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Vocabulary Instruction Correlation to Reading Comprehension

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Abstract

There is a direct relationship between word knowledge and comprehension-messages are composed of ideas, and ideas are expressed in words. Decades of research have resulted in significant best practices to support students' vocabulary development, yet very little has actually been implemented in the classroom. Teachers frequently rely on increasing student vocabulary through the incidental word-learning that results from sheer volume of reading. Research in this review will prove that incidental word acquisition is seriously inadequate. Effective vocabulary strategies include: hands-on activities or visuals, capitalizing on background knowledge or prior experiences, repeated exposure in meaningful contexts, and use of graphic organizers. Technology applications such as audiobooks, electronic and online texts, electronic talking books, programmed reading instruction, and interactive CD-ROM's

Running head: VOCABULARY INSTRUCTION CORRELATION

Vocabulary Instruction Correlation to Reading Comprehension

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has been approved as meeting the research requirements for the Master of Arts in Education.

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Abstract

There is a direct relationship between word knowledge and comprehension-messages are composed of ideas, and ideas are expressed in words. Decades of research have resulted in significant best practices to support students' vocabulary development, yet very little has actually been implemented in the classroom. Teachers frequently rely on increasing student vocabulary through the incidental word-learning that results from sheer volume of reading. Research in this review will prove that incidental word acquisition is seriously inadequate. Effective vocabulary strategies include: hands-on activities or visuals, capitalizing on background knowledge or prior experiences, repeated exposure in meaningful contexts, and use of graphic organizers. Technology applications such as audiobooks, electronic and online texts, electronic talking books, programmed reading instruction, and interactive CD-ROM's.

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The English language contains approximately 5 million words. The average child enters school knowing approximately 5,000 to 6,000 words. Children learn 2,500-3,000 new words each year and it takes 10 exposures to a word to learn it (Asselin, 2002). These are just a few of the mind-boggling facts about vocabulary development and its critical role in learning. This review will address the often overwhelming feat for educators to teach various strategies that will allow students to develop a vast and well-rounded vocabulary.

Strategies are sequences of teaching events and teacher actions which make explicit the steps that enable a learner to achieve an outcome. Knowledge of word meaning is referred to as vocabulary knowledge and knowledge of the strategies for acquiring word meanings is referred to as vocabulary development. In vocabulary development, strategies represent procedures to facilitate word learning at a desired level of understanding, as well as independence in the implementation of word learning strategies (Misulis, 1999).

From a teacher's point of view, the central focus in the classroom usually revolves around how to improve students' reading comprehension, whether it is in content area reading or in language arts. In order to fully understand the text, students need to learn strategies to determine the meaning of new words, or words that are not part of their listening vocabulary. Given the number of words in our language, and its continued growth, children need tools to make sense of the many unfamiliar words they will encounter throughout school (Smith, 1997).

Early literacy acquisition is fundamental to school success and long-time social, vocational, and economic adjustment. Many students, including a growing percentage of diverse

learners, depend largely on the quality of instruction in the primary grades to develop the literacy skills needed for school success. The importance of reading and writing instruction has been heavily publicized. In contrast, vocabulary development, although clearly recognized, has not received the same degree of instructional attention as other literacy skills. Vocabulary development is not an academic subject like reading, mathematics, and science. However, since vocabulary development pervades every subject from reading to mathematics to physical education, it is critical that educators are taught effective, applicable strategies to use in the classroom (Baker, Kameenui, & Simmons, 1995).

A large vocabulary not only helps students decipher unfamiliar words, but aids them in making connections to their existing background knowledge and to make coherent beyond-the-line inferences. An active vocabulary teaching program can make students more word conscious, this motivating them to learn more words through context (Brabham & Villaume, 2002).

Learning to read is an essential foundation for success in our society. Research by the National Research Council clearly shows that the process of learning to read is lengthy and begins early in life. Research further reveals that children who are not proficient readers by the end of 3rd grade have difficulties throughout the course of their schooling, perform poorly in other subjects and are less likely to graduate from high school. In today's fast-paced technological society, higher literacy has become a near imperative and increasingly serious consequences await those children who fall behind (Kauerz, 2002).

There are no easy answers or quick solutions for optimizing reading achievement. Nonetheless, the knowledge and practices exist to teach all but a small percentage of

students to read. Research has now identified the core, critical skills that young students need to become good readers. According to the National Reading Panel, the five scientifically based essential components of effective reading instruction included in The No Child Left Behind (NCLB) Act of 2001 include: phonemic awareness, phonics, vocabulary development, reading fluency, and reading comprehension.

Although science has now identified the core elements of effective reading instruction, these core elements have yet to be integrated into schools on a consistent basis. While American schools have improved over the last 50 years, a large gap between the educational haves and have-nots still exists. Schools in some districts have embraced and implemented research-based reading programs and instructional practices, many others have not. Some teachers are highly knowledgeable and are provided ongoing professional development and support to become excellent reading instructors. However, many others are not provided these development opportunities. The NCLB Act was developed to address these gaps by providing federal financial resources that can allow states to take advantage of the current scientific consensus regarding what it takes to teach all children to read by the end of 3rd grade (Kauerz, 2002).

This review offers research-based information, practical guidelines, and specific strategies to enhance vocabulary instruction. Researchers in these articles provide suggestions such as hands-on or visual activities, building on prior knowledge, environment or repeated exposure, graphic organizers, and technology implementation to help foster vocabulary comprehension.

Probing questions that drove the selection of articles for this review included:

- (1) Why is vocabulary acquisition crucial for development of student comprehension?

- (2) According to the research, what are the most effective vocabulary strategies we can use to increase reading comprehension in today's students?
- (3) What technology can be utilized to help enrich vocabulary instruction?

Methodology

The method of selecting the sources for this review of the literature was carefully done and it required intense scrutinizing when choosing the pertinent articles for this review. The Rod Library from University of Northern Iowa was a valuable source for many of the online journal articles used in this review. Through the databases of Wilson Web and InfoTrac from Rod Library, many articles related to the selected topic were gathered. After analyzing the content of each article, I selected each article on the basis of the three probing questions stated in the introduction to this review. The criterion for evaluating the information was based upon the authors or accredited journals that published the articles.

Vocabulary is an integral part of reading, comprehending, learning, and in fact, of life. Research shows that vocabulary is the glue that holds stories, ideas, and content together and that facilitates making comprehension accessible for children (Donohue, 2000). With little debate over the connection between vocabulary and comprehension, there is a debate over strategies. This review will summarize the findings of many researchers on the debate of effective vocabulary instruction. The research has found that vocabulary instruction with a balance of hands-on and/or visual activities, activation of prior knowledge, repeated exposures within a meaningful context, and graphic organizers will result in success in the classroom.

Hands-on/Visuals

Current research findings by Barrera and Rule (2003) emphasize the importance of hands-on learning for student achievement: students who regularly use manipulatives in their classes score higher on standardized achievement tests than peers who do not. Students acquire more vocabulary and content information when they can touch and see the information. Students who examine items and relationships in three dimensions can understand the meaning of the new vocabulary more easily. For example, when students are learning about the parts of a flower, new vocabulary such as the “pistil” and “stigma” can be touched and students could then identify each new word. Show-and-tell activities with objects provide context-embedded opportunities for language. Using objects in teaching multiple meanings of words offers the same context advantages.

Language boards are one example of effectively using hands-on manipulatives to engage students in learning new words. Johnston and Tulbert (2000) conducted a study on the effectiveness of language board activities. The development of the language board activities is carried out in a four-step process. Initially, the speech-language pathologist, special educator, and general educator meet to determine the content of the language boards before students read new material. New vocabulary for the unit should be identified based on student needs and curricular expectations. The educators also should discuss how to modify activities to meet the individual needs of the students in the class. Next, the instructional materials are created. Finally, the educators develop a strategy for monitoring student progress. This could involve assessment across the areas of speaking, listening, reading, and writing.

The language board activities should be implemented concurrently with numerous instructional strategies that are built upon solid theoretical and empirical ground. These instructional strategies include mnemonic keyword methods, interactive processes, rehearsal, holistic language instruction, pairing oral and written language, and collaboration (Johnston & Tulbert, 2000).

In the case study by Johnston and Tulbert (2000), the language board was used in a fifth-grade classroom with an experienced elementary teacher. Language boards involve manipulatives, hands-on activities, and visuals for all types of learners. There were 28 students in the class, two of whom qualified for special education services. A new vocabulary word was defined by using visual imagery as an instructional strategy. For example, when teaching the word “taper”, a student stood on a desk and the teacher proceeded to taper her pant legs while talking about how they are making the legs wider at the top and narrower at the bottom. As a follow-up, the students were asked whether or not their own pant legs were tapered. The students were then asked to identify other things that were tapered besides pant legs (e.g., ice cream cone, funnel, point of a pencil, a triangle). Thus, by using an interactive process, the teacher assists the students in generating their own images when students are asked to use the new concepts/vocabulary words in their reading, writing, discussions, or activities related to the reading selection (Johnston & Tulbert, 2000).

The language board activities prepared all of the students in the class, but especially those students with disabilities or who are at risk, to read and understand the reading selection. Before using the language board activities, most students had little understanding of the definition of the

new vocabulary and couldn't use the words in context as evidenced by the students' initial responses to the new words. During language board activities, students have the opportunity to see the words, hear the definitions repeatedly, visualize the meaning of the words, and practice using the words in context (Johnston & Tulbert, 2000).

While the language board activities are being used, students with higher level skills provide answers at their level of understanding, and students with little or no knowledge of the words learn through repetition and give answers at their level of understanding. In summary, the collaborative approach used by these educators provided opportunities for all students, especially students with learning and language disabilities, to understand the important and difficult vocabulary prior to reading new material. Collaboration in the context of hands-on and/or visualizing activities facilitates the learning of new vocabulary (Johnston & Tulbert, 2000).

Ellis and Farmer (2004) stressed the importance of constructing visual representations when teaching new vocabulary to students. Students acquire more vocabulary and content information when they can touch and see the information (Ellis & Farmer, 2004). Words with multiple meanings are challenging for all students and may be especially so when English is a second or new language.

In the Barrera & Rule study (2003), the activities were piloted with students at a rural public school in south-western Idaho having a large population of students from migrant families who speak Spanish. Two third-grade classes containing students at mixed ability levels participated in the study. Those students who scored 100% on the pretest were eliminated from the study sample because they already had mastered the material. One group of 15 students in Teacher A's class (9 Hispanic, 6 White) served as the control group, while 15 students (8

Hispanic, 7 White) in Teacher B's class received the experimental treatment of using object boxes of words with multiple meanings.

Teacher A taught 30 words via traditional direct instruction using overhead projection transparencies with illustrations of the different word meanings. She introduced and explained the concept, then guided students through several examples. Students practiced their new learning by completing worksheet activities during which they cut and pasted pictures of the two meanings next to each word. The teacher presented 9 words at each of the first two lessons, and 12 landform-related words at the final lesson.

Students in Teacher B's class were taught the same 30 words in a hands-on manner using objects, word cards, and definition cards. The teacher presented a different object box of words with multiple meanings at each of the three lessons. Equal amounts of time were devoted to studying the vocabulary words in both classes. Teachers of both classes extended the lesson by asking students to find words in their own experience that has two or more meanings. The control group students worked in small groups to produce a glossary of the words and definitions. The experimental group students also worked together to create new object boxes with multiple meanings.

All students were administered identical pretests and posttests. Students in both groups were found to be similar on the pretests. Group analysis of pretests showed no significant differences between the groups (Control mean=64.6%; Experimental mean=61.8%; $t_{\text{calculated}}=0.65$; $t_{\text{critical}}=2.05$). The final performance of the two groups, however, was not the same. There was a significant difference at the 95% confidence level between gain scores of the two conditions on the posttest (Control mean gain=11.7%; Experimental mean gain=18.1%;

calculated=-2.07; $t_{critical}=2.05$). These results indicate that although both groups started out at about the same knowledge level, students using hands-on materials made significantly greater progress (Barrera & Rule, 2003).

Bazeli and Olle (1995) suggest methods to develop vocabulary instruction using visual aids. All of their methods involve students actively and concretely taking part in their own reading vocabulary development. Reading from captioned video through the television screen has proven effective. The researchers found that students want to watch captioned television, feel confident processing information from a familiar medium, and seem to attend to the semantically rich and multisensory context.

An extension to using prepared captioned television would be for students to produce their own videos, with captioned vocabulary words and pictures or live action to illustrate the vocabulary. Teachers could also use video for students to read or act out student-created stories. Specific vocabulary words would be stressed orally, and a card with the printed word held in front of the camera would focus the viewers' attention on the written form of the word. This activity would provide a rich basis for using the vocabulary words in a real-life and meaningful situation (Bazeli and Olle, 1995).

Drawing in connection with new vocabulary provides children with the means to think in the language by which they receive much of their information, that being the visual language. Students could simply illustrate specific assigned vocabulary words, which would then be assembled and collectively would represent all of the vocabulary specific to a particular story. Students could also be asked to illustrate words from a story they read by themselves, or to illustrate a passage of a story. This is an excellent way for students to engage visually with the

story, and for teachers to evaluate the understanding of the students regarding vocabulary words on their comprehension of a passage (Bazeli and Olle, 1995). There are also many computer software programs which have been designed for developing vocabulary and reading skills. Computer drawing programs create a visual with the computer to illustrate a specific vocabulary word. The process of creating an accompanying visual provides practice with new vocabulary, and promotes encoding of that new vocabulary into long-term memory.

Bazeli and Olle (1995) also found visual perception as another effective strategy to develop vocabulary. As students become involved in actively analyzing pictures or book illustrations, they are putting to use much of the vocabulary they need to develop. An example of a visual perception activity would be to present each student with a list of specific vocabulary words. Each student would then select four or five words, create a visual of each that would be combined into one picture. Other students would employ visual perception skills to find the visual depiction of the vocabulary words within the complete drawing. According to Bazeli and Olle (1995), being able to interpret visual images provides children with skills and the confidence to interpret the more symbolic form—the printed page.

Background knowledge or prior experience

A second category of vocabulary instructional methods is the necessity for students to have some prior knowledge of the subject matter and vocabulary since both are fundamental to comprehending text (Donohue, 2000). Thus, prereading vocabulary instruction enhances students' ability to construct meaning from text. Studies on vocabulary instruction have identified vocabulary knowledge as a major factor influencing reading ability where comprehension was improved as a result of preteaching the vocabulary (Donohue, 2000).

The key to successful vocabulary instruction builds upon students' background knowledge and makes explicit the connections between new words and what they already know.

Reading comprehension is the act of constructing meaning from text. Reading comprehension requires an interaction between the text and the reader's knowledge. Reading comprehension is hindered greatly by students' lack of background knowledge and by their inability to use comprehension strategies to integrate information from the text with their background knowledge. Background knowledge is made up of readers' experiences both with the world and with text-including their experiences in identifying words and word meanings, their knowledge of print concepts, and their understanding of how text is organized. Citing the work of Beck & McKeown (1991), the Texas Educational Agency stated that research has established that students' background knowledge plays a critical role in their understanding of the higher level concepts contained in most content area materials. Students bring to content area reading a range of experiences and knowledge about many topics.

The work of Berg, Sinatra, & Stahl-Gemake (1998), as cited by the Texas Educational Agency, found that the extent of this knowledge and the ease with which they can activate and apply it to content area topics directly affects how well students understand what they read. Prereading activities such as having students tell what they know about the topic or inviting them to discuss what they want to learn about will facilitate learning of new vocabulary words. To help students link the new words with words they know and to their background knowledge, teachers also may use activities in which they semantically group new vocabulary words with familiar words that have similar meanings

Theory and research on vocabulary learning suggest that helping children relate new words to words they already know is very important. For example, if a child knows the word fruit, and knows the word apple, these words can help children learn the word kiwi (Brabham, Edna & Villaume, 2002). While teaching the new term in context of a subject-matter lesson is a critical instructional technique, an equally important elaboration technique is for students to relate the term to something with which the students are already familiar.

There is a wide array of methods by which students can formulate knowledge connections. For example, they can identify how the term is related to previous subject-matter they have learned, they can identify something from their personal life experiences the term reminds them of, they can create metaphors or similes of the term, or they can say how the term relates to understanding or solving some form of real-life problems. An essential part of this elaboration process is having the students explain the connection. The students should not only say what personal experience the term makes them think of, but also why it reminds them of it (Ellis & Farmer, 2004).

In explicit strategies instruction, teachers show children how to apply prior knowledge as they use context clues and break down word structures to figure out meanings (Brabham & Villaume, 2002). For example, if the unfamiliar word is “podium” in a story about an athlete who wins an Olympic gold medal, the teacher may ask students to visualize the ceremony and analyze text around the word that describes how athletes step up to receive the medals. Similarly, students may be prompted to analyze the word’s structure into its smallest meaningful parts, the morphemes pod and ium. Questions such as “What’s a tripod?” and “What is a stadium or coliseum?” may be used to trigger prior knowledge that anchors new understandings

of a podium as the place where someone steps or stands.

Content learning becomes more relevant to the learner as the content is connected to what is already known. Suggested strategies include using questions or brainstorming techniques to have students initially develop a list of words related to a topic or theme. For example, if teaching a thematic unit focusing on the topic of Eating Habits of Americans, the teacher could begin the unit by having the students brainstorm words related to a global concept of food. After students have generated a list of words that they associated with this term, the teacher could provide additional vocabulary words that were identified as being important for students' understanding of the topic or theme. This might take the format of presenting a written word list to the students, with verbal review of the words (Misulis, 1999). Helping students perceive a direct link between what they are learning and their prior knowledge enhances their comprehension and retention of what is learned. In addition, this promotes relevance and meaningfulness of instruction (Misulis, 1999).

Guided and independent practice using background knowledge and specific strategies for contextual and structural analysis improves students' abilities to infer meanings for both instructed and uninstructed words. These strategies help students develop independence in solving word problems, thus increasing their potential for incidentally learning the huge number of new words they encounter in texts. Ultimately, we cannot teach students all the words they need to know-there are just too many words. What we can do, however, is teach them how to learn word meanings themselves. A serious commitment to decreasing gaps in vocabulary and comprehension includes instruction that allows all students to learn and use strategies that will

enable them to discover and deepen understandings of words during independent reading (Brabham & Villaume, 2002).

Environment/Repeated exposure

Another effective strategy of vocabulary instruction focuses on repeated exposure to new words in a meaningful context. One or two exposures, or simply learning the definition of a new word, does not improve comprehension or increase vocabulary (Donohue, 2000). Truly effective vocabulary instruction consists of providing numerous encounters with words and concepts with discussions and opportunities to use these words and concepts across a variety of contexts. The time spent on instruction is highly correlated to the effect of the instruction (Donohue, 2000).

Developing a comprehensive understanding of a word comes through repeated exposure to the word in a variety of rich contexts. Only in this way do students fully acquire the word as part of their vocabulary (Duffes & Juel, 2004). Knowledge of a word includes knowing how it sounds, how it is written, and how it is used as a part of speech; it also means familiarity with its polysemy (multiple meanings) and its morphology (derivation) (Duffes & Juel, 2004). It is crucial for educators to furnish repeated occasions for students to hear words in varied contexts and to relate them to their own experiences and new knowledge.

Rereading the same story to students on several occasions can be especially beneficial for those with poorer vocabularies, presumably in part because the increased ability to predict what will come next frees up more working memory to attend to new words and to associate them to related known information. The technique of repeated readings of stories can thus provide an excellent source of growth in young learners' meaning vocabulary (Shand, 1993).

Teachers should develop and use vocabulary reinforcement activities in their content instruction. In order for vocabulary words to be learned, understood, and committed to long-term memory, they must be reviewed and their meanings must be reinforced many times in meaningful contexts (Misulis, 1999). It is not advised to use exercises in which students repeatedly write words and definitions. Such an exercise reduces learning to rote memorization. A better alternative is to provide opportunities for students to use the words, to apply knowledge of word meanings within meaningful instructional contexts. Several types of reinforcement activities that might be used within content instruction include matching exercises, multiple-choice exercises, word puzzles, classification or categorizing activities, analogies, games, demonstrations or performance-types of activities and projects that require use of the vocabulary words (Misulis, 1999).

In effective vocabulary instruction, teachers initiate vocabulary development at the beginning of the instructional unit or lesson and continue to develop and reinforce words meanings throughout instruction (Misulis, 1999). This might involve a brief discussion of the words and their meanings in the upcoming unit or lesson. Even preliminary exposure to the definitions of vocabulary words will contribute to greater understanding of the content being learned. Students will embark upon the learning experience with some understanding of the meanings of the words. Knowledge and understanding of word meanings would then be further developed and enhanced through the teacher's careful selection and utilization of vocabulary reinforcement strategies and activities throughout instruction (Misulis, 1999).

Childhood environments can be made literacy-rich through thoughtful inclusion of appropriate materials and practices. Reading and rereading a wide variety of texts contributes to

both phonemic awareness and comprehension (*Center for the Improvement of Early Reading Achievement*, 2002).

Graphic Organizers

It is generally accepted that students learn vocabulary more effectively when they are directly involved in constructing meaning rather than memorizing definitions or synonyms. Thus, techniques such as webbing that involve students' own perspectives in creating interactions that gradually clarify targeted vocabulary may be a way to combine direct teaching and the incidental learning into one exercise (Smith, 1997).

Through informal activities such as semantic association, students brainstorm a list of words associated with a familiar word, polling their knowledge of pertinent vocabulary as they discuss the less familiar words on the list. Semantic mapping goes a step further, grouping the words on the list into categories and rearranging them on the visual map so that relationships among the words become clearer. In semantic feature analysis, words are grouped according to certain features, usually with the aid of a chart that graphically depicts similarities and differences among features of different words. Analogies are also a useful way of encouraging thoughtful discussion about relationships among meanings of words (Smith, 1997).

Research has found that helping students make associations among the vocabulary words is a very effective strategy. This can be done by using questions, categorizing activities, and graphic organizers such as structured overviews and semantic maps/webs. These types of activities help students understand the meanings of words in relation to other words and the interrelationships among words (Misulis, 1999). A deeper understanding will be acquired when more connections between new and known information is made and more mental effort is

exerted. Learning vocabulary in the context of the subject matter being studied will ensure better comprehension of the subject matter, as well as the ability to use the new words properly (Donohue, 2000).

In content area reading, the development of vocabulary as a study of relationships seems particularly pertinent. Smith (1997) suggests a vocabulary matrix to help establish the dimensions of a subject. The power of any vocabulary matrix lies in its image of connected ideas, in its process of discovering context for a new word, and in its visual reminder of gaps in understanding (Smith, 1997).

One group technique that enables students to list synonyms and/or definitional phrases that they already associate with the topic involves the construction of a simple T-bar chart. With this kind of visual representation of a word and related terms, a matrix will begin for most students and the definition is enriched. The semantic context may now be rich enough for the reader to use this word in its context. To build background and to understand vocabulary in content area reading, students need the benefit of seeing multiple relationships (Smith, 1997).

Many teachers will utilize different elaboration techniques within the context of the class discussion, and yet some kids still do not comprehend the material. This is often because of the manner in which elaboration was facilitated was all verbal or listening forms of instruction. Writing elaborations, even for those where scripting is a difficult process, creates an opportunity for greater reflection on the term's meaning. Other forms of elaboration involve use of acting out via role-play the meanings of some terms or creating mnemonic pictures or stories that capture the essence of a new term's meaning.

According to the research by Ellis and Farmer (2004), the Clarifying Routine focuses on ways each of the above forms of elaboration can be facilitated. The teachers use an instructional tool, called a Clarifying Table, to facilitate these kinds of thinking behaviors. While some teachers use the Clarifying Table to pre-teach vocabulary terms students will encounter in an upcoming lesson, Ellis and Farmer (2004) found that the most successful way of using it was to anchor the meanings of terms whose meanings were first explored within the context of a subject-matter lesson. The teachers could explore the meanings during the subject-matter lesson, and then use the Clarifying Table to solidify understanding of those terms that are really essential for students to learn (Ellis & Farmer, 2004).

The word map technique is useful for helping students develop a general concept of definition (Greenwood, 2002). It makes students aware of the types of information that make up a definition and how that information is organized. A word map is a graphic representation of the definition of a word and focuses on three questions: What is it? What is it like? What are some examples?

When creating a word map diagram, the teacher first introduces the map to the students as a picture of what they need to know to understand a new word. Then the teacher demonstrates the use of the map by putting a general, common term in the central box and then asks questions to suggest words or phrases to put in the other boxes that answer the three questions. Students should then complete additional maps using other common terms to reinforce this process. It is useful for students to use completed maps to verbalize definitions (Greenwood, 2002).

Creating word webs is a group activity rather than an independent one because discussing the words on the web and using them in appropriate contexts are critical to the success of the

activity (Greenwood, 2002). When using a word web, the teacher first places the central concept (e.g., comic) on the chalkboard along with two or three categories (e.g., synonyms, types, attributes) related to the central concept. Then the teacher chooses one of the categories and lists two or three members of that category (e.g., attributes: funny, droll, zany). After the teacher introduces the students to this “starter web,” the students can then independently add words and categories to a web that they prepare at their own desks. Plenty of time should be allowed for students to reflect and to activate their prior knowledge. Students can then share their recommendations to add to the growing word web on the chalkboard. Teachers can lead students in a discussion on how the words are alike and different (Greenwood, 2002).

Researchers Bazeli and Olle (1995) found graphic organizers of various types to be useful visual tools for the development of vocabulary. Using key vocabulary words as a structural basis for a mind-mapping activity regarding a particular story can not only enhance the recognition and meaning of the words, but also can enhance the comprehension of the entire story. Word sorts can be a powerful vocabulary developmental strategy within a comfortable group setting.

Word sorts enable students to rehearse new vocabulary, to discuss various word classifications, and to develop convergent and divergent thinking through deducing the defining characteristics of words (Bazeli & Olle, 1995). As students work collaboratively to sort given vocabulary words into categories, they not only practice the pronunciation of the words, but also comprehend the meanings of the words. Word sorts involved the physical manipulation and hands-on experience that is missing from many other strategies of vocabulary instruction.

Student-made flash cards containing a vocabulary word and a picture can help in motivation and organizing learning (Bazeli & Olle, 1995). The typical flash cards with a printed word and definition are not very interesting to students in this visual world; however, the flash cards with a graphic element added to represent or remind the student of the meaning of the printed vocabulary word are much more interesting. When students can use their own visual creativity to select a visual, the motivation is dramatically increased (Bazeli & Olle, 1995).

Technology

In recent years, technology has opened up a window with many new possibilities for students to make deeper personal connections and better comprehend the materials they read. Current research supports the use of technology in enhancing the reading curriculum. “There is great potential of new technology to revitalize reading instruction and to make reading more relevant to the lives of children growing up in the Electronic Age” (Gahala and Holum, 2001).

Boling (2003) reported that technology use in classrooms can promote environments where students are actively engaged in learning through collaborative participation. Technology can also be used to empower learners by providing learning opportunities that are open-ended and flexible. Such change has the potential to transform traditional, teacher-led classrooms into innovative, inclusive learning environments (Boling, 2003).

Byrd (2001) found that student reading scores soared when students at a middle school in Texas used a computerized reading remedial and assessment program last year. Being able to improve their reading levels by up to four grade levels in just one semester definitely boosted their self-esteem as well.

Lee and Vail (2005) stated that current multimedia applications encourage student active participation, increase motivation, and involve a variety of modalities (vision, sound, tactile). Multimedia also provides greater levels of student interactivity and independence through high-interest and self-paced activities.

Holum and Gahala (2001) stressed that “Learning is likely to be found not in the technologies themselves but in the way in which these technologies are used as tools for learning”. Their study results indicated that the educational technologies that best support the development of students’ reading skills are audiobooks, electronic and online texts, electronic talking books, and programmed reading instruction.

Audiobooks entice students to read and improve student comprehension of texts (Holum and Gahala, 2001). Electronic books and online texts often are equipped with hypermedia-links to text, data, graphics, audio, or video that increase the students’ understanding of the material. Using electronic books particularly when students are allowed to construct knowledge and freely recall information significantly increased their reading comprehension. Grant (2004) found that evidence points to the student’s ability to increase word recognition and vocabulary as beneficial attributes of electronic books. The use of hypermedia to improve student comprehension of text likely is related to its ability to respond to the needs of an individual learner for information, which results in an increased sense of control over the learning environment and higher levels of intrinsic motivation (Gahala and Holum, 2001).

New technology has drastically changed the way fiction can be taught. According to the Grenwalt (2004) study, the use of commercial reading programs such as Accelerated Reader and *Reading Counts!* resulted in more students discovering that they liked to read than if they did not

have the tool. The pairing of reading skills instruction with reading management programs that require students to spend time reading and practicing these skills is the heart of a balanced literacy program today (Grenwalt, 2004).

The study conducted by Fisher and Molebash (2003) stated the top three technologies that show the greatest promise in affecting positive change in literacy instruction. These include: telecollaborative uses of the Internet, Personal Digital Assistants (PDAs) and other handheld computers, and voice recognition software. Tellecollaborative projects include a variety of uses of telecommunication tools such videoconferencing, e-mail, synchronous chats, and discussion forums to connect classrooms around the world (Fisher and Molebash (2003).

PDAs can be used to provide students with access to e-books, allow teachers to conduct student assessments and store the results electronically, and to provide teachers with datakeeping tools and grade books. Voice recognition can aid teachers in several ways, including transcribing student dictation, replacing portions of the K-12 writing curriculum, and providing access and greater independence to students with physical disabilities.

Holum and Gahala (2001) included four important guidelines of technology integration that all schools should keep in mind when implementing a technology plan. The school or district should set clear goals, expectations, and criteria for improvements in student literacy. Educational technology should support literacy instruction in the classroom and it should be integrated into the literacy curriculum. All students should have opportunities to use technology to improve their literacy skills.

Ongoing professional development on literacy and technology should provide educators with current and practical applications for enhancing students' literacy skills (Holum and Gahala,

2001). According to Boling (2003), it is essential for teachers to have technological support if they are expected to focus on their teaching rather than on resolving computer problems. Grant (2004) discussed the importance of frameworks for the use of multimedia texts whether electronic books, interactive CD-ROM's or online. These frameworks should be included in the written curriculum along with teaching strategy suggestions.

Cammack, et al. (2003) advise educators to ask people in your district exactly what technology support resources are available. Teachers should use technology as a resource to help guide professional development. Technology in the classroom must support and add value to the reading curriculum and instructional objectives. Use technology as a tool, not as a curriculum. Find ways to integrate technology with existing curriculum; don't try to add another subject in the day (Cammack, et al. 2003).

Conclusions and Recommendations

The literature is clear about the relationship between extensive vocabulary and reading comprehension. A rich vocabulary unlocks a wealth of knowledge and opens up worlds to its owner. As indicated in this review, too much drill and practice can turn kids off to reading and word study. The strategies in this review pay close attention to the needs of all types of learners, as well as taking into consideration time-cost ramifications. As always, the need for balance exists: direct instruction only goes so far, as does the important benefit of wide reading.

Visuals and hands-on activities have great impact on students' lives, and can be useful tools to develop vocabulary and comprehension skills. Research supports involvement of students in the classroom to create hands-on activities or visuals when learning new words.

Making reading instruction part of the visual world stimulates excitement and enthusiasm for learning within the classroom.

Throughout vocabulary instruction, it is important to continue to help students make associations between vocabulary words they are learning and what they already know, that is their prior knowledge. Helping students perceive a link between what they are learning and their prior knowledge enhances their comprehension and retention of what is learned. It also promotes relevance and meaningfulness of instruction.

It is equally important for teachers to furnish repeated exposures for students to hear words in varied texts. In order for vocabulary words to be truly understood and mastered, it is critical that students are exposed to new words in variety of contexts and activities. When children are given the opportunity to elaborate on the meaning of new words, there is a greater chance that the word will be committed to their long-term memory.

The instructional methodology of using graphic organizers enables students to make connections between words. Semantic associations allow for students to brainstorm a list of words associated with a familiar word. Semantic mapping allows for students group the words on the list into categories and arrange them on a visual map so that relationships among the words become clearer. Semantic feature analysis allows students to groups words according to certain features, usually graphically depicting similarities and differences. Analogies can also help facilitate thoughtful discussion about relationships between words. The development of vocabulary as a study of relationships is critical. Known words may help students associate meanings with new vocabulary. In that way, definitions and the particular meaning within a given sentence have a context and a set of relations to build on.

Graphic organizers empower students to demonstrate visually the meanings of new words. Word maps are useful for helping students develop a basic definition of a new term. Word webs are typically a group activity in which students are challenged to use new words in appropriate contexts on the web. Construction of a T-bar chart enables students to list synonyms and/or definitional phrases that they already associate with the topic. A Clarifying Table can be used to solidify understanding of terms that are really essential for students to learn.

Many technologies have emerged that also can be used to enrich vocabulary instruction. Audiobooks, sometimes known as books on tape, promote students' interest in reading and improve their comprehension of texts. Online, interactive texts can be useful for reading and comprehending expository text, where students are engaged in learning new terminology and constructing knowledge. The use of electronic talking books gives students an increased sense of control over their learning environment and higher levels of intrinsic motivation. Programmed reading instruction can create enthusiastic readers, help students know themselves, including their abilities and preferences as readers, and to provide teachers with a way of holding students accountable for practicing skills in a different manner. Telecollaborative projects connect classrooms around the world together to share and collaborate with each other for cultural or problem-based purposes. Voice recognition software can aid teachers in several ways, including transcribing student dictation, replacing portions of the K-12 writing curriculum, and providing greater independence to students with physical disabilities.

For teachers' practices to change in ways that would improve students' comprehension, they need opportunities to examine their practices, beliefs about teaching reading, and current research. Many teachers are often influenced by either the content of basal reader manuals, or their perception of administrators' expectations of basal reader implementation. These issues need to be examined more carefully.

I believe that good instruction, if sufficiently enlightened and intensive, and if initiated early enough, can increase the vocabulary knowledge of large numbers of young learners so that they will not experience the major negative repercussions that reading difficulties almost invariably entail. There is perhaps nothing more important that education can accomplish than to assure that all students, by the time they reach the point at which reading becomes a principal vehicle for the expansion of both vocabulary/concept and word knowledge, have developed a vocabulary of sufficient breadth and depth to enable them to comprehend the materials that they will encounter in school.

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