantic feature analysis, and semantic/syntactic feature analysis) with studying definitions among students of various ages and abilities. All three interactive techniques were more effective for these students than studying definitions.

Some studies that focused on presenting words for instruction in related groups as opposed to presenting them in alphabetical or random lists provided evidence that it is not just the relatedness of the words that is important but activities requiring students to verbalize the relations (Stahl, Burdge, Machuga, & Stecyk, 1992). Drum and Madison (1985) found mixed results when teachers of third- and fourth-grade students grouped words for presentation in semantically related sets but chose their own method of instruction using these sets. However, Durso and Coggins (1991) found that although a semantic organization of words for vocabulary instruction improved performance on comprehension tasks over use of an unorganized list, students' expressive vocabulary benefited only when they articulated the common theme linking the words; that is, they became more active in their learning. Overall, then, the available research in this area suggests that having students make semantic connections among words, and verbalizing or explaining those connections, supports learning the meanings of the targeted words.

Providing multiple sources of information, exposures, and practice

Numerous studies comparing instruction that provides students with definitional information with incidental learning from context or with no instruction control conditions support the notion that providing definitional information results in greater

learning (Kame'enui, Carnine, & Freschi, 1982; Pany & Jenkins, 1978; Stahl, 1983). However, instruction that combines definitional information with other active processing, such as adding contextual information (Stahl), writing (Duin & Graves, 1987), or rich manipulation of words (Beck & McKeown, 1983; Lansdown, 1991), is consistently more effective than definitional instruction alone. (See Blachowicz & Fisher, 2000, for a review of research in this area.) On the basis of a meta-analysis of studies that compared different types of instruction, Stahl and Fairbanks (1986) concluded that methods involving multiple sources of information led to superior word learning in studies that used both multiple-choice and oral or written reports. In effective classrooms, students worked to create or understand appropriate definitions, synonyms, and other word relations, and also encountered words in context.

In addition to providing multiple sources of information, repeated exposure is an important component of word learning. Stanley and Ginther (1991), working with sixth-grade students, supported earlier findings (Gipe, 1979–1980; McKeown, 1985) that exposing students to a word in differing contexts facilitates word learning. Results from a study of word frequency and word knowledge (Ryder & Slater, 1988) also supported the importance of repeated exposures. As indicated previously, a word-rich environment supports general vocabulary development, but it also may provide a vehicle by which a student can build knowledge of a particular word through repeated exposures and from multiple sources of information. For example, when teachers choose words for instruction related to text that is to be comprehended, highlight vocabulary before reading, question students after reading, or discuss the reading in ways that call on them to use the designated words meaningfully, and then engage the students with follow-up activities with the words, they ensure a repetition of vocabulary (Beck & McKeown, 1983; Blachowicz & Obrochta, 2005; Duke, Bennett-Armistead, & Roberts, 2003). This type of instruction, along with thematic instruction, ensures that students will see, hear, analyze, and use words in speech and writing, providing multiple, meaningful exposures over time.

Developing word-learning strategies

Students need to develop independent strategies for dealing with the new words they will meet in school, in work, and in other areas of life. When encountering an unknown word, the reader can examine the context for general clues, look at the

structure and morphology of the word itself (the internal context) for clues, or consult a reference. Unfortunately, the research on instruction to develop independent strategies for word learning is one of the most limited and inconclusive areas in the overall research on learning and teaching vocabulary.

Consider learning from context. Although there is research indicating that exposure to new words in written contexts results in some development of general vocabulary, it is difficult to predict what words can be learned through an examination of the context. Context does not always reveal meaning; indeed, it is sometimes misleading (Baldwin & Schatz, 1985; Schatz & Baldwin, 1986). Research on teaching contextual analysis is similarly complicated and is not always implemented in the classroom. Several studies have provided intensive instruction in contextual analysis (Jenkins, Matlock, & Slocum, 1989; Patberg, Graves, & Stibbe, 1984; Sternberg, 1987) with mixed results. Instructional studies (Blachowicz & Zabroske, 1990; Buikema & Graves, 1993) suggest that teaching contextual analysis using scaffolded explicit instruction leads to more student responsibility and that a metacognitive focus can help students become conscious learners from context. Similarly, research focusing on structural analysis or morphology, the learning of word parts, suggests that such instruction can be generative in learning new words (Baumann, 2005; Baumann et al., 2002; Baumann, Edwards, Boland, Olejnik, & Kame'enui, 2003; Nicol & Graves, 1990; White, Sowell, & Yanagihara, 1989), though not all teaching studies have been successful (Otterman, 1955; Wysocki & Jenkins, 1987).

We suspect that the lack of attention to word-learning strategy instruction in the classroom, relative to methods such as defining a list of words and semantic mapping, has to do, at least in part, with the instructional time and effort needed for the multifaceted, long-term requirements of robust strategy instruction. Teachers intent on preparing students for content reading may find more immediate benefits from teaching individual words directly related to lessons or units of instruction. Assuming that teaching a word-learning strategy is related to teaching a comprehension strategy and requires a model akin to the comprehension strategy instruction model described by Duke and Pearson (2002), teachers need to be skilled in providing an explicit description of the strategy including when and how to use it, modeling use of the strategy in action, structuring opportunities for students to use the strategy in collaboration with others, guiding student practice in strategy use with increasing levels of independence

and, finally, encouraging and providing opportunities for independent strategy use.

Knowledge of generative word elements, including affixes, roots that can combine to make and explain the meaning of new word forms, and word origins, is often a hallmark of students who have extensive vocabularies (Freyd & Baron, 1982) and develops significantly between fourth grade and high school (Nagy, Diakidoy, & Anderson, 1993). Studies of teaching word parts suggest that teaching in a systematic way significantly improves students' abilities to infer the meanings of words composed of these elements (Graves & Hammond, 1980; White et al., 1989). When used with instruction in context clues (Baumann et al., 2002, 2003), the effect is even more powerful.

Strategic use of outside references, such as dictionaries, thesauruses, and online resources, is another avenue to independence. With respect to dictionary use, every teacher who has watched a student struggle to look up a word knows that using a dictionary can be a complex and difficult task. Research suggests that students are able to select correct definitions for unknown words from a dictionary, but they have difficulty then using these words in production tasks such as writing sentences using the new words (Miller & Gildea, 1987; Nist & Olejnik, 1995; Scott & Nagy, 1997). Revised definitions intended to be more readily accessible to readers result in increased ability to glean meanings (McKeown, 1985), prompting suggestions that classrooms make use of dictionaries or other references, including online resources, with more accessible, functional definitions. Though research in this area is thin, it appears that instruction in extracting information from references and using that information should be part of the word-study curriculum and may be especially amenable to technological enhancement, something we will note in a subsequent section on technology.

Which words should be taught?

There are several approaches that a teacher can use to choose appropriate words for study by his or her class. Suggested approaches include picking the words that are not well established in students' vocabularies and will be encountered frequently in the future (Beck et al., 2002), selecting words that are important to what is being read, and choosing words based on generativity (i.e., the ability to use this word or word parts to learn other words; Blachowicz & Fisher, 2006; Graves, 2006). Most educators would

suggest that the words encountered most frequently in English are good candidates for learning and that various word lists can help teachers select words appropriate to various grade levels and content areas.

Research on word frequency in speech and text has produced many lists that can be informative to teachers. The Fry Instant Words List (Fry, Kress, & Fountoukidis, 2004) contains 75% of the words that students will encounter in their reading material. Although these words are often firmly established in the students' oral vocabularies, this may not be the case for English-language learners or for students with small vocabularies. For oral vocabulary, The Living Word Vocabulary (Dale & O'Rourke, 1976) gives estimates of words known by school-age students, and it is a resource whose predictions seem, for the most part, valid today (Biemiller, 2004). For older students and English-language learners, lists constructed in England for Teachers of English to Speakers of Other Languages (TESOL), notably The General Service List of English Words (West, 1953), have had great utility. The overlap in vocabulary across content areas representing social studies, science, and mathematics curricula suggests that content area words comprise an important vocabulary set to choose for instruction. Recently, older word lists of vocabulary relevant to content area subjects (Harris & Jacobson, 1982) have been updated (Marzano, Kendall, & Paynter, 2005), and lists representing important content areas (Hirsch, 1988) and word families have been created (Marzano, 2004). Further, research looking at early word learning suggests that thematic instruction in the content areas may be an important source of content word learning (Blachowicz & Obrochta, 2005; Duke, Bennett-Armistead, & Roberts, 2003).

Who should choose the words to be taught?

Commercial literacy texts typically combine many genres of literature and highlight vocabulary from these selections to represent frequency, decodability, central selection content, and words needed for instruction in a particular skill or strategy (Ryder & Graves, 1994). Thus, with the exception of early literacy, when it is logical to focus on high-frequency vocabulary, the words selected for instruction may be highly variable from literature anthology to anthology, requiring a systematic appraisal by teachers to select the words most appropriate for their students (Beck et al., 2002). In the academic content areas, by contrast, the considerations of each domain require that certain words should be taught. Beyersdorfer

(1991) reviewed studies of word choice, indicating that content area teachers produced word-study lists with a high degree of overlap across teachers.

There is also considerable evidence that student selection can be productive not only in determining vocabulary to study but also in building motivation and study skills. Harmon, Hedrick, Wood, and Gress (2005) found that eighth-grade students and adults were equally effective in choosing appropriate vocabulary from expository texts to study, although they varied in their reasons for choosing the words. Also, several studies have continued the work of Haggard (1982, 1985) in demonstrating the effectiveness of allowing students to select their own words to learn as part of classroom vocabulary instruction. For example, Fisher, Blachowicz, and Smith (1991) examined the effects of allowing fourth-grade students in literature circles to select their own words for study. The students not only chose words that were at or above their grade level but also retained knowledge of their meanings. A partial replication of this study at seventh grade (Blachowicz, Fisher, Costa, & Pozzi, 1993) found similar results. When students in fourth grade were allowed to choose their own words for vocabulary and spelling instruction, they demonstrated more effective and longer-lasting word learning than they did for words chosen by the teacher (Fisher & Danielsen, 1998).

Dole, Sloan, and Trathen (1995) also found that allowing 10th-grade students in literature groups to select their own words was effective. Further, the students who received instruction in a process showing them how to select words that were important for the reading selection learned more than those who did not. Later, Harmon (1998a, 1998b, 1999, 2000, 2002) confirmed these results in a series of studies with seventh-grade students. Undoubtedly, having students choose their own words for study appears effective in relation to reading literature, where the number of unknown words in a novel can be large, and the importance of any particular word is likely to be minimal. In addition, Jiménez, Garcia, and Pearson (1996) cited self-choice as a powerful motivator for word learning.

Reciprocal teaching is an instructional technique in which students may learn vocabulary that they select themselves. One of the four components of reciprocal teaching involves students helping one another to clarify parts of the text that they do not understand. This may involve the selection of vocabulary to study. Rosenshine and Meister (1994) reviewed the research in this area and came to positive conclusions about the effectiveness of the strategy for

developing comprehension. Yet they did not reach any conclusions in relation to vocabulary learning. It may be that students' control of their own learning in this situation is one part of its effectiveness. Further examination of instructional situations wherein students retain control over their learning, in group settings, may be productive in refining our understanding of how and why student choice affects word learning.

What approaches can bridge the early learning vocabulary gap?

As we noted earlier, by age 3 preschool children exhibit wide differences in vocabulary knowledge, a difference sometimes referred to as the vocabulary gap (Hart & Risley, 1995). Reading aloud to children, also referred to as shared storybook reading, is a productive means for giving students opportunities to develop new meaning vocabulary. Because children's books present more advanced, less familiar vocabulary than everyday speech (Cunningham & Stanovich, 1998), listening to books read aloud can help students go beyond their existing oral vocabularies and introduce them to new concepts and higher order word knowledge. Conversation after shared storybook reading also gives students opportunities to use new vocabulary in the more decontextualized setting of a book discussion (Snow, 1991).

Numerous studies have documented the fact that young students can learn word meanings incidentally from read-aloud experiences (Eller et al., 1988; Elley, 1988; Robbins & Ehri, 1994). Involving students in discussions during and after listening to a book has also produced significant word learning, especially when the teacher scaffolded this learning by asking questions, adding information, or prompting students to describe what they heard. Whitehurst and his associates (Whitehurst, Arnold, et al., 1994; Whitehurst, Epstein, et al., 1994; Whitehurst et al., 1999) have called this process "dialogic reading."

Research also suggests that this type of scaffolding may be particularly important to those students who are less likely to learn new vocabulary easily. Specifically, children with smaller initial vocabularies are less likely to learn new vocabulary incidentally and need a thoughtful, well-designed, scaffolded approach to maximize learning from shared storybook reading (Robbins & Ehri, 1994; Sénéchal, Thomas, & Monker, 1995). Collins's (2004) recent study illus-

trated that preschoolers in ELL programs can benefit significantly from a scaffolded approach to storybook reading in which sophisticated, as opposed to common, words are highlighted for instruction. Along with these read-aloud studies, recent studies using systematic, scaffolded reading in first grade (Blachowicz & Obrochta, 2005) and combinations of explicit and implicit instruction in preschool (Schwanenflugel et al., 2005) have forged new and appropriate ways to pay systematic attention to early vocabulary development.

What specific strategies or approaches can help ELLs?

Although students with strong heritage-language skills can use these skills in reading English (Moll, 1988; Slavin & Cheung, 2003), English-language vocabulary is still a significant stumbling block for students in ELL programs (Garcia, 1991). Research reviews suggest that the principles of sound vocabulary instruction summarized earlier in this paper also apply to the word learning of ELL students (Fitzgerald, 1995; Slavin & Cheung). Further, there are important implications from research that relate directly to ELL students.

First, a command of the basic, most frequent words in English is essential for starting to learn (Cummins, 2003; Nation, 2001). A general TESOL vocabulary list (West, 1953) forms the basis for many other lists that suggest 2,000–2,500 words as a basic vocabulary (Folse, 2004). This list can help students get started but does not provide "school" words that help them, particularly older students, advance academically (Cummins). As noted earlier, academic vocabulary is challenging for both English-language learners and native English speakers. For ELL students, one way to draw upon first-language skills is to use cognate-related instruction. Cognates are words that are similar in their native languages to English forms of words (Garcia, 1991; Jiménez et al., 1996; Nagy et al., 1993). Garcia (1996) found that middle-grade Spanish-speaking students were able to learn how to use Spanish cognates to figure out English words.

Studies have also suggested that enriching vocabulary instruction, through oral language and the use of written semantic analyses and cloze techniques, can improve the vocabulary of ELL students (Bos, Allen, & Scanlon, 1989). In a recent study, Carlo et al. (2005) used a long-term approach that incorporated seeing, hearing, spelling, and using strategies to

analyze word structure and meaning. Words were encountered in multiple content area contexts, and Spanish-language texts were used to support the English-language texts. Cognate as well as non-cognate words were learned, and the researchers focused on creating relational sets of words by looking at synonyms, antonyms, and multiple meanings. There were significant effects for both a more comprehensive and a less comprehensive approach to word learning. Therefore, it appears that comprehensiveness of instruction coupled with use of the native language, in support text and cognates, are powerful tools for increasing the vocabulary of ELL students.

Can technology be used to enhance vocabulary learning?

In his thoughtful review of the potential of electronic texts for transforming early reading instruction, McKenna (1998) noted that the use of electronic texts for literacy learning makes great intuitive sense and has a research foundation. Although many areas of literacy research can be identified to support the National Reading Panel's (NICHD, 2000) contention that technology enhances vocabulary learning (Blachowicz, Beyersdorfer, & Fisher, 2006), one area in particular informs our understanding of how electronic text may influence word knowledge. As we noted earlier, a primary way in which young readers are exposed to new vocabulary is within the context of supported storybook reading, which calls on the listener to interact with the text. For example, many electronic books for school use have animation cues that provide a rich context for word learning. Storybooks made available through computers and videodiscs, with built-in mediation and support, have generated provocative research.

Though the research has been somewhat equivocal on the use of electronic texts without mediation (Higgins & Hess, 1999; Matthew, 1997; Moore & Smith, 1996), studies found that this technology is more effective for learning when adult facilitation is provided. Natural questions arise from this research: What types of mediation are most effective in facilitating vocabulary learning from electronic texts? Can this type of mediation be provided within the text itself?

One early study addressing these questions used videodisc technology within which elementary students could access mediation in the form of definitions and illustrative sentences (Gildea, Miller, & Wurtenberg, 1990). The study suggested that learners knew when to ask for help but were not able to judge

whether definitions or illustrative sentences would be most helpful in expanding their word knowledge. Students tended to ask for definitions, which helped them less than illustrative sentences or information-rich pictures, both of which facilitated greater learning than did definitions. Because these were older students, the researchers suggested that looking for definitions was a result of prior instruction. This conclusion highlights the fact that in-text facilitation does not exist in a vacuum and leads to yet another question for researchers: What are the connections between learning from technology and the type of classroom instruction on reference use that precedes it?

Four other studies looked at the issue of facilitation from another angle. Koren (1999), working with second-language learners, found that facilitation that called for active inferencing on the part of the learner was one key to word learning from electronic text. Students learned more from tasks that required inferencing from context than they did from glossed texts, where students have the ability to call up definitions, graphics, or video explanations. Reinking and Rickman (1990) compared the comprehension performance of two groups of middle-grade students reading science texts. Both groups were allowed to request context-specific definitions of difficult words during reading; one group used technology, and the other used conventional dictionary and thesaurus resources. Students with the technology available investigated more word meanings, recalled the meanings of more words, and comprehended more of the experimental text than the comparison students. Pawling's (1999) case studies of high school students found that metacognitive reflection was an important part of learning and that the students welcomed working on, and responding to, electronic text when they would have the privacy to answer without having others make fun of their replies. Last, a carefully designed study by Xin and Rieth (2001) used video to anchor text by presenting a prior-knowledge video followed by interactive text that highlighted new vocabulary words. These anchor presentations were then mediated by instructional sentence comprehension and cloze tasks and resulted in greater learning than the anchored text alone, an effect that was strongest for students with learning disabilities.

In all, considering what we know about word learning generally, electronic texts can be both motivating and effective for word learning when they provide or couple their presentations with facilitation that calls on the students to actively engage with the words. Questions raised by recent studies about the type and placement of the mediating instruction

provide fertile ground for future research. Further, the current studies are all of short and limited duration so that longer term, richer studies will extend our understanding of the possibilities of electronic texts for developing meaningful vocabularies.

What do we know about assessment and other little-researched issues?

Despite the strong and persistent relationship between vocabulary and comprehension, programs designed to teach vocabulary, while improving comprehension of individual texts, have often had surprisingly little effect on reading performance as measured by standardized tests (Dale et al., 1973; Mezynski, 1983; Petty et al., 1967; Stahl & Fairbanks, 1986). Certainly this issue can be explained by the limitations of conventional approaches to assessing vocabulary. Standardized tests with their limited measurements of word knowledge may not capture the gradual accretion of meaning that is word learning.

Even though we know more about the incremental and metacognitive aspects of word learning than we did 75 years ago, the typical measures for vocabulary are still the same gross assessments of our childhood. A cursory review of the indexes of books on vocabulary instruction also reveals that few, if any, pages are devoted to assessment, particularly assessments that use items scored as correct or incorrect. This limitation points to a clear vacuum in the research and one that should be addressed in a more sensitive way. Perhaps the renewed interest in content learning and its related academic vocabulary development will provide a context to assess more clearly students' word learning and its relation to comprehension, because the corpus of academic terms in a particular discipline is more constrained than the measures of general vocabulary that are characteristic of standardized reading assessments.

Conclusion

As we reflect on the intersection of research, theory, and practice pertaining to vocabulary development and instruction, we are struck both by the need to actively transfer what we have learned from research into the daily practice of classroom teachers

and by the need for continued research to address questions that teachers often ask, but for which the existing research provides few answers. A third consideration, which is linked to each of these two concerns, is the need for greater emphasis on and understanding of metacognition in relation to vocabulary learning and instruction.

Watts (1995) concluded that little had changed in vocabulary instruction from earlier classroom studies. Historically, vocabulary instruction has been overshadowed by instruction in word recognition and comprehension; however, it is clearly an area of concern in its own right and, therefore, needs to become a priority in the instructional preparation and inservice professional development of classroom *and* content area teachers. It is important that teacher education at both the preservice and inservice levels include experiences that will provide teachers with a strong understanding of the underpinnings of vocabulary development, an array of strategies for teaching individual words and for teaching word-learning strategies for independence, and an appreciation for the role of word consciousness in vocabulary development and ways in which word consciousness can be fostered.

We firmly believe that the most effective approaches to vocabulary instruction are ones that are integrated with the curriculum and include attention to word learning throughout the day and across subject areas. These approaches need to be undergirded by a comprehensive knowledge base and theoretical perspective that reflect an understanding of how words work to make meaning and how to make this apparent to children. Further, these approaches must fit or be differentiated for a range of teaching styles and classroom organizations, be easily understood and relatively easy to implement, and let both teachers and students see concrete results.

Although this is a tall order for research, it is no more challenging than many of the tasks teachers must address. Every day in their classrooms, as teachers are faced with teaching vocabulary in a multiplicity of ways for a variety of purposes, they are also faced with persistent and immediate questions: Which words are the best words to teach today? How much time should I spend on vocabulary instruction? How can I link what I am doing today to my students' overall vocabulary development?

It seems to us that what underlies effective teacher decision making to answer such classroom questions about vocabulary instruction is an understanding of the metacognitive aspects of vocabulary learning. Specifically, when teachers understand that words are learned gradually, and when they know the principles underlying how words make meaning,

then the answers to frequently asked questions of word selection, time spent teaching, and the development of depth of word learning can be addressed more readily in the context of a lesson and a curriculum. A teacher in such a situation has the tools to decide, for example, whether knowing a synonym for a word is enough, or whether students need to know what characteristics differentiate a synonym from the target word.

For researchers the challenge is to begin to look at the ways in which various aspects of vocabulary acquisition and instruction are interrelated. For example, researchers have shown the effectiveness of drawing students' attention to morphemes and how they combine to make meaning. They have articulated frameworks for how definitions work for various parts of speech. They have suggested the importance of developing word awareness. They have investigated the role of context in word learning. They have emphasized the importance of acquiring both depth and breadth of word knowledge. We believe more clearly articulated considerations of metacognition in relation to vocabulary development will help us to assemble individual components, such as these, into a coherent whole and provide a stronger research and theory base for answering classroom questions about vocabulary instruction.

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