

Institute of Education Sciences

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IES Grant

TITLE: **Development of Integrated Text Level Curricula for Kindergarten Through Second Grade Students**

CENTER:	<u>NCER</u>	YEAR:	2010
PRINCIPAL INVESTIGATOR:	<u>Ciancio, Dennis</u>	GRANTEE:	<u>University of Tennessee</u>
PROGRAM:	<u>Reading and Writing</u> [Program Details]		
AWARD PERIOD:	3 years	AWARD AMOUNT:	\$1,369,422
GOAL:	Development	AWARD NUMBER:	R305A100093
DESCRIPTION:	<p>Co-Principal Investigators: Emily Solari, University of California Davis and Brian Wilhoit, University of Tennessee.</p> <p>Original Award Information: R305A100270: University of Texas Health Science Center at Houston</p> <p>Purpose: Learning to read requires the integration of several critical oral language and written language skills, yet there is little known about the types of instruction that would adequately support growth across these domains. In this project, researchers are building on a kindergarten and first grade vocabulary curriculum developed with IES support (the <i>Building Vocabulary for Emerging Readers [BVER] curriculum</i>) by integrating comprehension instruction into the existing vocabulary lessons, expanding the scope of the writing component of the curriculum, and extending the curriculum upward to second grade.</p> <p>Project Activities: The goals in this project are threefold: (1) to integrate comprehension and writing instruction into the already developed vocabulary lessons for kindergarten and first grade; (2) to develop a similar curriculum for second grade that integrates comprehension, vocabulary, and writing instruction; and (3) to determine the feasibility of high-fidelity implementation in classrooms by examining how teacher opinion, knowledge, and instructional behaviors moderate usability and implementation. The researchers are working with teachers in kindergarten and first and second grade classrooms to develop an integrated literacy curriculum that is feasible, usable, and effective in improving children's oral language (e.g., listening comprehension and expressive language) and written language (e.g., early reading skills and written expression) in the early elementary grades.</p> <p>Products: Products of this project include a literacy curriculum for kindergarten and first and second grades that integrates comprehension and writing instruction into existing vocabulary lessons, a set of curriculum-based assessments for teachers to track students' learning, and training manuals for the curriculum and assessment battery. Peer reviewed publications will also be produced.</p> <p>STRUCTURED ABSTRACT</p> <p>Setting: This study takes place in elementary schools located in Texas, Tennessee, and California.</p> <p>Population: The sample includes teachers (approximately 70) and students (approximately 300) in kindergarten and first and second grade classrooms.</p> <p>Intervention: The intervention being developed is a literacy curriculum for kindergarten, first and second grade students that integrates explicit comprehension and expanded writing activities into existing vocabulary lessons developed with previous IES funding. Vocabulary is taught in a 5-day lesson cycle with instruction on a specific set of target words using storybook reading and student writing. In this project, the researchers are adding explicit instructional strategies to the existing lessons. The strategies are intended to support early developing comprehension skills such as main ideas, story sequencing, and use of imagery. The writing instruction in the existing lessons is being expanded and builds from alphabetic knowledge to orthographic mastery (handwriting and spelling) and composing (planning, text generating, reviewing and revising). Targeted assessments and curriculum-based measures are being developed to evaluate the effectiveness of the curriculum and to track students' acquisition of the material. Training manuals will be developed to support teachers' use of the curriculum and the accompanying assessment battery.</p> <p>Research Design and Methods: In Year 1, a curriculum development team will begin by identifying the key principles and components of each curricular element—vocabulary, comprehension, and writing—separately and then across all three collectively. The researchers will then work with 10 teachers to develop and pilot the curriculum at all three grade levels. Through an iterative development process of implementation, observation, and teacher feedback, the researchers will explore facets of the curriculum (e.g., activity selection and degree of explicitness) that are associated with student learning and high-fidelity implementation. In Year 2, 10 teachers per grade level will participate in an expanded iterative process of implementation, observation, and feedback to further refine the lessons and materials. In Year 3, another group of 10 teachers per grade level will implement</p>		

the curriculum to determine feasibility and usability. During this final year, the researchers will also randomly select 10 students per class to be assessed pre and post intervention to determine potential instructional effects of the curriculum on oral language (e.g., listening comprehension and expressive language) and written language (e.g., early reading skills and written expression).

Control Condition: There is no control condition.

Key Measures: Oral language skills will be assessed using the Peabody Picture Vocabulary Test (PPVT-III), the Story Recall subtest of the Woodcock Johnson – III, the *Expressive One-Word Picture Vocabulary Test (EOWPVT)*, and narrative tasks from the *Diagnostic Evaluation of Language Variation (DELV)*. Written language skills will be assessed using the *Test of Early Written Language-2nd*, the *T-BEST* (emergent spelling), and the *Woodcock Johnson – III* subtests of Letter-Word Identification, Passage Comprehension, and Word Attack. Researcher-developed measures will also be used to measure word learning, comprehension, and writing skills. The general literacy environment of the classrooms will be measured using the *CIRCLE-Teacher Behavior Rating Scale*.

Data Analytic Strategy: Analysis of covariance will be used to determine growth over time in oral and written language, and to assess the potential promise of the intervention at improving student outcomes.

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Development Of Integrated Text-Level Curricula For Kindergarten Thru Second Grades Significance

The primary objective of this three-year project is to develop integrated comprehension, vocabulary and writing curricula for kindergarten, first and second grades and to evaluate the role of such instruction in the development of language arts proficiencies in young students. This objective comes from national concerns regarding the lack of functional literacy, including vocabulary demands of comprehending and cogently constructing written language. There is a high degree of consensus regarding the critical elements of learning to read (Foorman & Torgesen, 2001; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001; Snow, Burns & Griffin, 1998): decoding skills, reading fluency, oral language development, vocabulary development, comprehension skills, and the ability to encode speech into writing. However, national reports on the adequacy of instruction in these critical elements concur on the dearth of effective interventions for oral language development, vocabulary development, comprehension skills, and writing (National Reading Panel, 2000; RAND Reading Study Group, 2002) leading to large proportions of students with inadequate comprehension skills (NAEP, 2007) and writing skills (NAEP, 2002).

The genesis for this project stems from observation and developmental impetus from ongoing creation and preliminary evaluation of empirically derived vocabulary curricula with embedded writing activities for kindergarten and first grades. For the purpose of this project, we focus on integrating comprehension instruction into the existing vocabulary lessons, expanding the scope of the writing component (i.e., from activities to reinforce word meaning to specifically sequenced writing instruction), and expanding upward to an additional grade level (second). We posit that the theoretical foundation for selecting vocabulary targets for instruction combined with consolidating comprehension instruction and complete writing sequence into singularly organized instructional materials focused on text-level skills will allow students to make connections, inferences, and meaning of print or constructed oral language (i.e., compositions that are read to students who cannot yet read).

This classroom-based project has three research goals. The first goal is to integrate comprehension and writing instruction into the already developed vocabulary curricula for kindergarten and first grades. The second goal is to develop a similar curriculum for second grade that integrates comprehension, vocabulary, and writing instruction. The third goal is to begin to explore the feasibility of high-fidelity implementation in classrooms by examining how teacher opinion, knowledge and teaching behaviors moderate usability and implementation. The comprehension and writing sections will integrate with the vocabulary curricula that has been developed through a prior development project. These kindergarten and first grade curricula draw on an empirical base for word selection and also embed writing activities. During this development through observation and piloting, we have noted that, due to the connection to authentic and rich children's literature, some teachers naturally weave minimally comprehension modeling/explaining and other at other times comprehension instruction into the vocabulary lessons. However, systematic and explicit comprehension instruction does not exist in the curricular materials. Also, while the vocabulary curricula have embedded writing activities, it is incomplete writing instruction. These writing activities currently focus on deepening lexical and orthographic knowledge either by joint-writing activities, writing the vocabulary targets, or composing narratives that use the vocabulary targets. While this appears to serve the purpose for which the activities were created, the opportunity to reshape the writing component presents itself. We posit that integrating high quality comprehension and vocabulary instruction will foster a symbiotic text-level learning whereby the students are introduced to language and meaning via storybook read-aloud and the surrounding

classroom language. Instruction on comprehension strategies and meaningful relationships among words (listening comprehension) provide the initial context for strengthening students' understanding of both word and text meanings. Subsequent vocabulary instruction attempts to decontextualize the words from specific context to more general use, allowing students to broaden their language use and concepts in personal ways and also to instantiate their global understanding of text through written expression. The National Research Council's report "Preventing Reading Difficulties in Young Children" (Snow et al., 1998) laid out the following literacy benchmarks for the end of third grade: (a) read age-appropriate literature independently with pleasure and interest; (b) read age-appropriate explanatory texts with comprehension for the purpose of learning; and (c) talk and write about those texts in age-appropriate ways. These benchmarks are echoed in many state standards and accountability tests and in the National Assessment of Educational Progress (NAEP). Yet more than 60% of fourth grade students tested on NAEP writing were classified as "basic" writers, demonstrating only partial mastery of the skills and knowledge needed at that grade level (Greenwald, Persky, Campbell, & Mazzeo, 1999). Another 16% of fourth grade students scored below this basic achievement level. Results from NAEP reading show that 37% of fourth graders read below the basic proficiency level for fourth grade and that among minority students this percentage is an alarming 60% for African-American fourth graders and 56% for Hispanic fourth graders (NCES, 2003). There is strong empirical support for the relationship between young children's oral language and subsequent reading proficiency (Bishop & Adams, 1990; Scarborough, 1989; Share, Jorm, MacLean, & Mathews, 1984). Oral language, vocabulary in particular, is essential for understanding the text that is read. If one fails to grasp the meanings of individual words in text, one will struggle to grasp the meaning of the text as a whole. Further, some research shows that there is a predictive relation between early listening comprehension and later reading comprehension performance (Aarnoust, van den Bos, & Brand-Gruwel, 1998; Garner & Bochna, 2004; Nation & Snowling, 2004).

The National Reading Panel (NRP, 2000) reported impressive effect sizes for the impact of instruction in phonemic awareness and phonics on word recognition and on reading comprehension, but found too few studies on vocabulary instruction to conduct a meta-analysis and found only 2 studies for comprehension instruction in kindergarten and first grades. The RAND Reading Study Group (2002) recognized the importance of research on vocabulary and comprehension instruction. In previous collaborative research in high poverty schools, less than 8% of instructional time was devoted to vocabulary instruction in first and second grades and less than 12% of instructional time was devoted to comprehension instruction (Foorman & Schatschneider, 2003), yet both are related to literacy outcomes for teachers rated more effective (Foorman, Schatschneider, Nuttall, Fletcher, Francis, & Moats, 2004a). Typical vocabulary instruction consisted of defining a few words before reading text selections from the basal. Typical comprehension instruction consisted of asking literal questions, asking inferential questions, and using strategies while students read. Typical writing instruction consisted of copying sentences and practicing writing to prompts used on the state accountability test. The goals here are (a) to increase time on vocabulary, listening comprehension and writing instruction up to 30 to 45 minutes daily of language arts, starting in kindergarten and continuing thru second grade, (b) to emphasize the depth, inter-relatedness, and multiple meanings of words in the context of listening comprehension and (c) to emphasize writing instruction that builds from alphabetic knowledge to orthographic mastery (Treiman & Bourassa, 2000a), as well as from direct teaching of transcription skill (handwriting and spelling) and composing (planning, text generating, review, and revision; see Berninger et al., 2002). We hypothesize that explicit instruction in text-level skills while maintaining existing emphasis on standard instruction in phonemic

awareness, decoding, and word study from the basal reading program will result in significant achievement gains in language, writing, vocabulary, and reading.

The third primary research question addresses the role of teacher knowledge and teaching quality in vocabulary, comprehension and writing instruction. Here, we posit that professional development, as well as the amount and type of support that teachers receive in implementing a new curriculum or innovation may be as important as the curriculum itself. We also posit that quality implementation of an innovation, in this case a research-based curricula for text-level instruction, might be related to quality teaching in text-level instruction.

There is a body of research extolling the characteristics of good teaching (Pressley et al., 2001; Snow et al., 1998; Taylor, Pearson, Clark, & Walpole, 2000) but a lack of research explaining how these characteristics relate to student outcomes. Two recent studies that do link teaching quality to student outcomes show that highly effective teachers based on timed records of teaching behaviors allocate instructional time differently than less effective teachers (Foorman et al., 2004a; Taylor, Pearson, Peterson, & Rodriguez, 2003), and that they do so differentially, depending on students' initial skill levels (Connor, Morrison, & Katch, 2004; Foorman et al., 2004a).

Baker and Smith (2001) cited a body of research (conducted by the U.S. government beginning in the 1980s) which "identified three aspects of the effective implementation of innovation that are central to our proposition that student learning outcomes should be used to give shape and depth to definitions of research-based practices in beginning reading" (p. 317): (a) Even when professional development is strong, the quality of implementation can vary among teachers; (b) teachers have the tendency to change implementation innovation over time, frequently to the benefit of students but also, to the other extreme, making the innovations less effective because they do not understand the conceptual underpinnings of certain teaching practices; and (c) when teachers have objective evidence that a "new approach or instructional change has resulted in improved student learning, implementation and sustained use become a more consistent aspect of instruction" (p. 318).

Some common themes from much of the research on professional development and support of the effective implementation and sustainability of instructional innovations include the following: (a) Consistent policy reflected in the alignment of school, district, and state standards (Moats, 2004); (b) the provision of adequate time for professional development that challenges teachers to learn and apply newly learned practices (Moats, 2004); (c) the use of student outcome data for instructional decision making (Moats, 2004); (d) the commitment of school-level administrators to instructional innovations (Moats, 2004); and (e) placing emphasis on teachers' conceptual understanding of underlying principals of instructional innovations as opposed to shallow, procedural knowledge about a practice (Vaughn et al., 2000).

To this, we posit that including multiple teachers with varied teaching perspectives into the development process will foster a high degree of usability and promote fidelity to a curriculum based on, in part, their own modifications and also, in part, on the successes of their students. Our goal here is to allow primary-grade teachers' knowledge about teaching vocabulary, comprehension and writing to positively inform the development process and potentially moderate gains in students' literacy. Further, as the project moves towards field-testing in Year 3, we hope to address this goal with close attention directed toward professional development as well as the type and amount of support for teachers that will best facilitate the effective and faithful implementation in the future.

In sum, this study has three primary research objectives: (a) integrating comprehension and writing instruction into existing vocabulary curricula, thus creating more complete text-level curricula for kindergarten and first grades; (b) develop a text-level curriculum for second grade, based on the same principles as the above curricula for kindergarten and first grades; (c) exploration

of how teachers' opinions regarding curricula structure and teaching behaviors that affect implementation of developed curriculum. In order to outline the theoretical foundation for developing text-level curricula across kindergarten thru second grades, the following sections will review background literature on the development of vocabulary, listening comprehension, and writing and later reading comprehension to provide a context for the instructional research. Next, we review our relevant prior studies. Finally, we present our proposed research methods, highlighting our sample, design, measures, and data analysis plan.

Narrative

Relation of Vocabulary to Reading

Snow (1991) argues that oral language skills fall into two categories, contextualized and decontextualized, with only the latter showing a significant correlation to literacy. Children who are minimally exposed to literacy and decontextualized language at home are behind their peers on the first day of school (Snow et al., 1998). Moreover, children from higher socioeconomic status (SES) homes know twice as many words as lower SES children (Graves, 1987; Graves & Slater, 1987). The gaps are apparent in preschool, where Hart and Risley (1995) estimate it would take 41 hours a week of intensive vocabulary instruction to close the vocabulary differences between advantaged and disadvantaged children. Hart and Risley (1995) traced the origin of the gaps to the infancy and toddler periods by following 40 families that varied in SES from the child's first birthday until 36 months. They found that the children from low SES backgrounds were exposed to (a) fewer novel words during parental interactions, (b) more commands rather than prompts and questions from parents, and (c) less affirmative feedback from parents than children from middle-class backgrounds. Dickinson and his colleagues (Dickinson & Sprague, 2001; Dickinson & Tabors, 2001) studied oral language characteristics of Head Start classrooms. They found that kindergarten vocabulary and literacy scores were influenced by home literacy support, vocabulary environment, curriculum quality, and teacher talk. The aspects of teacher talk most predictive of end-of-kindergarten literacy-related success were (a) use of novel words, (b) ability to listen to children and to extend their comments, and (c) tendency to engage children in intellectually challenging conversations about non-present topics.

During the burst of phonological development in the first year of life, infants' ability to detect word boundaries seems to be aided by attention to prosodic cues and acoustic patterns (Gerken, Landau, & Remez, 1990). In the language of mothers and caretakers (motherese), clauses tend to be grouped under an intonation contour that is clearly marked by the lengthening of the terminal segment and by modulation of vocal pitch at the end of the clause. These prosodic groupings are generally consistent with syntactic organization and thereby serve to parse meaningful units (Jusczyk, Hirsh-Pasek, Kemler-Nelson, Kennedy, Woodward, & Piwoz, 1992). In this way, infants' phonological sensitivity paves the way for the burst of semantic and syntactic development in the second and third years of life, which, in turn, fosters the encoding and decoding of print essential to grasping the meaning of written language. The extensions of discourse into the decontextualized register of academic language (e.g., by explicitly encoding references for pronouns, actions, and locations; see Olson, 1977) in preschool and kindergarten are what predict literacy success in middle school, controlling for home variables (Dickinson & Sprague, 2001). Relations between preschool oral language and middle school reading comprehension are mediated by decoding instruction in the primary grades (Whitehurst & Lonigan, 2001). Additionally, young children's vocabulary is associated with growth in decoding (Lonigan, Burgess, & Anthony, 2000; Wagner et al., 1997) as well as growth in phonological sensitivity (Bowey, 1994; Lonigan, Burgess, Anthony, & Barker, 1998; Lonigan et al., 2000; Wagner, Torgesen, Laughon, Simmons, & Rashotte, 1993; Wagner et al.,

1997).

There are two major ways in which this research on the relationship between vocabulary and reading informs our present work. First, language intervention that builds vocabulary and decontextualized language structures needs to occur prior to and during decoding instruction, rather than later. In the present proposal, we expect that vocabulary instruction that leads to improved knowledge of word meanings will also lead to improved literacy outcomes. Second, a measurement model that takes the inter-related components of literacy into consideration must be validated. Current measurement approaches to the relations among vocabulary, phonological sensitivity, decoding, and reading comprehension tend to be univariate analyses where these literacy components serve as both independent and dependent variables in regression equations. In her review of studies following such an approach, Scarborough (1998) found that measures of expressive and receptive language, as well as assessments of syntactic and semantic knowledge, were found to correlate .24 to .47, with the higher correlations related to measures that tapped a broader range of oral language skills. Catts et al. (1999) employed multiple regression to investigate the relative contributions of phonological processing and oral language abilities in predicting second grade reading achievement across good and poor reading groups. Results indicated that over 70% of poor readers had a history of language deficits in kindergarten and that both oral language and phonological processing abilities each accounted for unique variance in reading achievement. Dickinson et al. (2003) contrasted two perspectives on the relationship between oral language and literacy skills: the phonological sensitivity (PS) view, which posits that vocabulary provides the basis for phonological sensitivity, which then is the central language ability supporting reading, and the comprehensive language (CL) view, which posits that various language skills stimulate literacy development and play a key role in reading achievement. Correlational and regression analyses on 533 Head Start preschoolers found results consistent with the CL view and a core deficit in phonological sensitivity interpreted from the CL perspective. Storch and Whitehurst (2002) used structural equation modeling in a sample of economically disadvantaged children followed from preschool through fourth grade. They found that measures of phonological awareness and print knowledge were the best predictors of reading achievement in first and second grades. However, in subsequent grades, reading accuracy and comprehension emerged as related but separate abilities, the latter predicted by measures of oral language proficiency. In a similar manner, Vellutino et al. (2004) used confirmatory factor analysis to test a model whereby word level skills such as phoneme awareness, phonological decoding, and word identification are more important determinants of reading comprehension in beginning readers than in more advanced readers, whereas language comprehension skills, such as semantic and syntactic knowledge are more important determinants of reading comprehension in more advanced readers than in beginning readers. Results of analyses with elementary and middle school children provide qualified support for this model and suggest a developmental shift from early reliance on word-level skills to later reliance on semantic and syntactic knowledge.

Relationship between Listening and Reading Comprehension

Listening comprehension or narrative comprehension has been acknowledged by some researchers as an important early skill for reading comprehension development. Whitehurst (1998) identifies early narrative comprehension as an important precursor to reading ability; however, it is discussed mainly in the context of story structure knowledge, and does not include other elements important to comprehension ability such as inference and recall of specific events in stories. Van den Broek and colleagues have developed a strong cognitive model of general comprehension, one that integrates memory-based and constructionist perspectives (van den Broek, Rapp, & Kendeou, 2005) and accounts for the dynamism of inferencing processes required during reading (Trabasso & Van

den Broek, 1985; van den Bos, 1994). More specifically, he and his colleagues have theorized that reading comprehension is partially grounded in development of listening comprehension skills which begin to develop before students first encounter print and, thereafter, develop in conjunction with word reading ability (van den Broek, 2001).

There appears to be a bidirectional relationship between reading and listening comprehension (Hedrick & Cunningham, 1995). Additionally, listening comprehension is a strong predictor of reading comprehension (Royer & Carlo, 1991; Hoover & Gough, 1990). Explicit and direct instruction in comprehension strategies has been demonstrated to improve comprehension of both expository and narrative text for children with learning disabilities (see for review Gersten, Fuchs, William, & Baker, 2001; Meenakshi, Jitendra, Sood, & Sacks, 2007). Comprehension strategies include instructional devices used to make text more meaningful and accessible by facilitating selection, organization, and presentation of material, as well as cognitive strategies that are to teach students to facilitate interaction with the text, usually with the goal of transferring responsibility for strategy implementation to the student (Meeakshi et al.).

Recent research has indicated that listening comprehension might provide a precursor target for both risk monitoring and interventions that can be conducted in tandem with word decoding instruction (Carlisle & Felbinger, 1991; Catts & Hogan, 2003; Duke, Pressley, & Hilden, 2004). Available research shows that there is a predictive relation between early listening comprehension and later reading comprehension performance (Aarnoust, van den Bos, & Brand-Gruwel, 1998; Garner & Bochna, 2004; Nation & Snowling, 2004).

For example, Nation and Snowling (2004) found that in a study of 72 students between the ages of 8 and 13 oral language skills (vocabulary and listening comprehension) were important predictors of reading comprehension both concurrently and longitudinally. This study found that oral language skills added unique variance to the prediction of reading comprehension after phonological awareness and pseudoword reading were accounted for during first grade. Further analyses show that first grade listening comprehension and vocabulary predicted reading comprehension performance in second grade.

In a series of studies, Van den Broek and colleagues (1994) investigated the influence of comprehension ability in the preschool years of television narratives and audiotaped stories to later text comprehension. Scores on the comprehension measures for the audiotaped stories and the television shows were highly correlated, indicating underlying comprehension ability across modalities. Additionally, comprehension scores in preschool predicted text comprehension scores in second grade.

Tabors, Snow and Dickenson (2001) found a predictive relationship between kindergarten students' narrative production skills and later reading comprehension. In kindergarten, students were asked to look at a sequence of pictures and then tell a story about them. Significant correlations were found between the quality of the narrative production in kindergarten and reading comprehension in fourth and seventh grade.

Development of writing and the relationship of writing to reading

Writing is at the heart of mastering the alphabetic system. Writing starts with the encoding of speech to graphic forms that come to represent orthography in an intentional and conventional manner. From its initial phonological emphasis, writing develops to entail encoding and recognition of orthographic patterns that merge phonological, morphological, and conventional information. Ability to phonemically segment a word predicts ability to encode and decode the word (Berninger et al., 1998; Foorman & Francis, 1994; Foorman, Francis, Novy, & Liberman, 1991; Treiman & Bourassa, 2000a). Treiman and Bourassa (2000b) examined written and oral spelling performance in

primary-grade children and found no difference among oral and written spelling in kindergartners. However, in first and second grades an advantage for written over oral spelling emerged ostensibly because "typically developing children can better analyze and represent phonology when they can symbolize the results in a lasting, visible form (written task) than when they cannot (oral task)" (p. 314). Anglin (1993) reports a burst in students' knowledge of affixed words during elementary school, and this awareness of morphological structures helps them parse words for the purpose of reading and spelling (Carlisle & Fleming, 2003; Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003). A complete representation of a word's spelling in memory will enhance the speed and accuracy with which it is recognized (Ehri, 1998; Perfetti, 1992). Thus, the writing of words supports the reading of words and, over time, builds toward the writing of text, which can support the comprehension of text.

Theory of Change through Instruction

Vocabulary instruction

There is relatively little research on vocabulary instruction in the primary grades beyond studies of shared reading and Beck and McKeown's (2001) Text Talk (see Foorman, Anthony, Seals, & Mouzaki, 2002; and Foorman, Seals, Anthony, & Pollard-Durodola, 2003, for reviews). A positive relation between shared reading and early literacy and language has been noted in research (Bus, van Ijzendoorn, & Pellegrini, 1995; McGill-Franzen, Lanford, & Adams, 2002; Snow et al., 1998). Two causal mechanisms have been offered, a phonological mediation mechanism and a sociocognitive mechanism, and both appear relevant. According to the first mechanism, listening to the literate language of books draws attention to the segmental nature of language. This possibility is supported by Feitelson, Goldstein, Iraqi, and Share's (1993) research in Israel with vernacular-speaking Arabic kindergartners and Strickland's (1973) research in the United States with kindergartners who spoke African-American vernacular English. Also in support of the phonological mediation mechanism, McGill-Franzen, Allington, Yokoi, and Brooks (1999) demonstrated that by linking book reading to writing, children's performance on letter-sound associations, word reading, and word writing tasks improved.

The sociocognitive explanation emphasizes an interactional read-aloud style (e.g., Brabham & Lynch-Brown, 2002) and the extension of discourse beyond the story message into decontextualized, literate language (Dickinson & Smith, 1993). Whitehurst et al.'s (1999) dialogic reading, where the parent or teacher models active listening, questioning, and responding to books, as the child gradually assumes more of the storytelling role, is an example of the sociocognitive view. Wasik and Bond (2001) extended the dialogic model with concrete representations of targeted vocabulary, multiple book exposures, and open-ended discussions of new words. Additional factors to consider in extending dialogic reading are (a) the frequency of the word in the text, (b) depiction of the word in illustrations, and (c) the amount of redundancy of the word in surrounding text (Elley, 1989).

There are many issues to keep in mind when developing vocabulary instruction for the primary grades. First, just as children can demonstrate their sensitivity to phonemes in rhyme and alliteration at ages four through six, so can they be sensitive to word meanings without having full-blown development of the concept of word (see Gombert, 1992). However, linguistic and cognitive demands must be kept within the developmental capabilities of the children. For example, if children have the concept of "sad," then they should be able to learn "forlorn." In contrast, the word "virtuoso" could be taught to five-year-old children as "someone who is very good at something" but the understanding that this skill resides in the fine arts (e.g., a virtuoso violinist) and not in baseball (e.g., a virtuoso pitcher) would be beyond their grasp and, therefore, make direct teaching of "virtuoso" ill advised. Second, incidental learning of words and direct teaching are not incompatible.

A relatively small number of root words may be targeted for direct instruction and many more may be introduced to children incidentally in conversation. Third, there is no point to teaching easily imaged, concrete nouns because children will learn these incidentally. Fourth, when introducing the relatively small set of root words, word learning strategies need to be emphasized so that, with development, children become more sensitive to word parts and how they can unlock the meaning of new words. Fifth, although decontextualizing word meanings is essential to gains in literacy, initially locating word learning within engaging contexts such as storybook reading is a recommended instructional technique (see Sternberg, 1987, for a discussion of the role of context in vocabulary learning).

In sum, there is a gap in research on vocabulary instruction in primary-grade children. Child language researchers have described language development in infants and toddlers; Hart and Risley (1995) have documented the SES gaps in vocabulary among preschool-age children. By elementary school the gaps in vocabulary due to SES and to limited English proficiency are well documented and are becoming larger with the increasing proportion of English language learners in the school-age population. Clearly more research on vocabulary instruction in the primary grades is needed. Research suggests the kinds of instructional strategies that teachers can use to teach vocabulary to primary-grade children and the kind of words to target, but implementations in Title 1 populations and the link to decontextualized written language have not been investigated. Consequently, we propose to explore the link between vocabulary instruction to a broad array of literacy outcomes.

Comprehension Instruction

Van den Bos and colleagues (1998) have conducted a few studies which tested the power of listening comprehension and reading comprehension interventions on students reading comprehension performance. In the first study, students with learning disabilities received an intervention that concentrated on listening comprehension strategies with the hypothesis that the skills taught would then transfer to reading comprehension. The listening comprehension intervention concentrated on teaching students strategies for better listening comprehension through a direct instruction teaching technique. Students were taught to better understand auditorially presented text by using the following four strategies: clarifying, questions generation, prediction and summarizing. Selection criteria was based on listening ability; students were split into poor and normal listening groups and then randomly assigned to the experimental or control group. Students in the experimental group (both low and normal groups) scored higher on the strategic listening and reading comprehension test when compared to the control group at post test and retention testing one year later. However, there were no group difference (experimental v. control) on the general listening and reading comprehension assessments. The strategic listening and reading comprehension assessments were designed to measure the ability of the students to apply the strategies of clarifying, question generation summarizing and predicting for both listening and reading situations. Given that the intervention designed was grounded in the use of these strategies for listening comprehension, it makes sense that there would be an improvement on the strategic listening and reading comprehension assessment and not the assessments of general listening and reading comprehension. In a follow-up study by Van den Bos and colleagues (1998), students who were identified as learning disabled as well as normally achieving students were included. The intervention in this study included both listening and reading comprehension. Again, students were divided in two groups based on ability level forming both a low and high group and then were randomly assigned to either the experimental or control group. Similar results were found with this study in that there were improved in the experimental groups performance on the strategic listening and reading comprehension assessment, not general listening and reading comprehension.

Morrow (1985) conducted an eight-week story retell and listening comprehension intervention with kindergarten students. All students listened to the same stories throughout the eight week period. The control groups was asked to draw a picture of the story they listened to, while the experimental group were asked to retell the story to the teacher on an individual basis. When students had trouble retelling the story, teachers were allowed to prompt them with specific questions about the text. Specific comprehension strategies were not taught in the this intervention, however, students in the experimental group improved their story retelling ability as indicate by a pre and post test measure of listening comprehension that required students to retell a story.

Baumann and Bergeron (1993) investigated the influence of a story grammar intervention with first grade students using explicit story mapping instruction. The goal of the story mapping was to see if it would enhance the student's recall and recognition of central themes in the stories. Students in the experimental group were taught how to use story mapping in order better comprehend the stories they read or listened to, while students in the control group listened and read the same stories but were not provided with specific comprehension strategies. Instruction included teacher modeling, guided practice and independent practice of story mapping and recall and comprehension strategies. Students who were in the intervention group were able to produce more accurate retelling of stories after the six-week intervention compared to control students.

Palinscar (1991) used a reciprocal teaching method designed for older students for comprehension instruction and adapted it for use with first grade students. The experimental group first received five sessions that introduced the students to the five comprehension strategies in the model: prediction, question generation, summarization and clarification. Next, these strategies were used to enhance listening comprehension strategies over the next twenty sessions. Growth analyses indicated that experimental group student's knowledge of the strategies improved as well as their comprehension ability.

Paris (2003) conducted a five-week listening comprehension intervention with first grade students with the goal of transfer between pictorial comprehension and listening comprehension. Students were taught main elements of stories and strategies for retelling as well as finding the main idea of stories and inferential strategies. The experimental group showed improved recall of the stories and better ability to understand information presented by the stories when the stories were presented with pictures. In addition, the experimental group improved performance on listening comprehension when compared to the control group. The intervention helped both explicit and implicit listening comprehension as the experimental group performed better on sequencing and recall of main events in the stories. The intervention also helped improve oral narratives as the experimental group produced better narrative explanations of texts.

Listening comprehension intervention studies are limited, however, the existing research shows that young students can be taught comprehension strategies to improve listening comprehension performance. There appears to be a void in the literature when considering the effect listening comprehension strategies have on later reading comprehension. While these studies have shown that listening comprehension interventions can be used to train young students to comprehend better auditorially, transfer to general reading comprehension ability has not been shown in all the studies.

Need for Intervention Studies in Younger Populations

Pressley and colleagues (1989) argue that students can be taught strategies to use during reading to improve comprehension of text. The National Reading Panel (2000) suggests that there are several different strategies that can be taught to help improve reading comprehension. They suggest that students can be taught summarization, and other strategies to identify main ideas in texts. Story sequencing can be taught through story maps or other graphic representations. Students can be taught

to generate questions about text, which has been shown to help students remember texts more efficiently. Inference making and predictions, or activating prior knowledge, can also be used to generate comprehension of texts. Graphic representation of stories or “story maps” has also been found to be an effective tool for reading comprehension improvement.

While all of these instructional methods have been shown to enhance reading comprehension ability, few studies have applied these principles to young students. The majority of intervention/instructional research is concentrated on populations in third grade or older. In a review by the National Reading Panel (2000), they found that 79% of all instructional studies aimed at improving reading comprehension have been conducted with students in third grade or older with the modal age being fourth grade. In addition the panel found that the majority of teacher training studies aimed at improving comprehension strategies of students were conducted with classrooms between the grades of two and eleven.

Writing Instruction

Research on the relationship between emergent writing and reading development emphasizes socio-cognitive as well as phonological mechanisms. The socio-cognitive perspective emphasizes the social and symbolic flexibility and adaptability of written language learning (Bissex, 1980; Clay, 1975; Dyson, 2001; Sulzby & Teale, 1991). The phonological perspective emphasizes that early writing promotes phonemic segmentation (Castle et al., 1994; Richgels, 1995). Recent research on the development of writing emphasizes the importance of the transcription processes of handwriting and spelling as well as the executive functions of planning, text generating, review and revision (e.g., Berninger & Graham, 1998; Berninger et al., 1997; Berninger et al., 2002; Graham, Harris, & Chorzempa, 2002). Most of the research on the pedagogy for teaching writing has been conducted on upper elementary and secondary students (e.g., Hillocks, 1986), or on the cognitive processes in skilled writing (e.g., Hays & Flowers, 1980; Kellogg, 1994). The process writing movement (e.g., Graves, 1975) and the whole language movement (e.g., Calkins, 1986) have emphasized the process of writing and construction of meaning, often to the exclusion of explicit instruction in transcription and in writing skills (McIntyre, 1995). Clearly, both meaning and skills are important. Writing pedagogy should reflect an emphasis on meaning integrated with (a) instruction in transcription skills, (b) explanations and modeling of the composing process, and (c) an opportunity for guided and independent practice (Harris & Graham, 1996). Research on writing instruction has value in and of itself, but here our objective is to integrate vocabulary, comprehension and writing instruction to facilitate overall text-level synthesis and transfer to outcomes in oral language, spelling, writing, and reading.

According to the phonological sensitivity approach (PSA), the impact of vocabulary on reading comprehension is mediated by phonological sensitivity and decoding skill. These relations between vocabulary, decoding, and phonological sensitivity may reflect an increasingly segmental structure of spoken word recognition that occurs with oral language development, and this increasingly segmental structure of word recognition may support the acquisition of increasingly higher levels of phonological sensitivity that require segmenting the voice stream (e.g., Goswami, 2001; Metsala, 1999). An alternative hypothesis—the comprehensive language approach (CLA)—posits that various oral language skills, such as syntax and vocabulary, foster early literacy and reading comprehension (e.g., Catts, Fey, Zhang, & Tomblin, 1999; Scarborough, 1998). Recent measurement work suggests that multidimensional approaches such as PSA versus CLA may be artifacts of the inter-relatedness of literacy indicators, and it may be more valid to conceive of literacy as a latent unitary construct with multiple indicators such as phonological awareness, word recognition, and spelling (Foorman, Mehta, Branum-Martin, Francis, 2004b; Vellutino, Tunmer, Scanlon, Jaccard, & Chen, 2004).

Related Studies and Pilots

IES R305G060008, "Development of an empirically based vocabulary curriculum for kindergarten and first grade students."

This study developed the Building Vocabulary for Emerging Readers (BVER) curricula for kindergarten and first grades, drawing on the need to improve primary-grade students' oral language and writing skills and a manageable language arts curriculum within which to do so. The preliminary results from the Vocabulary Enrichment Project (VEP, described below) in Grades 3-4 and pre-kindergarten were encouraging and led us to develop similar vocabulary curricula for Kindergarten and Grade 1 with the following additions. First, we incorporated writing activities more directly so as to enhance transfer of decontextualized oral language to written language. Second, we increased the number of lessons (weeks) per year from 20 to 30, thereby increasing the number of instructed words from 300 to 450 per year. Third, we increased opportunity for incidental learning by re-reading and reviewing the text throughout the week. We felt that, aside from this allows for deeper comprehension connections, particularly with words related to the target words. Fourth, we refined our criteria for selecting target words. We targeted words that: (a) were recognized by the teachers as challenging words in motivating texts, (b) were above grade-level in students' oral vocabulary according to the Living Word Vocabulary (LWV; Dale & O'Rourke, 1981), and (c) are not on the Chall and Dale (1995) list of frequent words and (d) are frequent in literature at Grades 1-3, using the intersection of Biemiller's level 4 words and Zeno et al.'s (1995) printed word frequency.

The format is 15 target words each week, presented in a 5-day lesson cycle. The cycle of each lesson weaves together common elements found in the research literature (for reviews see Baumann & Kame'enui, 2004; McKeown & Curtis, 1987; Beck, McKeown & Kucan, 2002) on teaching vocabulary. For example, storybook reading is an excellent activity for young students to be exposed to new vocabulary because teachers can use decontextualized language to discuss with the class multiple uses and meanings of words (Snow, 1991). Further, the language contained within storybooks is much more rare than in normal adult conversation (Cunningham & Stanovich, 1998). Thus, our initial activity in the cycle is to use storybooks to engage students and to introduce new vocabulary. Subsequent activities use the storybook as a unit theme and reinforce word meanings moving from contextualized to decontextualized to deepen the students' word understanding.

A scope and sequence illustrating the 5-day cycle, as well Days 1 and 2 of lessons for *Pigsty* by Mark Teague is provided in Appendix B. On Day 1, there are 6 short activities: 1) Vocabulary review of any words that may need revisiting from the prior week; 2) Introduce the book, where teachers give an overview of the book and the story to provide some context; 3) Read aloud, where the teacher emphasizes the words of the day, "mess," "break," and "hiding;" 4) Introduce new vocabulary, where teachers introduced the words for the day with a child-friendly definition (teachers use a consistent introduction of words that goes, "This word is 'mess.' Say mess with me. Mess. Good job! Mess means 'dirty.' Let's say the definition together. Mess means dirty. Good job! Now let's say our word one more time. Mess."); 5) Teach new vocabulary, where each word has a unique instructional activity such as "Examples and Non-examples," "Multiple Meanings," or "Practice using this word;" 6) Closing activity, which is a summative activity reviewing the words for the day (this is very often a writing activity). Similar activities appear on in Lesson 2 with the addition of a "Chip's Journal" activity where the teacher reads a journal entry from the program mascot, Chip the Beaver. Chip journals his daily or life's events in a creative way using the three words taught from the previous day. This serves as both a new context and brief priming for the vocabulary review, which happens subsequently. The teacher also reviews the book, revisiting themes and concepts that might have only been touched upon earlier and allows for deeper comprehension of this text, and

then rereads a sample of pages which contain the words for the day. Each day follows a similar lesson flow that is designed to help establish implementation and teaching consistency. As part of the professional development topics, teachers are coached in “scaffolded discussion” to stimulate children to process the words deeply and in the activities. Also, writing instruction is incorporated into lessons almost daily. Writing activities to reinforce word meaning vary and include: a) shared writing; b) alphabetic knowledge and orthographic mastery; c) transcription skill, d) visualizing a narrative (story-board compositions), e) composition of sentences.

Teachers can monitor the progress of their students’ understanding of taught words through: (a) weekly reviews; (b) curriculum-based assessments; (c) analysis of student writings, including analysis of either (invented) spellings or writing mechanics and process. With regards to curriculum-based assessments, we developed a web-based assessment to monitor student progress. The assessment is individually administered to each student and takes from 1 to 3 minutes per student. Students put on headphones and click on their name (or, for younger students teachers can click for them to get started). They are then shown a display with four pictures in a 2x2 grid. Students hear a voice prompt that says, “Click on the picture that shows <target word>.” There are 3 samples that are consistent across all assessments and give some corrective feedback. After the 3 samples, students proceed through a series of 10 items. These assessments are designed to occur at two-week intervals. Because the program teaches 30 words over the span of two weeks, the 10-items represent one-third of the vocabulary words that students were taught using the curriculum. Teachers have access to student-level reports to examine their class for which students performed well on the task and which students struggled. Teachers also have access to word-level results to review which items were correctly or incorrectly identified by their students. For example, a teacher might find that 90% of their class missed the item *soil*. They could choose to revisit that word in review or examine the instructional activity that accompanies it and consider an alternative.

We have also developed a researcher assessment tool for use at pre- and post-testing. This is a 45-item individually administered vocabulary assessment for each grade level. Thus, the Kindergarten form has 45 items containing words from the Kindergarten curriculum and the First Grade form has 45 items from the First Grade curriculum. Students are given a target word and a sentence using it. Students are then asked to provide a meaning for the target word in that sentence (context). Examiners are asked to write the definition provided and score on a 0,1, or 2 basis. Examiners scored 2 points for an answer that clearly demonstrated correct understanding of the word in the context of the sentence provided, and 0 points for an answer that demonstrated incorrect or no understanding of the word’s meaning. When the student provided a vague definition or less direct synonym, or conveyed some limited but correct understanding of the word meaning, the examiner awarded 1 point. At pretest, the test demonstrated an internal consistency coefficient of $\alpha=0.90$ for the Kindergarten form and $\alpha=0.95$ for the First Grade form. With regards to concurrent validity at pretest, the Kindergarten vocabulary test correlated $r=0.595, p < .01$ with the Expressive Vocabulary Test (EVT). At pretest, the First Grade form correlated $r=0.558, p < .01$ with the EVT.

A quasi-experimental evaluation of the curricula was conducted with ten schools in the Houston Independent School District. 59 teachers from these ten schools participated, 13 Kindergarten teachers were provided with the full BVER curriculum, 10 Kindergarten teachers were provided the 30 books of children’s literature that accompanies the BVER curriculum. 15 First Grade teachers were provided with the full BVER curriculum and 10 First Grade teachers were provided with only the 30 first grade books. All teachers were given a professional development on effective vocabulary instruction and how to implement either BVER (experimental group) or the vocabulary sections of Open Court (adopted basal for the comparison group). Although much of this data are still being

cleaned and reviewed for normality, outliers, etc. preliminary analyses suggest significant growth for the BVER students on the vocabulary test compared to the controls, $F(1,177)= 11.13, p<.001$) for Kindergarteners and $F(1,198)= 14.07, p <.001$ for First Graders. Also, preliminary analyses suggest significant growth for the BVER students on the EVT compared to the controls, $F(1,157) = 8.03, p<.01$) for Kindergarteners but not for First Graders. With regards to teacher feedback, 11 out of 13 Kindergarten teachers had overall positive feedback, defined as a favorable response across 80% or more of the feedback items on our survey. Also, 12 out of the 15 First Grade teachers had overall positive feedback responses. One typically telling item on surveys is whether teachers would use the program again if not part of a study. While all but one of our teachers responded with a "yes" to this item, what is more (to us) indicative of teacher and principal support is that 3 schools have already contacted our project director about ordering consumable materials for next year at their expense.

Grade 3 Vocabulary Enrichment Project

The VEP curriculum targeted 15 words per week over 20 weeks, for a total of 300 words in Grade 3. Words were selected from level 4 of the Dale and O'Rourke (1981) Living Word Vocabulary (LWV) list that also appeared in the text selections. LWV consists of 44,000 word meanings grouped according to the level at which 67%-80% of students from grades 4 through college knew the meanings. Level 4 represents the level at which 67-80% of third and fourth graders knew the word meanings. The five-day lesson cycle for VEP consisted of: presentation of the pronunciation and meanings of the 15 target words on Day 1; identification of the target words in context as the teacher read the text selection on Day 2; continued discussion of the words within the context of the story on Day 3; extension of word meanings (e.g., morphological elements; antonyms/synonyms; multiple meanings) on Day 4; and continued extension of word meanings, word bingo, and test on the 15 target words on Day 5. Throughout the week emphasis was given to deep processing of words and text, inferencing and writing skills, and dictionary skills. Homework assignments each night included writing definitions, providing antonyms/synonyms, contextual analysis activities, solving riddles, completing word substitution and odd-word identification activities, Word Wizard (Beck et al., 1987), and studying for the end-of-week test.

An evaluation of VEP was conducted with 27 third grade teachers from five of the 17 schools participating in the research study. Schools were matched on demographics and then assigned to either an intervention or comparison group. The 12 teachers in the comparison group taught vocabulary from the basal reading program. The 15 VEP teachers received two days of after-school training and follow-up coaching in the classroom. Fidelity of implementation was monitored and percentage of expected components exceeded the criterion of .80. Students in the VEP and control classrooms completed at pretest and at posttest (a) an IRT-based vocabulary test of 50 words selected at random from the 300 words taught during the year and (b) the Word Identification subtest of the Woodcock-Johnson Psychoeducational Battery (WJ-III; Woodcock, McGrew, & Mather, 2001). We found significant growth in vocabulary for the VEP students compared to the controls ($\eta^2 = 14\%$). However, as others have found, these results did not generalize to improvements in verbal reasoning, reading comprehension, or decoding on standardized tests.

Kindergarten Comprehension Study

The instructional content for this study was designed to develop comprehension skills in pre-readers through listening or auditory comprehension (Solari & Gerber, 2008). The study employed a randomized treatment- treatment control design. Eight-nine Kindergarten English language learners participated in the study. Students were taught different subcomponents of comprehension necessary for successful comprehension of text as indicated by the National Institutes of Health and Human Services (2000). Sub skills included summarization of text, identifying the main idea in text, direct

factual recall, prediction making and inference. Students began instruction with easier elements of comprehension, for example, direct recall and summarization and then moved on to more difficult comprehension sub components such as prediction making and inferences. The length of comprehension material increased as students progressed within sub skills. For example, during the first few intervention sessions, concentrating on direct recall of facts from text, students were presented with short sentences and asked to answer questions related to facts in the sentences. Once students mastered the skill at the sentence level, they moved onto multi-sentence passages and eventually to full paragraphs. This sequencing of instruction was the same with the additional comprehension sub skills (summarization/main idea, prediction and inference); students began the skill working on sentence length text and eventually moved to passage length text. Results indicate significant differences between treatment and control students on measures of standardized listening comprehension, (Woodcock Johnson) and an experimental listening comprehension assessment that required students to answer different types of questions about stories (direct recall, summarization and inference).

Summer School Pilot

Kindergarten Summer School Pilot. Denton, Solari et al. (in review) conducted a pilot study of a full-day summer school reading curriculum for students between grades k-1. The program was delivered by 3 regular school district teachers and 3 paraprofessionals daily for 20 days to students who were at-risk because they attended high-poverty schools. Using a quasi-experimental design, outcomes for the treatment group (n=30) were compared to those of students who received typical summer school instruction (n=29). The intervention had 4 parts: (a) 2 daily read-aloud sessions (30-45 min.) with instruction in vocabulary and comprehension, (b) small group systematic comprehension instruction (20 min.), (c) independent vocabulary word use through journal writing, and (d) 2 20-minute daily small group decoding/word reading lessons (1 in the morning, 1 in the afternoon). Every student received all of these components every day, delivered either by the teacher or paraprofessional, who received 2 days of professional development prior to implementation and weekly coaching during implementation. Implementation fidelity was high. We developed the vocabulary, writing, and comprehension components of the summer school intervention using guidelines similar to those for the currently proposed project, although it covered only 4 weeks of instruction. Results indicated that students in the treatment group had significantly higher outcomes than comparison students on CTOPP Blending Words, WJ Letter-Word Identification, WJ Oral Comprehension measures after accounting for pretest. Specifically, effect sizes for additional variance accounted for by group membership were phonological awareness (10%), word identification (21%) and listening comprehension (9%) favoring the treatment group. In a post-intervention focus group, participating teachers reacted positively to the intervention and indicated that the approach was practical to implement in summer school.

Methods

Description of the Experimental Curricula

There is a clear need to improve primary-grade students' oral language, comprehension and writing skills and a manageable language arts curriculum within which to do so. The preliminary results from the Building Vocabulary for Emerging Readers (BVER) and Kindergarten Comprehension Projects are encouraging and lead us to extend these early primary curricula with the following additions. First, we plan to integrate comprehension instruction into the existing vocabulary curricula by infusing it with the following strategies: (a) summarization/ main idea, (b) question generation, (c) inference making and predictions, (d) story sequencing, and (e) graphic

representations or “story maps.” Second, we plan to refine the existing writing component of the BVER curricula to include writing instruction rather than limited to writing about vocabulary words. In coordination with the comprehension and vocabulary components, the writing instruction would include instruction in skills such as: (a) handwriting, (b) writing process, (c) story construction, (d) story sequencing and (e) graphic representations, (f) more explicit direction for development of writing skills instruction in addition to the existing writing opportunities and prompts. Third, we plan to extend the entire curricular approach (vocabulary, comprehension, writing) to include second grade. For clarity, Figure 1 in Appendix A displays what is already developed and the new development we are proposing. A sample scope and sequence for the current BVER curricula illustrating how all three components might be integrated into a lesson cycle, as well as two sample lessons is provided in Appendix B.

Overview of the project design and sample Curricular Development

In this three-year project we propose to integrate comprehension, and writing instruction into existing vocabulary curricula for kindergarten and first grades and to develop a vocabulary, comprehension, and writing curricula for second grade. Development of the curricula can be divided into four phases, though the phases may cross over study years (see Figure 2 in Appendix A). The primary purpose of Phase 1 development activities is the crystallization and formalization of the key principles and components of each curriculum separately and then across all three curricula collectively. Together the team reviews and documents their experiences with vocabulary, comprehension, and writing instruction, and their knowledge of best practices for these instructional components as determined through scientifically based reading research. An initial structure for daily lessons is designed that incorporates these best practices and weaves instruction between the text-level components. The other critical component of early development work addresses the selection of vocabulary words to teach. The development team will write and refine lessons for a sample text to finalize the initial lesson format plan. Practical questions and issues will be addressed and resolved in order to prepare the lessons to be piloted in our partner classrooms during Phase 2. A preliminary review and selection of possible children’s literature books for inclusion in the curriculum will also be part of Phase 1 work.

The central component of Phase 2 development is the collaboration of the curriculum development team with a team of teachers at one elementary school. Approximately three kindergarten, first and second grade teachers will be part of Phase 2. In initial meetings with teachers the development team will provide background on the project and gather feedback from teachers about their own practices and beliefs about vocabulary, comprehension, and writing instruction. Curriculum staff will work with teachers to develop a plan for working together that would allow for all of the following: (a) formal and informal feedback from teachers; (b) opportunities for curriculum developers to work directly with students; (c) opportunities for teachers to teach individual lessons and a series of lessons; and (d) multiple opportunities for classroom observations in each classroom by each curriculum developer.

The development team is highly sensitive to the many demands on the time and attention of classroom teachers. Emphasis will be placed on getting the maximum amount of teacher input with a minimum of teacher time or disruption to classroom instruction. During Phase 2, the development team repeats a process of preparing a lesson, teaching the lesson, gathering and reflecting on feedback, revising the lesson and then teaching the lesson again. Following the teaching of a lesson in one or more classrooms, the development team meets to discuss and revise the lesson, and then creates a modified lesson structure with a new lesson in a different class. Going through this process

over the course of several months will lead each to a finalized lesson design. With a finished plan for individual lessons in place, the focus of the development team shifts to two related and unresolved issues: the progression of lessons over the course of a week and the organization and presentation of teaching materials for teachers. To address these issues jointly, the development team prepares an entire week of lessons and supporting materials. This week of lessons will be taught by all participating teachers for that grade level. The development team observes each teacher at least once, and again meets with teachers afterward to review and reflect on the process of teaching the lessons. Suggestions are gathered for the lesson design and the organization and packaging of teaching materials. The curriculum development teams then finalize the lesson design for each grade level and for a complete week of instruction. To conclude Phase 2, each member of the curriculum development team independently writes four weeks of lessons for separate picture books. The team then shares and reviews each other's lessons for quality and consistency, and discusses the process of selecting words, comprehension strategies, and writing lessons. Opportunities to streamline and refine the lesson development process are discussed. Then, the final books are selected for use in the curricula, comprehension strategies are arranged and books that facilitate certain strategy instruction are segregated, words are pulled from each text that meets the word selection criteria, and each text is assigned an approximate week number in the curriculum.

Phase 3 of the curriculum development consists of two primary components. Finishing all lessons is the first and primary focus of Phase 3. The second component of Phase 3 involves working with teachers from multiple schools to determine the most effective methods for teaching the lessons and supporting teachers in their use of the curricula. Writing the remaining weeks of lessons is a multi-step process involving the entire curriculum development team. In the first step of this process a template for lesson planning is created. The template facilitates the selection of words, comprehension activities and writing goals and helps with the preparation of all components of a week's lessons. Then the lessons for the week and any of the supporting materials needed for the lesson (e.g., graphic organizers, pictures, models of charts, writing pages, etc.) are created. Once set of lessons for a week has been written, each week is reviewed and revised by a different member of the development team. The set of weeks of lessons then undergoes a final review by the co-PIs for development, Ciancio and Solari. Materials are then organized and packaged together in a large plastic bin, in sets of 8 weeks per grade at a time. During Phase 3, around ten classrooms per grade level, in two to three different schools, will teach the curricula. Curriculum materials are delivered four times over the course of the year, with roughly two months of materials each time. This incremental delivery of materials allows the curriculum team to learn from teacher use of the curriculum for the first half of the school year as they develop materials for the second half of the school year.

To facilitate rich learning from classroom teachers about their use of the curriculum, the development team fosters ongoing relationships with participating teachers and make regular visits to classrooms. Prior to the start of the school year, a teacher training session is provided on each campus to allow teachers to learn about and practice using the curricula and learn about the ongoing development process. During the first months of implementation, the curriculum team teaches model lessons in classes. Several observations of a lesson are also conducted in each classroom. During each visit to a classroom, curriculum staff informally field questions and gather comments from teachers. Both individual and team meetings are held in each school to gather teacher feedback about the curricula and to learn how to best support them in their use of the curricula. Teachers complete surveys regarding the curricula as well. During the final weeks of the school year, developers will meet individually with many teachers for interviews about the curriculum and materials. Periodically

during the year, the curriculum team will meet to review teacher feedback, and to make adjustments to the curriculum itself and to teacher support activities. Phase 3 concludes in the preparation of all curricula lessons and materials for use the following school year in additional schools, for a total of nearly 30 to 40 classrooms across all grades.

Phase 4 of development includes a comprehensive review and revision of all aspects of the curriculum. Most lessons will undergo only minor revisions for the sake of consistency or clarity. Select lessons and activities may undergo more extensive revision. Then all materials are printed and organized into semester sets, the first will be delivered to classrooms prior to the start of the school year, and the second arriving in classrooms in January. During this final stage of development, the curriculum team will again observe and meet with teachers periodically to gather feedback and learn how it is used in each school. Non-instructional demands on teachers are minimal. Interviews and surveys will decrease in frequency and teachers will be asked to participate in a final closing interview. Phase 4 concludes with the development team reviewing all data, teacher and student, to review results and to resolve any remaining development issues.

Description of Sample

We will conduct this study in three to five elementary schools in Houston Independent School District, where the ethnic composition of the 212,099 student body is 30.5% African-American, 3% Asian, 57.1% Hispanic, .1% Native American, 9.3% White, and the SES is 80.3% economically disadvantaged. Our sample will reflect a greater proportion of African-American and less Hispanic students than the school district's overall composition because children in bilingual programs are not participants. An intervention curricula designed for students in bilingual programs would address a different set of hypotheses and goals. Gender ratios will be approximately half girls and half boys. Regular education teachers will deliver the instruction during the school day in the reading/language arts block. Excluded will be self-contained bilingual or special education classes because they are served outside of the regular education environment. Teachers will be trained in their respective curricula and will be supported in their implementation across the school year. Research staff will conduct classroom observations and assess children's language, writing, and reading skills at the beginning and end of the year. District officials are enthusiastic about participating in this study because the successes of our previous research (see Appendix A, attached letter from Houston Independent School District).

Design Decisions

As the curricula are developed in Years 1 and 2, a select few teachers will be actively involved in piloting lessons in classrooms. We will solicit development and implementation assistance from approximately three or four teachers per grade in Year 1, giving them each a \$500 stipend for their time. In Year 2, we will expand to two or three schools for more refined piloting of materials. We plan on the assistance of ten teachers per grade to implement and pilot, but less extensive development effort. Teachers in Year 2 will receive a \$150 stipend. By the end of Year 2, the curricula will be, based upon pilot results, revised for efficiency and effectiveness. During Years 1 and 2 particular attention will be paid to levels of explicitness, amount and types of support needed for high implementation, and diversity of activity types necessary for successful and effective instruction. Prior to the start of the school year for Year 3, two new schools will be recruited. Teachers from Year 2 will be given the opportunity to continue participating or they may decline participation. Given our experience with prior projects, we anticipate most teachers will opt to continue, but recognize some may not. Revised materials will be returned or provided to all the classrooms, between 10-15 classrooms per grade. Students from participating classrooms will be assessed at the beginning and end of the school year and a final round of teacher feedback will be

solicited through short online surveys and an interview during the spring. At the end of the project the materials will stay with the schools.

Assessment Plan

Pre- and posttest collection of student data collection occurs in Year 3 when preliminary evaluation of curricula design and implementation feasibility occurs. We will randomly select 8 to 10 students (fewer students per class if the number of classes rises) in the participating classrooms; we plan on 300 student assessments. The method we used to select student assessments was construct-based. The constructs most relevant to the primary research questions are oral language and written language and are presented graphically in Figure 3 and Table 1 includes a list of the measures that will be completed by children. Within the oral language construct, we will evaluate a range of skills related to listening comprehension and expressive language. The written language construct will be evaluated by child measures evaluating early reading skills and written expression. The goals of the evaluation plan were to adequately measure child skills in the constructs of interest and utilize procedures to keep the time demands on children minimal. One of the ways this will be accomplished is by systemically collecting progress monitoring measures that are routinely completed by teachers in recruited schools/classrooms. This can easily be accomplished due to the fact that recruited sites all use the TPRI (i.e., Texas Primary Reading Inventory) in kindergarten through second grade.

By using archival data collected by teachers (i.e., TPRI), pre- and post-testing of consented children for the purposes of this project should be able to be completed in sessions of approximately one hour (see Table 1 of Appendix A for time estimates). Assessors used for collecting child level data will contain a mix of full-time research assistants and casual employees that work not only on this project but on other investigations being conducted within the Children's Learning Institute. Assessors will be trained across a two day workshop led by co-investigators. Training methods include the following components: (1) didactic overview of each measures, (2) demonstration of assessment techniques by the co-investigator, (3) guided practice with peers, (4) initial certification procedures that are completed during a mock evaluation conducted by the co-investigator responsible for assessments, and (5) field certification with study participations and one-on-one supervision with a co-investigator. Assessors will only be allowed to begin data collection procedures with study participants following certification during a mock assessment with a co-investigator. Individuals who are struggling with assessment procedures (e.g., deviations from the assessment scripts, failure to understand and/or adhere to basal and ceiling rules) will not be certified to collect data with study participants and given the opportunity for additional practice. Additionally, ongoing monitoring of assessors will occur via observation of examiners administering the battery by co-investigators on a subsample of children enrolled in the study to ensure that standardized instructions are being followed throughout the pre- and post-testing waves.

Child Measures

Written Language

Written Expression: Evaluation of children's written language abilities will occur through the use of an emergent spelling task and evaluation of more complex writing skills via the Test of Early Writing Language-2nd. Emergent spelling will be measured with the T-BEST in kindergarten and Grade 1. The T-BEST is a 10-item composite spelling test designed to measure children's spelling sophistication by accounting for orthographic and phonological features of young children's invented spellings (Treiman & Bourassa, 2000). Students are asked to correctly spell the word that is presented orally. Composite scores are created by assigning a score based on the number of orthographic and phonological features present in the attempt. Zero points are given for an attempt

that does not include any letters and full points (between 8 and 11 points) are given for a fully correct spelling. Reliability is reported as 94% agreement, ranging between 84%-99% for individual words.

Evaluation of writing skills in kindergarten thru Grade 2 will also include the Test of Early Written Language-2nd Edition (TEWL-2; Hresko, Herron, & Peak, 1996) will be used. The TEWL-2 evaluates the early writing skills of children between the ages of three and ten. The TEWL-2 measures conventional components necessary for effective writing (e.g., directionality, letter features, punctuation, proofing, & spelling), linguistic components (e.g., combining sentence, syntactic maturity, conceptual vocabulary), and conceptual components (e.g., metalinguistic knowledge, logical sentences). The TEWL-2 is an engaging measure for children and contains a variety of tasks appropriate for kindergarten and first grade children. For example, young children are asked to identify writing implements, write their names, compose a note, demonstrate a tripod grasp, and write letters, numbers, lists, and simple sentences. Coefficient alphas for 6 and 7 year old samples were .96 & .95 respectively. Test-retest reliability (14-21 day interval) was .89 when used with a 7 year old sample. Extensive validity data are reported in the TEWL-2 technical manual. However, criterion-related and construct-related validity should be considered to be moderately strong. For example, the TEWL-2 correlated with the Woodcock-Johnson Psychoeducational Battery-Revised: Written Language (Woodcock-Johnson, 1989) at moderate levels (.59).

Reading: Our selection of reading measures is based on our extensive experience in assessing reading development and achievement. In all grades multiple measures are used to evaluate word reading, nonsense word reading, and passage comprehension skills. Additionally, letter and letter/sound knowledge data will be collected through archival means (see teacher collected child level data below). Children will complete subtests from the WJ-III including Letter-Word Identification, Passage Comprehension, and Word Attack. The WJ-3 series is a widely used measure with excellent psychometric properties and strong validity data. The standardization sample is large (n= 8818) and is weighted toward the younger ages. The test provides the user with a myriad of scores including standard scores, age equivalent, and grade equivalents. The Letter-Word Identification subtest requires that children identify specific letters and words via both multiple choice and free response formats. Test-retest reliability for the Letter Word Identification subtest was reported to be .98 (McGrew & Woodcock, 2001). The Passage Comprehension subtest of the WJ-III contains a variety of items. The first section evaluates a child's ability to understand the symbolic nature of print via rebuses. Children are then asked to read high frequency words and point to a picture that corresponds to the word stimuli (e.g., yellow bird). The majority of test items utilize a cloze procedure to evaluate sentence and passage comprehension abilities. Test-retest reliability at an interval of one year was excellent in four to seven year old children (.89). The Word Attack subtest of the WJ-III begins with two items that evaluate a child's ability to identify sounds and then transitions to a nonsense word reading test evaluating phonetic decoding skills. The Word Attack subtest has excellent test-retest reliability at a one year interval (.79).

Oral Language

Listening Comprehension: Children's auditory comprehension abilities will be evaluated via measures of receptive vocabulary and story recall. These skills are central to the core components of the developed curriculum and are strong predictors of later reading comprehension skills. Receptive vocabulary will be measured with the Peabody Picture Vocabulary Test (PPVT-III; Dunn & Dunn, 1997). The student will look at a group of pictures and put her finger on the correct answer. The score is the number of correct responses from lowest basal to the highest ceiling. Reliability is acceptable (.73). Also, we will measure children's auditory comprehension skills with the Story Recall subtest from the WJ-III. The Story Recall subtest measures aspects of language development,

listening ability, and meaningful memory. In the Story Recall subtest, children are required to listen to oral passages and recall sentence/story elements. Like the rest of the WJ-III series, the Story recall subtest has excellent psychometric properties and a test-retest reliability coefficient of .69 for children aged four to seven with an interval between test administrations of one year.

Expressive Language: The Expressive One-Word Picture Vocabulary Test (EOWPVT; Brownell, 2000) was used to measure children's oral language vocabulary skill. The EOWPVT measures children's ability to correctly label an action or concept depicted for individuals 2 to 18 years of age and has English and Spanish versions. Examinees are presented with stimulus pages containing an individual color picture and asked to correctly label each picture. Test-retest reliabilities over a 20-day interval was .89 for 4- to 7-year-olds. A number of studies show concurrent correlations ranging from .64 to .87 with other language measures and from .67 to .90 with other specific measures of vocabulary (Brownell, 2003).

As the current proposal is focusing on the development of emergent writing skills in children during the kindergarten year, we have devoted a portion of the assessment battery to evaluate the ability of children to develop oral narrative abilities. Therefore, children will complete 2 separate narrative tasks from the Diagnostic Evaluation of Language Variation (DELV; Seymour, Roepel, and de Villiers, 2005). The DELV narratives assesses a child's abilities to contrast characters, link events in time, and include references to mental states of the characters when they tell a simple story. In the DELV narrative task, children examine a stimulus card with six pictures and tell the examiner a story. While the DELV narratives provide an opportunity for examiners to score 4 questions immediately following the completion of the child's narrative, we will also transcribe children's narratives and score the story using an adaptive version of Miller, Gillam, and Peña's (2001) narrative task in *Dynamic Assessment and Intervention: Improving Children's Narrative Abilities*. The coding scheme of Miller, Gillam, and Peña contains a 5-point rating and allows the flexibility of partial codes (e.g., 3.25). Story components evaluated in the system include setting, character information, temporal order of events, and causal relationships. Story ideas that are coded include complexity of ideas, complexity of vocabulary, grammatical complexity, knowledge of dialogue, and creativity. While the coding scheme developed by Miller, Gillam, and Peña allows for additional codes (e.g., listener effort required to understand the story), we did not feel that these aspects could be reliably coded by individuals reading a transcript of the child's narrative. We plan to double code 20% of the narratives by an expert rater (i.e., co-investigator) to ensure quality of the codes obtained. The technical manual of the DELV does not specifically provide test-retest, internal consistency, or interscorer reliability information for the Narrative tasks. However, individual subscales of the DELV (i.e., Syntax, Pragmatics, Semantics, Phonology, and Total Language Score) are reliable (i.e., .83, .84, .80, .94, and .92 respectively). As the coding scheme used in the *Dynamic Assessment and Intervention: Improving Children's Narrative Abilities* is considered to be a process measure that can be used by speech pathologists to better understand young children's narrative abilities, the technical manual does not include technical information on test-retest or inter-scorer reliability.

Curriculum-Based Evaluations of Child Skills

Also included in our assessment are "Curriculum-based" tasks consisting of vocabulary words, comprehension tasks, and compositions that relate directly to the curricula. Development of these measures will consist of: (a) item writing, (b) small-scale piloting, (c) refinement of items, (d) piloting with oversampling of items. In order to have sufficient item cohesion for any particular measure, we will pilot 3 times the desired item total. For vocabulary, we further examine the measure designed from prior work which consists of a random selection of 45 words from the 450 words targeted in each grade. For comprehension, we will design measures to consist of listening

comprehension through story retell and question and answer formats. For writing, we will create handwriting, spelling and spelling tasks scored similar to T-BEST and some sentence construction tasks similar to TEWL tasks. Our staff will administer these curriculum-based assessments at the beginning of the year as a baseline measure, before teachers begin to teach the curricula, and at the end of the year to determine gains. We will also develop end of unit tests for instructional guidance. From the BVER project, we have a dedicated website designed for students to take these short assessments at a computer station. Teachers can monitor and have access to student results. Teachers have reported to us that they have found these useful to follow both individual student progress and also instructional components that may need revisiting, (i.e., 80% of my class missed this item).

Archival Data Collected by Teachers

Texas Primary Reading Inventory. The proposed research will benefit from the opportunity to evaluate children's emergent reading abilities due to the fact that all of the enrolled classrooms use the TPRI (TEA, 1998). The TPRI is a widely used instrument and is currently used in over 95% of the school districts in Texas. The TPRI systematically evaluates children's progress in key literacy skill areas at the beginning, middle, and end of year during both kindergarten and Grade 1. The Kindergarten TPRI contains 8 tasks with a heavy emphasis on phonological awareness (i.e., rhyming, blending word parts and phonemes, deleting initial and final sounds, graphophonemic knowledge, and listening comprehension). The Grade 1 TPRI contains all of the sections that are completed in kindergarten and several additional sections evaluating more complex emergent literacy and word reading skills (e.g., consonant substitutions, middle vowel substitutions, blends in the final position, and word reading). The Grade 2 TPRI contains a graphophonemic knowledge section as well as basic reading skills, such as reading accuracy, fluency, and oral reading comprehension. Professional development activities with teachers surrounding TPRI administration are ongoing and teachers have access to an extensive library of online video clips demonstrating administration procedures.

Observational and Survey Measures

Teacher Survey Information. We will collect teacher demographic information during the enrollment phase of the study. These data will include the educational background, certifications, professional development activities across the last two years, gender, tenure within the current grade, and total years of experience teaching. Surveying teacher opinion occurs both formally and informally in all years of the project. Formally, we have developed a website where we can put up surveys. In past projects, we have surveyed opinion regarding curricular materials, instructional activities, curricular organization, design preferences, etc. These short surveys help us inform development decisions with opinion data. Informally, of course, our development team works closely with teachers to gather information. We have developed a process of modeling a lesson idea with teachers and then debriefing with them after to review and reflect on the teaching processes involved. Then the curriculum development team gathers to review those lessons that were modeled and to consolidate the product of each debriefing. Finally, at the end of the project, each teacher will participate in a structured interview about the curriculum and materials and may elect to participate in a focus group so that we can gain more insight into their experiences surrounding the curricula (e.g., successes, potential difficulties, willingness to continue using the curricula components in the future, and challenges).

Fidelity ratings. Because ensuring teachers' ability to integrate curriculum within their Language Arts/Reading Instruction is the focus of this project, an important part of the classroom observation procedures in Year 3 will evaluate the teachers' ability to successfully implement the curriculum throughout reading instructional time. We are particularly interested in the explicitness of the curricula, the diversity of activities, and amount of support necessary for effective implementation.

As the addition of comprehension and writing activities have expanded the curricula's focus, classroom observation tools have been adapted to capture the extent to which teachers are successful at implementing the new curriculum components. Observations will include coding the degree to which teachers directly follow the curricula as written, as well as whether they transfer the word-discussion, writing activities, and comprehension activities into other portions of the reading/language arts block.

Observations of the General Teaching Environment. The general literacy environment of classrooms will be evaluated using the CIRCLE-Teacher Behavior Rating Scale (TBRS; Landry, Crawford, Gunnewig, & Swank, 2002) to rate the quality and frequency of occurrence of specific teaching behaviors. The TBRS contains multiple subscales with a total of 50 items measuring multiple indicators of teaching behaviors. For the following subscales, quantity and quality summary scores are obtained: 1) oral language, 2) book reading, 3) print & letter knowledge, 4) written expression, 5) phonological awareness, and 6) a total composite that combines all individual subscales. For the lesson plan and portfolio subscales, only a quantity score is obtained; and for the centers subscale, only a quality score is obtained. Quality scores are based on a 3-point rating scale, (i.e., low, medium, and high). Quantity scores are based on a 3-point rating scale where a score of 1 indicates "0-1 activities observed," 2 indicates "2-3 activities observed," and 3 indicates "4 or more activities observed." An exception is the portfolio quantity score which involves a 5-point rating system. Specifically, portfolios of five children from a classroom are randomly selected for review. The highest score reflects that work samples across three skill areas were included in at least four of the five portfolios reviewed. Interrater reliability using generalizability coefficients are high, ranging from .80 to .98. Internal consistency also is high, .96. Although significant correlations between subscales are found, these are not so high that the information is redundant (Assel, Landry, & Swank, 2007). The TBRS and fidelity observations will occur at three intervals throughout the year, (September, January, & April) of implementation.

Data Management and Analysis

As each curriculum is developed, research staff will be monitoring the developmental progress on three core facets of design: (1) intentionality, (2) instructional application, and (3) evidence of student learning. We define intentionality as whether each curriculum as a whole or each lesson individually achieves the desired intent as conceived. For example, when development staff model a new lesson and then debrief with the observing teacher, we will be looking for confirmation that the product of that lesson is consistent with the intended instructional approach. Each curricula will be considered meeting the goal of intentionality if through observation or collected data, we observe that the design is capable of achieving the desired intent. We define instructional application as whether materials are conducive to teacher's use. For example, during development we expend much energy considering how or whether teachers not participating in our project would use our materials. To some degree we can assess this by examining data collected during classroom observations, in our third study year, when teachers have less interaction with study personnel. Evidence of student learning can be evaluated through our pre- posttest data collection as well as by examining the end of unit assessments developed for each curriculum.

Observation forms already exist for a majority of the measures to be used due to their use in prior research at our centers, but will need to be developed for some measures and then combined into an assessment packet that reflects the total assessment battery for a given grade. Reliability will be continuously monitored on all measures created for this study.

Prior to formal data analyses to explore research questions, we will employ standard techniques for examining variable distributions to screen for extreme data values in univariate and bivariate

space, and to assess distributional assumptions of statistical modeling procedures. This step includes analysis of distributions of raw data, as well as examination of residual distributions from modeled data (Francis, Schatschneider, & Carlson, 2000). We always examine distributional assumptions using a variety of graphical methods including variable scatterplots, frequency distributions, and QQ plots (Cleveland, 1993), and a variety of residual plots to assess modeling assumptions. If necessary, data are transformed prior to analysis, or robust statistical methods are used in the modeling phase of the analysis.

The hypothesis that using the designed curricula will have significant effects on oral language, writing, vocabulary and reading after controlling for initial differences in these outcomes, will be evaluated using the multilevel extension of the familiar (pre-post) ANCOVA models to evaluate potential for growth effects. When applicable, we will use multivariate multilevel analyses on a single construct domain (i.e., phonological awareness, word recognition, reading comprehension, vocabulary, and spelling) using latent variable models. We will examine whether instructional quality and fidelity moderates effects of student outcomes by using multilevel models suitable for nested data structures.

Software issues

We employ HLM 5 and/or SAS PROC Mixed. When the same model can be fit in each program, the programs give quite comparable answers. They do differ in ease of model specification for some models, and in ease of getting data into the program in the appropriate structure. Consequently, we choose the program depending on its suitability for conducting the specific analysis.

Key Personnel

Dennis J. Ciancio, Ph.D., is Principal Investigator of this project. Dr. Ciancio is an Assistant Professor of Pediatrics at the University of Texas Medical School-Houston. Dr. Ciancio specializes in quantitative methodology and in early literacy assessment in preschool and primary-grade children. Dr. Ciancio is Principal Investigator on the pre-cursor IES Reading and Writing Goal 2 grant, "Development of an empirically based vocabulary curriculum for kindergarten and first grade students." Dr. Ciancio is a co-author the TPRI and principal investigator on a state contract with the Texas Education Agency for continued development of this instrument. In this capacity, he has coordinated item-development, validity, and implementation studies. He conducts the empirical evaluation after data collection. Also, Dr. Ciancio was Co-Principal Investigator on DHHS – Head Start Research Scholars Grant, "Educational Games for Preschoolers" which investigated the efficacy of a small-scale curriculum add-on for Head Start children. In his previous work, Dr. Ciancio pursued similar curricular enhancements for early literacy development. Additionally, he is co-PI on the Texas Reading First grant at UTHSC-H and specializes in literacy assessment in primary-grade children. Dr. Ciancio provides the overall scientific leadership for this project, giving direction to the curriculum development, coordination of study implementation and data management. He will direct this project at 45% effort during each year.

Susan H. Landry, Ph.D., will devote 5% effort to this research in Years 1-3 as a Co-PI. Dr. Landry is a Developmental Psychologist and the Michael Matthew Knight Professor in the Department of Pediatrics at The University of Texas Health Science Center at Houston (UTHSC-H). She is also the Chief of the Division of Developmental Pediatrics and the Director of the Children's Learning Institute. The Institute, with funding from the U.S. Department of Education, the TX Education Agency, and several foundations is currently involved in using the knowledge gained from years of studying young children to help promote the national goals of early childhood literacy initiatives. Her activities involve conducting numerous research projects and training activities related to the goal of promoting quality learning environments for young children. Dr. Landry will

provide overall project guidance and supervision to Dr. Ciancio and the curriculum development team.

Emily Solari, Ph.D., will devote 50% effort to this research in Years 1-3 as a Co-PI. Dr. Solari is an Assistant Professor in the CLI of the Department of Pediatrics at the University of Texas Health Science Center Houston. Dr. Solari will oversee the development of the comprehension curriculum and professional development to support the proposed reading intervention. Dr. Solari brings to the project experience in (a) development and implementation of Tier 2 reading interventions, (b) designing and managing school based research, (c) developing and implementing professional development materials, including coaching. Dr. Solari has worked on several federally funded studies investigating effective teaching practices for Spanish-speaking English language learners. Her past research has successfully investigated effective early language and comprehension interventions with young students at risk for reading failure and Spanish-speaking English language learners. Specifically, this research has concentrated on the development of oral comprehension skills necessary for sufficient later reading comprehension performance.

Mike Assel, Ph.D., will devote 5% effort to this research in Years 1-3 as a Co-PI. Dr. Assel is an Assistant Professor in the Children's Learning Institute of the Department of Pediatrics at the University of Texas Health Science Center Houston. His primary research interests include program evaluation studies within multiple types of early childhood educational settings, curriculum evaluations, assessment, and observational measures used in school settings. Dr. Assel has been a co-investigator on several NICHD, IES, and TEA funded projects evaluating early literacy and math development in young children. Dr. Assel is also a co-author of the CIRCLE-Phonological Awareness, Language, and Literacy System, a progress monitoring system for pre-K students. Dr. Assel developed the assessment plan and trained assessors for the National Evaluation of Early Reading First. Dr. Assel will be responsible for the training of assessors and developing quality assurance procedures for both child assessments and classroom observational data.

Terri King, Ph.D., will devote 10% effort to this research in Years 1-3 as methodologist and will lead the data collection and management. Dr. King is an Assistant Professor in the Children's Learning Institute of the Department of Pediatrics at the University of Texas Health Science Center Houston. One of her research foci is in the statistical methodology associated with the evaluation of educational interventions. She is the quantitative methodologist on the Early Childhood School Readiness Program: Texas Early Education Model program and is performing validation and reliability analyses as well as research analyses.

Keith Millner, M.A., has been an Education Coordinator II at UT-Houston since August 2004. He has served as project manager for Dr. Ciancio's Vocabulary development grant. Mr. Millner holds a Master of Education degree from Harvard Graduate School of Education and a Master of Arts degree in Early Childhood Education from University of Colorado at Denver. Mr. Millner will be employed 50% in each project year to develop the curricula and coordinate interactions, interviews, and observations of teachers. He will also serve as a liaison to participating schools. He will coordinate and assist with completing ratings of teaching effectiveness on participating teachers in Years 2 and 3.

Victoria Moss, M. Ed., will devote 50% effort to this research in Years 1-3 as part of the curriculum development team. Victoria has been an Educational Outreach Manager at UT-Houston since 2004. Victoria helped co-author Dr. Ciancio's Vocabulary curricula. Also, Victoria is writing a comprehension and vocabulary intervention for struggling readers in 4th thru 6th grades. She is currently coordinator for professional development for the TPRI assessment and coordinator for the Dan L. Duncan Neurodevelopmental Clinic tutoring outreach program.

TBN Research Associate, will devote 50% effort to this research in Years 1-3 as part of the curriculum development team.

Bang Pham, will devote 33% effort in Year 1 and 20% effort in Years 2-3. Mr. Pham has been designer and web programmer for the Children's Learning Institute for 8 years. He designed the curricular materials for Dr. Ciancio's vocabulary curricula as well as the web-based student assessments and web-based teacher surveys. He will perform similar functions for this project.

Resources

University of Texas-Houston Health Science Center – Children's Learning Institute

The Children's Learning Institute, which includes Drs. Ciancio, Landry, Solari, Assel, and King, is in the University Center Tower building. It consists of 19,400 square feet with workspace for research assistants, files, storage space, and multiple personal computers supported by a two-server network. This space, constructed on the 20th, 23rd and 24th floors of the University's central building, includes 8 testing rooms evaluating toddlers and older children as well as five video play rooms with one-way mirrors and furniture specifically for assessment of infants and young children. There are also 8 coding stations with TV/VCR units.

Other available equipment includes a) microcomputers presently programmed for observation studies of a variety of interaction paradigms; b) videocassette recorders, and an interactive computer terminal for online data entry and analysis; and c) a number of software packages for data management and analyses. UT-HHSC has a fully staffed audio-visual and electronics department that provides set-up and maintenance of all equipment, and complete computer resources are available. In addition there are multiple conference facilities available in this building and adjoining buildings for satellite and teleconference meetings.

The Children's Learning Institute is currently involved in using the knowledge gained from years of studying children to help promote the national goals of early childhood literacy initiatives. These include conducting and evaluating model training programs for teachers across Texas and a number of other states with the goal of improving children's language and early literacy and math skills. Developmental Pediatrics also focuses on: (a) moving research results into the classroom through dissemination of information to teachers, curriculum developers, and teacher educators; (b) implementation of prototypes of professional development and observational feedback on instructional strategies; and (c), the development of improved methods of evaluating student performance and preventing reading difficulties. Research is supported primarily by grants from the National Institute of Child Health and Human Development (NICHD), IERI, OERI, and has also attracted funding from the private sector. Its work on dissemination and assessment is currently supported by the Texas Education Agency (TEA). Staff also produce professional development materials and instructional strategies for helping teachers use the assessments effectively and subsequently work with students on the basis of their results.

Additional Considerations

Described above in Related Studies and Pilots, the Building Vocabulary for Emerging Readers (BVER) curricula is currently being developed under IES-Goal 2. Further, the significance of oral language and need for high-quality vocabulary instruction has also been described. In one sense this proposal may be viewed as an extension of those curricula in two directions: level (to second grade) and breadth (comprehension and writing). Further, we would like to reiterate the unique aspects of integrating text-level instruction that is often much different in nature than, but not at the expense of word-level decoding or processing instruction. In this context, we feel it is appropriate and critical to explore the feasibility of this integrated approach for text-level instruction in addition to existing word-level instruction.