Giving children a fighting chance: Closing the knowledge gap in early literacy development

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There is a basic paradox in education that has stymied researchers for over fifty years. That is, although the vast majority of our children worldwide have the capacity to learn how to read, there is a striking number, in the U.S. almost 20%, of children who will struggle with learning to read (NAEP, 2004). Furthermore, research has shown that these problems are not due to children's innate abilities. Rather, it is due to the lack of environmental supports that enable children to learn.

In this paper, I first describe the environmental supports that children need to improve their reading performance that has shaped my work in early literacy. I then describe a set of principles that can help to promote children's achievement. Throughout this discussion, I highlight how greater access to books and high-quality literature can enhance and even accelerate learning for children who come immigrant families and others who come from economically distressed communities.

Environmental Supports

My work is situated in Bronfenbrenner and Morris's ecological model (Bronfenbrenner & Morris, 1998), an update of the original ecological framework, which posits that four areas, process, context, time, and person interact to impact a child's development. Proximal processes are arguably the most important of the sources because they serve as a primary method with which young children learn in the home or the classroom. They include frequent interactions with peers, adults, materials, and concepts. The remaining three sources (context, time, and person) influence these proximal processes. In this respect, the macro-environment – neighborhood, church, clubs – in which a student may interact has a powerful influence on the

micro-environment of the classroom. Outside influences such as a parent's sudden unemployment will likely impact the home, creating stressors that may influence the child's interest and engagement in school activities.

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Therefore, the driving force in my research has been to discover how to use the environment to our advantage, recognizing that even simple changes in the physical environment can influence learning. In one study, for example, Kathy Roskos and I re-fashioned housekeeping corners into literacy-related play settings to include a wide access of literacy tools, books, and play materials. We created small cozy niches for children to talk with each other and found that children read more (and engaged more in literacy-related play themes with resulting effects on literacy improvement) (Neuman & Roskos, 1992).

It was the close, physical proximity of literacy-related toys, and books at children's eye view that seemed to make a difference. People tend to use objects that are close to them. For example, years ago, we learned that taking a TV out of the child's bedroom was one of the easier ways to curtail excessive viewing. Using the same principle but to learning's advantage, our observations indicated that children spent significantly more time interacting with books when they were placed in close proximity to other play activities.

However, the environment also includes the people that inhabit the space and create important psychological supports for literacy learning. Children are clearly influenced by other peers and adults present in a setting, their background experiences, and what they hold dear or value. In our studies, therefore, it is the integration of place, people, and occasion that support opportunities for learning. From a Vygotskian perspective, the participants in the setting have the potential to help children perform at a higher level than they would be able to by interacting with their physical environment alone. It is the contrast between assisted and unassisted performance that differentiates learning from development.

A great corpus of research (Dickinson & Neuman, 2006; Neuman & Dickinson, 2001) identifies the types of supports that promote children's language and literacy development. Essentially, they highlight both instructional and relational components. Since language represents the foundational basis for literacy learning in the early years, there is evidence that the amount of verbal input in settings enhances children's language development (Hart & Risley, 1995) (Hart & Risley, 1995). Children whose teachers engage them in rich dialogues have higher scores on tests of both verbal and general ability (Whitehurst et al., 1994). This is especially the case when discussions consist of teachers encouraging, questioning, predicting, and guiding children's exploration and problem-solving.

In short, environment matters for literacy development. The good news, therefore, for researchers and educators in the field is that it is highly alterable. We can manipulate the learning environment to support greater engagement and interaction; similarly, we can use strategies to support stronger and more powerful interactions between teachers and children to enhance literacy learning. Some basic principles from my research are designed to highlight these conclusions.

Opportunities to Learn

The concept of opportunity to learn has been in the discourse of education for a long time. It was originally based on the work of John Carroll (1963) and rests on the proposition that students' ability to learn is determined by whether or if they are exposed to the opportunity to learn. It further emphasizes the relationship between teaching and learning, arguing that one can only test what has been taught. Specifically, in our work, we have developed the following conditions, stated as premises, associated with opportunity to learn about literacy. Basically, this is what we argue:

- If we expect students to learn to read, we would expect them to have something to read.
- If we expect parents to engage in behaviors associated with early literacy, then we have got to provide them with the resources to do so.
- If we expect students to learn higher-order thinking and conceptualize big ideas, then we have got provide for ambitious teaching.

It is the opportunity to learn, not children's natural ability, that has often stymied their progress in early literacy.

Quality vocabulary instruction has many dimensions, but at its core are the teacher's experience and expertise at delivering instruction and the design of instructional materials. We begin with the assumption that it is the opportunity to learn, not children's natural ability, that has often stymied their progress in early literacy. Therefore, to accelerate instruction, we need to provide better instructional tools through tested principles of design and to enhance professional development for teachers. Following is a description of these foundational design principles, along with illustrations for how they work within the context of a curriculum we developed, the World of Words (WOW) (Neuman, Dwyer, Koh, & Wright, 2007).

Briefly, the *World of Words* is a shared book reading 15-minute supplementary vocabulary program. The program includes ten text sets (for each grade) containing five culturally diverse, narrative nonfiction and information books, each of which is taught over a two-week period. Each topic focuses on a concept that is developed through the read-aloud experience. For instance, during the topic on plants, the teacher will read five books over the course of a two-week period and will highlight the concept that plants need sun, light, and air to survive. Comprehension activities are designed to develop children's knowledge of text structure, knowing that many at-risk children lack familiarity with the genre of information-type books.

Each text set includes a complete teacher's manual, highlighting the target words to be taught, the

concepts to be developed, and before-, during-, and after-reading activities. Explicit teaching techniques are described throughout the manual with a rationale , and background information for enacting the program. At the end of the program at each grade level children will have learned 100 topical words, 30 challenge words (e.g., "chrysalis"; words that are designed to accelerate development and problem-solve using evidence), and 100 supporting words (e.g., "predict" or "summarize" – academic vocabulary that supports children's ability to talk about the topic).

Underlying the intervention is a set of principles which include:

Principle 1: The Notion of Acceleration. The statistics that differentiate poor children from their mainstream peers are dramatic and highly disconcerting. Hart and Risley (2003), for example, probably describe it best. They estimate that the accumulated experiences of words prior to kindergarten constitute a 30-million-word catastrophe. Put simply, this gap is not going to close easily, particularly when we consider that children have spent 20,000 hours with their parents prior to school entry, and the number of hours of instruction in a school year may represent as little as 540 hours.

To narrow these statistics, it will not be enough to merely improve children's vocabulary. Rather, we will have to find ways to accelerate its development – to create self-teaching strategies early on so that children can learn new words on their own.

Principle 2: The organization of word knowledge. This principle relates to our first and suggests how we may be able to accelerate word learning. Too often, words are taught in isolation, with little attention to how these words may fit within larger concepts and ideas. Children learn them, then quickly forget them because they do not understand their relationships.

There is an emerging body of evidence indicating that the organization in which children learn words may support word learning. Recent research has shown that when children undergo a "vocabulary spurt" (McMurray, 2007), a point in

development in which the pace of word learning increases rapidly, they also begin to display the ability to categorize. The co-occurrence of these abilities has led researchers to speculate a synergistic relationship between them. Borovsky and Elman (2006), for example, in three computational simulations manipulated the amount of language input, sentential complexity, and the frequency distribution of words within categories. In each of these simulations, the researchers found that improvements in category structure were tightly correlated with subsequent improvements in word learning ability. Their results were consistent with previous research by Gopnik and Meltzoff (1987), who have argued for the "bi-directional interaction" of categorization as a tool for learning language.

Richly organized concepts are structured as taxonomies (groupings of like things, e.g., pets) (Markman & Callanan, 1984), a hierarchy in which successive levels refer to increasing generalizations. Taxonomies have similar properties (e.g., pets – dogs, cats are animals that live with people) and fall into an intermediate level of abstraction (Smith, 1995). In this respect, they are different from themes or thematic groupings (e.g., things you do in a grocery store – clusters of things that interact), which are based on associations and have a less clear-cut structure (Markman & Hutchinson, 1984). Specifically, it is the structure and coherence of taxonomic categories that have been associated with improved word learning.

A number of studies (Gelman & Markman, 1986; Murphy & Lassaline, 1997) have shown that categories can have an inductive potential, helping children to develop generalizations across categories and inferencing beyond what is specifically taught. Consequently, learning words in categories seems to promote word learning and can lead to potentially accelerating vocabulary growth and concept development. Specifically, here is what we know:

▶ Children learn new vocabulary in the context of acquiring new knowledge; concepts come in clusters that are systematically interrelated (Anderson & Freebody, 1979)

▶ Children tend to organize information into meaningful categories consisting of multiple features.
▶ Children learn words using this classification decision process, assessing how well the basic features of the semantic meaning match existing representations.
▶ Vocabulary knowledge, then, develops from understanding similarities and differences in categories – an efficient method for organizing information (Gelman, Coley, Rosengren, Hartman, & Pappas, 1998).

Our work is based on the selection of content-rich words that represent labels of common items that will be necessary to build and ultimately activate background knowledge.

Principle 3: Word Knowledge. Vocabulary is children's entry to knowledge and the world of ideas. In order to have a good conversation or inquiry lesson in science, for example, children need a threshold of content-specific words to talk about their ideas. Therefore, our work is based on the selection of content-rich words that represent labels of common items that will be necessary to build and ultimately activate background knowledge. For example, the words "stems", "leaves", "bulbs" are foundational words that children will need to discuss things in nature. Examples of background knowledge developed in WOW include concepts and words related to the physical and biological sciences, mathematics, and maintaining one's health and well-being.

In addition, we teach words that help children talk about these concepts. We call them supporting words, since they serve the central function of helping to examine, contrast, and compare and differentiate phenomena. Morphology, syntax, and pragmatics provide children with many of the "tricks of the trade" for using language to make meaning. Morphology deals with the

structural forms of language, more often suffixes, prefixes, and root words. Syntax addresses the arrangements of words and phrases to create well-formed sentences. And pragmatics addresses the day-to-day practical uses of the language in social discourse. Children who turn out to be successful in reading will use the morphological structure in word forms to understand changes in word meanings (big; bigger); to be able to comprehend sentences of greater syntactic complexity; and to identify and use extended discourse, such as narratives, explanations, definitions, and other socially defined genres (Carlisle & Stone, 2005; Snow, Burns, & Griffin, 1998).

To develop proficiency in the forms and functions of language, children will need to use language, play with it, and get feedback from their teachers in order to improve their skills. Therefore, we also included the following functional concepts to help children talk about the vocabulary they are learning to follow instructions, solve logical problems, and answer questions.

▶ *pronouns* – I, you, your, my, we, she, her, he, his, they, their, our
▶ *identity statements* – What is this? This is a …
▶ *opposites* – wet/not wet, full/not full … later teach full/empty, wet/dry
▶ *part/whole* – parts of the body, parts of common objects
▶ *comparatives* – Which is bigger? Which is smaller?
▶ *materials* – what is it made of? Cloth, paper, plastic, leather, glass, wood, metal, concrete, rubber, paper, brick (teach that a circle is still a circle, whether it is made out of cloth, paper, or plastic)
▶ *spatial and temporal relations* – first, next, last, before/after
▶ *prepositions* – on, over, in front of, in, in back of, under, next to, between
▶ *time* – days of week, months, seasons
▶ *plurals* – hand/hands, ear/ears
▶ *same/different* – I am going to clap my hands. You do the *same* thing. Which of these is *different*? Which are the same?
▶ *some, all, none* – Am I holding up *all* of my fingers?
▶ *where, who, when, what* statements

Somewhat different from previous research, we focus on important words that are taxonomically related to topics and that can be applied to higher-order concepts. For instance, children learn to classify vocabulary pictures of concepts with similar properties, and they learn to differentiate words and concepts through challenge questions, such as, "Is a snake an insect? Why or Why not?" (It is not an insect, because an insect has three segments and six legs).

Principle 4: The Use of Informational Text. Storybook narratives are a wonderful source for learning new words and developing children's imagination. However, information books provide children with knowledge about their world, which can be used to gain greater depth in content knowledge and facilitate comprehension. In our work, lessons are organized into related topics, such as insects, wild animals, animals that live in water in order to prime background knowledge in high-utility content and strategically integrate concepts with previously learned material. Children listen to books, followed by comprehension activities to develop knowledge of the text structure and comprehension outcomes. The information book will be read and re-read, as we dig deeper into concepts over an eight-day sequence. Following the topic, children will take home a copy of the book which they can share with their families.

Teachers use different degrees of support, or scaffolding, to assist their young learners at the initial stage, then systematically and gradually release control so that children can try their new activities on their own.

Principle 5: Gradual release of control. This principle refers to the guidance, assistance, and support that teachers provide to their learners. Teachers use different degrees of support, or scaffolding, to assist their young learners at the initial stage, then systematically and gradual-

ly release control so that children can try their new activities on their own. In the beginning, for example, teachers focus on explicit instruction, helping children to "get set" – providing critical background information so that the children establish a purpose for learning. Teachers then "give meaning" in order to deepen the students' understanding of the topic. Rather than ask open-ended questions, they provide information to children, giving more meaning to each word and the concept it represents. In these initial sessions, teachers use the "call and response" interactive strategy. They will say something like this: "An insect lives outside. Where does an insect live?" or "Insects have three body parts. How many parts does an insect have?" "Three." The purpose is to engage children in many rapidly paced responses in unison, using their words. As the instructional sequence progresses, the teacher begins to "build bridges" to what children have already learned and what they will learn (establishing inter-textual linkages across media). Here, the teacher begins to release more control to the children during the teacher-child language interactions. She will dig deeper and talk about other insects that are similar to and different from what the children see and watch. Finally, the teacher will "step back," giving the children more opportunities for open-ended discussion. Since children now have a better background understanding and more words to discuss their ideas, these conversations encourage children to elaborate on what they have learned.

Together, these principles underlie the World of Words intervention and are designed to maximize children's opportunities to learn words and concepts that are targeted to science, math, and health content standards in early preschool. Throughout the sequence, familiar words are used to help children talk about a topic and incorporate the approximately 10–12 content-specific words for each topic into more known contexts. Lessons are 10–12 minutes daily, most often conducted during circle time.

Two studies now (Neuman et al., 2008; Neuman et al., 2009) have demonstrated the potential of WOW to improve children's word knowledge and concept development. A quasi-experimental study with 322 children in treatment and control groups provided initial evidence that children could learn content-rich words and retain word knowledge over time. Since then, we have conducted a randomized controlled trial, examining the curriculum's potential to accelerate word learning beyond what was specifically taught. We found that Head Start children in our treatment group far exceeded those in the control (d = 1.2 e.s.). However, they not only improved in conceptual knowledge, categorical knowledge, and knowledge of properties compared to their equivalent control group; they essentially closed the gap between those children who were middle-advantaged and more advantaged in subsequent units of instruction.

Children who enter school in these situations will need skillfully developed instruction that not only improves their word knowledge, but which accelerates it, maximizing the limited time they have in school.

The lesson that our experience with WOW tells us is that vocabulary development is highly malleable and sensitive to instruction. It is a matter of planned, sequenced, and systematic instruction. It is also a matter of selecting words, concepts and ideas that matter most to children and to what they will need to learn as they enter more formal schooling. Many children who come from high-poverty circumstances have had only limited experiences with language, specifically conceptually-based vocabulary. Children who enter school in these situations will need skillfully developed instruction that not only improves their word knowledge, but which accelerates it, maximizing the limited time they have in school. These environmental supports – the physical access to books, and the psychological support of highly caring adults who are responsive to children's interests and read to them often – are critical for the children's future success.

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