

**AN ASSESSMENT OF UNIVERSITY INSTRUCTORS  
AND THEIR PRE-SERVICE TEACHERS' KNOWLEDGE OF  
BASIC LANGUAGE CONSTRUCTS BEFORE AND AFTER  
UNIVERSITY INSTRUCTOR PROFESSIONAL DEVELOPMENT**

A Dissertation

by

EMILY SUZANNE BINKS

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2008

Major Subject: Curriculum and Instruction

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## ABSTRACT

An Assessment of University Instructors and Their Pre-Service Teachers' Knowledge of  
Basic Language Constructs Before and After University Instructor Professional  
Development. (May 2008)

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Reading is a basic skill for survival and those who have reading difficulties in early grades continue to struggle in school and later in life. Previous studies have shown that instructional procedures that incorporate basic language constructs with literacy instruction are helpful in improving reading skills. It has also been shown that many teachers and reading professionals are not familiar with such concepts. The purpose of this research is to explore reasons for classroom teachers' poor preparation to teach literacy skills and how this situation might be improved.

First, a basic language constructs survey assessing self-perception, knowledge, and ability (46 items, Cronbach's  $\alpha = .903$ ) and based on recommendations by the National Reading Panel and reading research was administered to university instructors of EC-4 reading education ( $n=114$ ). Forty-eight of these university instructors completed the survey *after* at least two years of participation in a professional development program (Higher Education Collaborative, HEC) geared towards the incorporation of scientifically-based reading research (SBRR) and research-based reading instruction (RBRI) into teacher

preparation. The other sixty-six university instructors completed the survey *prior* to their participation in the professional development program (HEC).

Second, the same survey was administered to pre-service EC-4 teachers (n=173) at the completion of their reading education coursework. Fifty-five of these pre-service teachers had been taught by the “HEC university instructors.” The other 118 pre-service teachers had been taught by “non-HEC university instructors.”

Results indicate non-HEC university instructors and their pre-service are not familiar with basic language constructs and how to teach these concepts to primary level children. However, while room for improvement exists, HEC university instructors and their pre-service teachers did perform statistically significantly better on the survey than their counterparts.

This study indicates pre-service teachers need better preparation in teaching the basic language constructs of the English language and university instructors often lack the knowledge to prepare teachers with such information. However, professional development programs designed for university instructors might be one way to help improve the situation.

## DEDICATION

To my “first” first-graders:

Shon Tavia, Dominique, TreVon, Melissa, Sergio, Brian, Jean Luc, Mauricio, Broesha,  
Alondra, Jairo, Jimmy, Jasmon, Danielle, Mikella, Tobiance, Stephanie, Lupita, Azaria,  
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Ultimately, I must finally acknowledge the reason for this dissertation and for my pursuit of a doctoral degree and career in higher education: my students. From those in pre-kindergarten to those at the brink of graduation from the college of education, the future lies at their fingertips. I am always refreshed by the eagerness of the youngest to learn and the motivation of the oldest to make a difference. It is my hope and passion, through both research and teaching, to help enable those two exact things to happen.

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## CHAPTER I

### INTRODUCTION

There is evidence that perhaps classroom instruction, particularly at the early primary grades, is the core contributor to the high incidence of reading problems in the United States (Bos, Mather, Dickson, Podhajski, & Chard, 2001; McCutchen, Harry, Cunningham, Cox, Sidman, & Covill, 2002b; Moats, 1994, 2000; Moats & Lyon, 1996; & Spear-Swerling & Brucker, 2003). These studies have attributed poor classroom instruction to a lack of teachers' basic understanding of the concepts related to the English language that are necessary to teach reading skills. Can this lack of understanding be contributed to inadequate preparation at the pre-service level during university coursework? The purpose of this study was to determine what university instructors of reading education themselves know about basic language constructs and if their patterns and gaps in basic language construct knowledge carry over to their pre-service primary level teachers. Furthermore, the study sought to determine if professional development at the university instructor level is effective at improving the knowledge of basic language constructs of both populations.

#### **Background**

A great deal of research has rather recently been devoted to reading instruction at the elementary level. Yet despite such a large body of research, many children still struggle

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This dissertation follows the style of *Reading and Writing: An Interdisciplinary Journal*.

to acquire basic reading skills:

- 33% of fourth grade students (60% of minorities) are unable to read simple books with clarity and fluency
- 38% of the fourth graders are reading below the Basic level and 29% of the eighth graders are reading below the Basic level, which means that these students cannot perform at the minimum academic expectations
- Approximately 25% (or 70 million) individuals in the U.S. have reading difficulties (e.g., unable to read a newspaper or bus schedule)
- 3 million students are placed in learning disabled classrooms because they cannot read
- Of the ~15% of students who drop out of school, >75% report difficulties in learning to read
- 2% of students receiving special or compensatory education for difficulties learning to read will go on to complete a four-year college program
- >50% of the adolescents with criminal problems and history of substance abuse have reading problems

(NCES, 1999 and NCES, 2005)

Further, the United States ranks 25<sup>th</sup> among 29 nations in student reading achievement (UNESCO, 2005). Interestingly, the math scores have increased at both the fourth and eighth grade levels and the gap between the performance of White, Black, and Hispanic

students in math is narrowing (NAEP, 2005). Because of the concerns with reading achievement and performance, the Congressional Hearing on Measuring Success: Using Assessments and Accountability (Lyon, 2001), declared illiteracy a public health issue. Various reasons have been proposed for the reading problems: poor oral language development (Hart & Risley, 1995; Moats, 2001), number of books available at home (Chiu & McBride-Chang, 2006), genetics (Pennington & Olson, 2005), and poor classroom instruction, especially at the early primary grades (Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; Torgesen, 2005; Vellutino, Scanlon, & Jaccard, 2003).

In response to this situation, many theories, models, and materials have been offered (Adams, 1990; Chall, 1967; Goodman & Goodman, 1979; Huey, 1908), but in 2000, the National Reading Panel identified that systematic phonics instruction, training in phonemic awareness, fluency, vocabulary, and strategies for comprehension are all necessary components of quality reading instruction (NICHD). Furthermore, the National Research Council (Snow, Burns, and Griffin, 1998) concluded that “quality classroom instruction in kindergarten and the primary grades is the single best weapon against reading failure” (p. 343).

Because the acquisition of reading skills does not come naturally or easily for many children, these children become dependent upon the skills and knowledge of the primary grade classroom teacher as their main source for learning to read. The National Research Council (Snow, Burns, and Griffin, 1998) cited poor classroom instruction as a statistically significant cause of reading difficulties in young children. A focus on early reading is particularly important, as 88% of students who were poor readers in first grade were also poor readers in fourth grade and 87% of students who were good readers in first grade were

also good readers in fourth grade (Juel, 1988). Additionally, stability in reading status from first grade to fifth grade was predictable based on kindergarten performance (Torgesen, 1997). Finally, reading problems identified in third grade and beyond require considerable intervention, as reading problems are not outgrown: 74% of children identified with reading disabilities were still identified with a reading disability in ninth grade (Francis et al., 1996).

Do those who prepare teachers for reading instruction understand themselves the critical components of early reading instruction, in particular the knowledge of basic language constructs? At the conclusion of their reading education coursework, are pre-service primary level teachers knowledgeable of basic language constructs, such as phonological and phonemic awareness, the alphabetic principle and phonics, and the role of morphology? Will university instructor professional development result in heightened university instructor knowledge in such critical areas, and in turn heightened knowledge in their pre-service students?

### **Statement of the Problem and Purpose of the Study**

While research has suggested certain and specific components and student skills necessary for learning to read (NICHD, 2000), teachers have demonstrated limited knowledge of such concepts over the past ten years. Moats (1994) and others (Bos et al., 2001; McCutchen et al., 2002b; Moats & Lyon, 1996; & Spear-Swerling & Brucker, 2003) have attributed poor classroom instruction to a lack of basic understanding of the concepts related to English language needed to teach reading skills. As a result, many children do not receive the kind of instruction necessary for them to succeed in reading, and hence, a national literacy problem exists. In fact, while math scores continue to rise, reading scores



remain steadily constant over the past 30 years (NAEP, 2001). One main factor is suggested as the major cause: poor instruction due to poor teacher knowledge due to poor teacher preparation. However, there is hope that when teachers receive high-quality training in these essential components of reading and learning to read, both teacher knowledge and classroom practice, as well as student reading achievement, will be positively affected.

But how can teacher preparation to teach reading effectively and based on scientifically-based research be improved? While knowledge of basic language constructs has been established as essential knowledge for teachers of early reading in the field, are those who prepare pre-service teachers to teach reading knowledgeable in such areas? Are there certain aspects of basic language constructs in which university instructors are more knowledgeable than others? Do their knowledge patterns (including deficits/gaps in knowledge) carry over to pre-service teachers? Additionally, does university instructors' knowledge of basic language constructs improve with professional development designed for university instructors? What parts of a professional development are most utilized or perceived as most beneficial to university instructors? Further, does university instructor professional development and/or an increased knowledge base of basic language constructs carry over to their pre-service students of early reading education?

While much recent research has shown a general lack of teacher knowledge in language constructs and reading components, little research has analyzed the current knowledge level of those preparing teachers to teach early reading. Further, while research indicates that professional development of teachers in components of basic language constructs can positively affect their knowledge and hence student reading achievement,

little to no research discusses or elaborates upon if and how professional development at the university instructor level might carry over to teacher preparation in basic language constructs. The purpose of this study was to determine what kind of knowledge (and/or patterns in knowledge) both university instructors and pre-service teachers have of basic language constructs, as well as if university professional development helped improve the situation.

### **Research Questions**

First, what do university instructors know about basic language constructs prior to participating in professional development? And what do pre-service teachers who have taken courses from university instructors without professional development know about basic language constructs? Secondly, is university instructor knowledge of basic language constructs improved as a result of participating in a professional development program for at least two years (with an analysis of overall as well as concept-specific knowledge)? And after taking courses from university instructors who have participated in this professional development program, do pre-service teachers' have a heightened knowledge of basic language constructs as compared to those pre-service teachers whom have taken courses from instructors without professional development (overall as well as concept-specific knowledge)? What patterns of knowledge emerge within these populations, and how are these patterns the same or different between the populations?

The university instructors were defined as those who instruct pre-service teachers in early reading instruction in both traditional and alternative certification programs at the university level. These instructors voluntarily agreed to participate in a scientifically-based

reading research professional development program geared for university instructors. They were assessed in their knowledge of basic language constructs both prior to and at least two years after professional development. Pre-service teachers were defined as those participating in traditional and alternative EC-4 certification programs at the university level. Both pre-service teachers who have taken reading education courses from university instructors without professional development as well as pre-service teachers who have taken reading education courses from university instructors with at least two years of professional development were assessed in their knowledge of basic language constructs. “Knowledge of basic language constructs” will included an assessment of the university instructors’ and pre-service teachers’ own abilities (e.g., count the number of ...) and factual knowledge (e.g., terminology and instructional practices) in phonological and phonemic awareness, the alphabetic principle/phonics, and morphology. Phonological awareness was defined as an understanding of the different ways in which spoken language can be broken down and manipulated; phonemic awareness was defined as the ability to notice, think about, or manipulate the individual sounds in words (phonemes); alphabetic principle/phonics was defined as the acquisition of letter-sound correspondences and their use in reading and spelling and an understanding of how letters are linked to sounds (phonemes) to form letter/sound correspondences in application to decoding and reading; and morphology was defined as an understanding of meaningful word parts and their role in decoding and reading (NICHD, 2000).

## Conceptual Framework

Areas of basic language constructs assessed include phonological and phonemic awareness, the alphabetic principle/phonics, and morphology. The National Reading Panel (NICHD, 2000) recommends that teachers have an explicit knowledge of such concepts for the effective teaching of decoding skills in a direct, systematic manner to enable the successful acquisition of early reading skills for all beginning readers. Ironically, colleges of education may not be providing pre-service teachers with this information, leaving teachers unprepared to effectively teach reading to all students, as one cannot teach what one does not know. Moats (1999) states this clearly,

Specifically, teachers must understand the basic psychological processes in reading, how children develop reading skill, how good readers differ from poor readers, how the English language is structured in spoken and written form, and the validated principles of effective reading instruction. The ability to design and deliver lessons to academically diverse learners, to select validated instructional methods and materials, and use assessments to tailor instruction are all central to effective teaching. (p. 13)

Through scientifically-based reading research, it has been repeatedly shown that the direct teaching of linguistic structure concepts is of great importance to both beginning and struggling readers (Moats, 1994). Research performed with struggling readers has repeatedly found that “early, systematic instruction in phonological awareness and phonics improves early reading and spelling skills and results in a reduction of the number of students who read below grade level” (Bos, Mather, Dickson, Podhajski, & Chard, 2001, pp. 97-98). Adams (1990) clearly demonstrated in her synthesis of research on beginning

reading the importance of teaching children explicit instruction in English orthography. Additionally, her research demonstrated that different types of literacy experiences are required for the development of sound reading ability, including explicit phonics instruction, exposure to rich vocabulary, and practice in reading varied and interesting texts. However, Adams emphasized the key role of phonemic awareness in fostering an understanding of how print works. In order to effectively teach reading, writing, and spellings, teachers “need to understand the relationship between speech and print because these basic language processes are often deficient in cases of reading failure...teachers also need to be knowledgeable in this area to benefit from psychologist and specialist reports” (Fielding-Barnsley & Purdie, 2005, p. 65). Furthermore, knowledge of phonemic segmentation is “integral to teaching children to segment the sounds in words and develop the phonemic awareness that is fundamental to learning to read” (Bos et al., 2001, p. 114). And in line with the elements of def, “phonics instruction in English requires the teacher to lead students through multilayered, complex, and variable spelling correspondences at the sound, syllable, and morpheme [unit of meaning] levels” (Moats & Foorman, 2003, p. 24). This knowledge is necessary for developing accurate, automatic word recognition, which is needed for fluent reading. Teachers’ knowledge of morphology and historical changes in English helps inform vocabulary instruction, which requires a systematic understanding of the “relationship among word structure, grammatical rule, and meaning” (Moats & Foorman, 2003, p. 24).

The assessment of university instructor and pre-service teachers’ knowledge builds upon these findings in scientifically-based reading research. Such studies served as the conceptual framework for the basic language constructs survey.

### **Assumptions and Limitations**

An assumption of this study is that, although classroom instruction and student reading achievement were not observed or measured in this study, the knowledge assessed by the survey is important to and correlated with effective reading instruction and early reading skill development. The survey was designed to assess the knowledge of basic language constructs outlined as critical through extensive literature review, as well as based off of previous teacher knowledge surveys developed and used by other researchers (Cunningham, Perry, Stanovich, & Stanovich, 2004; McCutchen et al., 2002b; and Moats, 1994).

Additionally, another assumption of this study lies in the accuracy of the assessment measure of teacher knowledge. The teacher knowledge survey may have assessed to a certain extent “good and bad test-takers” rather than those truly knowledgeable or not knowledgeable in basic language constructs, and the survey may have assessed some irrelevant aspects of knowledge as well as exclude relevant aspects of knowledge.

Further, since participation in the survey is voluntary on the part of both the university instructors and pre-service teachers, it is assumed that those who agreed to participate are representative of the entire population (including those who did not agree to participate). This assumption is accounted for through the use of a non-respondent study, which offered some evidence that those who did not agree to participate were similar to those who did by comparing the demographic information of both groups (e.g., gender, race, and location information).

A limitation of this study is that, while university instructor knowledge and pre-service teacher knowledge may be correlated in this study (e.g., similar patterns and/or levels), these two variables are not necessarily causally-related. Similarly, while professional development participation may be correlated with higher knowledge, these two variables are also not necessarily causally-related. Other factors beyond control may have influenced pre-service teachers' knowledge patterns and levels.

### **Significance of the Study**

If the basic language constructs survey scores of the university instructors (and their students) who have participated in at least two years of the professional development program are statistically significantly greater than those of the university instructors who have not participated in professional development (and their students), then professional development would be correlated as a valid predictor variable (contributing factor). Thus, it would outline a potential for improving instructor knowledge, and hence teacher knowledge. The concluding hypothesis would be that when professional development programs instill such knowledge in university instructors, pre-service teachers can improve, and hence, students' reading achievement can improve. Increased reading achievement results in better lives.

## **CHAPTER II**

### **REVIEW OF THE LITERATURE**

#### **What Does Research Say About Reading Skills and Research-Based Reading Instruction?**

Evidence-based reading practices are synonymous with scientifically-based reading research (SBRR), which refer to application of rigorous, systematic, and objective procedures to obtain valid knowledge relevant to reading development, reading instruction, and reading difficulties (Fletcher & Francis, 2004). According to the Reading Excellence Act (1998), some of the criteria included in SBRR are research studies that employ systematic, empirical methods that draw on observation or experiment; involve rigorous data analyses; and have been accepted by a peer-reviewed journal or have undergone rigorous, scientific review.

The federal government created the National Reading Panel to perform a meta-analysis that reviewed all scientifically-based reading research studies and, in 2000, outlined the findings that had been repeatedly replicated. According to National Reading Panel (NICHD, 2000), the five essential components of reading based on scientifically-based reading research include explicit, systematic instruction in phonemic awareness, phonics, fluency, vocabulary, and comprehension.

The first element, phonemic awareness, defined as the ability to notice, think about, or manipulate the individual sounds (phonemes) in words, serves as a critical bridge between spoken language and written language, and thus, phonemic awareness is a prerequisite for decoding. Repeatedly, studies have proven that children with good



phonemic awareness have more success in learning to read and spell (NICHD, 2000).

However at the same time, only 17% of kindergarteners enter school with some phonemic awareness skills; but a key realization is that training in phonemic awareness improves reading skills (NICHD, 2000). Phonemic awareness training includes practice with activities that isolate, identify, categorize, blend\*, segment\*, delete, add, and/or substitute the beginning, end, and/or middle phoneme(s) of words (\*most important). Such training is best performed focusing on one or two skills at a time, in small groups, for small periods of time, and in connection with letters.

The second element, phonics (also referred to as the alphabetic principle), is the relationships between the letters of written language and the individual sounds of spoken language (graphophonemic or letter-sound correspondences). Perhaps one of the most critical findings and realizations for quality phonics instruction is that systematic and explicit phonics instruction (particularly the synthetic approach – convert letters to sounds, then blend sounds to words) is more effective than non-systematic or no phonics instruction (NICHD, 2000). Such systematic and explicit phonics instruction greatly enhances children's word recognition (decoding), spelling, and reading comprehension, is effective for children from various social and economic levels, and is particularly beneficial for children who are having difficulty learning to read and who are at risk for developing future reading problems. Teachers must understand that systematic and explicit phonics instruction is most effective when introduced early (e.g., kindergarten and first grade), and also that while systematic and explicit phonics instruction is critically important, it is not an entire reading program for beginning readers.

While there are many additional research-based strategies for specifically developing fluency, vocabulary, and text comprehension skills outlined by the NRP, a mastery of basic language constructs in phonemic awareness and the alphabetic principle early in reading development are necessary prerequisites that enable the development and refinement of fluency, vocabulary, and, the ultimate goal of reading, comprehension.

### **The Situation: Current Teacher Knowledge**

In 1994, Moats set out to determine if teachers possess awareness of language elements (e.g. phonemes and morphemes) and of how these elements are represented in writing (e.g. knowledge of sound-symbol correspondences) by testing experienced teachers of reading, language arts, and special education. In this breakthrough study, the results indicated that, on a typical basis, even highly motivated and experienced teachers have a poor understanding about spoken and written language structure, even though such knowledge is believed to be necessary in providing effective instruction in these areas.

A survey of preexisting knowledge was given to 89 subjects, consisting of an equal number of reading teachers, classroom teachers, special education, teachers, speech-language pathologists, classroom teaching assistants, and graduate students of varying college and teaching experiences and backgrounds. The survey assessed the specificity and depth of teachers' "knowledge of speech sounds, their identity in words, correspondence between sounds and symbols, concepts of language, and presence of morphemic units in words" (Moats, 1994, p. 89). Tasks included defining terms; locating or giving examples of phonic, syllabic, and morphemic units; and analyzing words into speech sounds, syllables, and morphemes.

Survey results indicated an inadequate understanding of language concepts and persistent weaknesses related to the concepts of the very skills that are needed for direct, language-focused reading instruction, such as the ability to count phonemes and to identify phonic relationships:

- Terminology: The majority of tested subjects could not accurately define or discriminate between related terms, such as inflection, derivation, compound, affixed, phonetics, phonology, phonics, phonological awareness, speech sound, and phoneme.
- Phonic Knowledge: Approximately 10-20% of all tested subjects consistently identified consonant blends in written words. Nearly 0% of those tested could reliably identify a consonant digraph, while less than half of the participants could identify schwa consistently and 30% could explain when ck was used in spelling.
- Phoneme and Morpheme Awareness: Only 27% of subjects could identify the component morphemes of transparent words and only 25% of this group knew that “ox” is comprised of three speech sounds. The tested teachers were typically unable to recognize the nasal /n/ (as in “lung”) and the glides /w/ and /y/.
- Spelling Rules and Conventions: “Ignorance was the norm” (Moats, 1994, p. 93): Few participants could explain why the “t” is doubled in “committed” but not in “commitment.”
- Other Misconceptions: Common beliefs expressed by participating teachers include “the letters ‘ng’ represent an amalgam of /n/ and /g/...the letter x corresponds to /z...silent letters such as those in balk, calm, and comb should be

pronounced...digraphs such as 'th' represent a melding of two consonant phonemes (/t+/h) rather than a unique phoneme...a doubled consonant such as the t's in 'little' represents two distinct speech sounds" (Moats, 1994, p. 93).

Such results indicate that even literature and experienced teachers typically have a lack of understanding of spoken and written language structure and thus, would be unable to explicitly teach such essential skills to beginning and struggling readers. The indicative conclusion of this 1994 study is that teachers were unfortunately, yet commonly, misinformed about the differences between speech and print and about how print represents speech.

A later similar study again revealed (Moats & Lyon, 1996) that teachers have "insufficiently developed concepts about language and pervasive conceptual weaknesses in the very skills that are needed for direct, systematic, language-focused reading instruction, such as the ability to count phonemes and to identify phonic relationships" (p. 79).

Other researchers (Bos et al., 2001) looked to investigate the perceptions and knowledge of preservice and inservice educators about early reading instruction. "Specifically, we examined whether educators were knowledgeable about recent research findings that identify critical components of instruction for teaching reading to a broad range of learners (NICHD, 2000; Snow et al., 1998) and were favorably disposed to using an explicit, systematic approach for students who struggle to learn to read" (Bos et al., 2001, p. 114). Subjects in this study consisted of 252 preservice educators (either in the semester before or semester of student teaching) and 286 inservice educators (with varying degrees of teaching experience). The authors used a perception survey, entitled "Teacher Perceptions About Early Reading and Spelling," to measure teachers attitudes towards explicit versus

implicit instruction and a knowledge assessment, entitled “Teacher Knowledge Assessment: Structure of Language,” to examine knowledge of the structure of the English language at both the word and sound levels as well as their perceived preparedness.

The researchers concluded “preservice and inservice educators demonstrated limited knowledge of phonological awareness or terminology related to language structure and phonics” (Bos et al., 2001, p. 98). Assessment results showed that 53% of pre-service and 60% of inservice educators were unable to correctly answer nearly half of the “Knowledge of Language Structure” questions. Educators with more than 11 years of teaching experience did demonstrate greater knowledge of language structure than educators with zero to five years of teaching experience, and special educators demonstrated more knowledge than general educators. However, all groups had scores which fell below two-thirds correct. Furthermore, less than two-thirds of both the pre-service and inservice educators had mastered the meanings of structured language terminology (e.g. syllable, consonant blend, and digraph). Although over 50% of the pre-service and inservice teachers were able to segment the phonemes in a two-phoneme word, they were unable to do this for four-phoneme words. However, there were a few items which were answered correctly by nearly 100% of the pre-service and inservice teachers: defining a phoneme, identifying a short vowel sound, and identifying the two words that began with the same sound.

Although teachers indicated that they believe such reading instructional practices are important, their knowledge in such “important” practices is lacking. Results indicated that inservice teachers believe (with a mean of 5.27 on a Likert Scale of 1 to 6) that poor phonemic awareness contributes to early reading failure, two-thirds thought that

phonological awareness was “a method of reading instruction that begins with individual letters and sounds.” Furthermore, both preservice (M=5.59) and inservice (M=5.79) educators indicated that they strongly believe that K-2 teachers should know how to teach phonics, but their scores on the phonics items on the knowledge assessment indicated that they lacked basic knowledge.

The participants perceived themselves as only somewhat prepared to teach early reading to struggling readers. The results from the perception survey indicated that the subjects possess positive attitudes toward explicit and implicit code instruction, with inservice educators more positive about explicit code instruction than pre-service educators and pre-service educators more positive about implicit code instruction. “The relationships between educators' perceptions of their preparedness to teach and the attitude ratings and knowledge scores indicate that in general, pre-service educators attitudes toward a particular instructional approach may have had a greater effect on their feelings of preparedness to teach than their inservice colleagues” (Bos et al., 2001, p. 115). In other words, pre-service educators who favored an explicit approach felt more prepared to teach all children, struggling readers, as well as phonological awareness and phonics. But this finding was not replicated with the inservice teachers, in which those who had a more positive attitude toward explicit instruction perceived themselves as more prepared to teach phonological awareness and phonics, but not to teach all readers or struggling readers. The results of the study also showed that for both pre-service and inservice teachers, those who feel more confident with the knowledge of language structure also perceived themselves as more prepared to teach all children how to read. On the other hand, educators in both groups

who felt more positive about implicit code instruction seemed to feel more prepared to teach using whole language.

The findings from this study highlight a “mismatch between what educators believe and know and what convergent research supports as effective early reading instruction for children at risk for reading difficulties” (Bos et al., 2001, p. 98). The results indicate scientifically based reading research practices have not been communicated effectively to teachers. And thus, the educators who are directly responsible for teaching children how to read have relatively limited knowledge about the structure of the English language (which has been proven essential to early reading success and overcoming reading difficulties) and are confused about the differences between phonological awareness and phonics, and therefore, would be limited in their skills to teach reading explicitly to children who struggle.

McCutchen et al. (2002b) investigated relationships among elementary teachers’ reading-related content knowledge (knowledge of literature and phonology), their philosophical orientation toward reading instruction, their classroom practice, and their students’ learning. Results indicated that instructional philosophy and content knowledge were not highly correlated, nor were instructional philosophy and classroom practice. But results did indicate a correlated relationship between content knowledge and instruction, as well as between kindergarten teachers’ phonological knowledge and their students’ reading achievement. The participating teachers demonstrated that they were not strict in either their philosophical beliefs about reading or their instructional practices, and teachers’ content knowledge, rather than their philosophical beliefs, best predicted classroom practice. The authors claim that “such a finding illustrates the importance of the call from the National Reading Panel (2000) for more research on the knowledge base needed to

teach reading effectively, especially knowledge of phonology” (p. 224). As the authors’ goal was to “begin to disentangle discussions of teacher content knowledge from discussions of instructional philosophies,” (p. 224), the authors recommend that “the recent focus on teacher's disciplinary knowledge be broadened to include teachers of beginning reading and that teachers be afforded opportunities to develop the necessary knowledge base to teach reading effectively” (p. 207).

Surprising gaps in teachers’ knowledge of learning to read and teachers’ lack of basic knowledge of reading that would seem necessary for teacher certification were also found by Moats and Foorman (2003). Through a longitudinal, four-year study of reading instruction in low-performing, high-poverty urban schools and the use of teacher knowledge surveys regarding reading-related concepts, Moats and Foorman explored the type and level of questions that would begin to discriminate more capable from less capable teachers and that would have a predictive relationship with student reading achievement outcomes. Measures of teacher content knowledge in language and reading were refined in a three-stage process: After experimenting with measurement of K-2 teachers’ content knowledge (Form #1), a new Teacher Knowledge Survey was created and administered with 41 second and third grade teachers in one study site (Form #2). The survey was again refined and expanded (Form #3) and administered to 103 third and fourth grade teachers in both project sites. “Teachers’ misconceptions about sounds, words, sentences, and principles of instruction were pinpointed so that professional development could address teachers' needs for insight and information about language structure and student learning” (p. 23):



The multiple-choice measures targeted specific understandings of language and reading processes, not philosophies, attitudes, or knowledge of reading methods. Most elusive among the essential understandings were a) the differentiation of speech sounds from letters; b) the ability to detect the identity of phonemes in words, especially when the spelling of those sounds is not transparent; c) knowledge of the letter combinations (graphemes) that represent many phonemes; d) conceptualization of functional spelling units such as digraphs, blends, and silent-letter spellings; e) the conventions of syllable division and syllable spelling; f) the linguistic constituents of a sentence; g) the recognition of children's difficulties with phonological, orthographic, and syntactic learning; and h) comprehension of the ways in which the components of reading instruction are causally related to one another. (p. 37)

The authors were able to establish a modest predictive relationship between teachers' knowledge, classroom reading achievement levels, and teachers' observed teaching competence, particularly at the third and fourth grade levels.

The results of this study suggest that teachers will most likely not learn such essential elements of reading instruction if they must rely only on teaching experience, use of structured reading programs, use of screening tests, or willingness to implement higher academic standards. However, the teachers in this study improved with coursework, which suggests that teachers' formal knowledge is acquired through explicit instruction and ample practice with each of the concepts at issue.

The findings of many previous researchers (Bos, Mather, Dickson, Podhajski, & Chard, 2001; Mather, Bos, & Babur, 2001; McCutchen, Abbott, & Green, 2002; Moats,

1994, 1999; Scarborough, Ehri, Olson, & Fowler, 1998) were reinforced again by Spear-Swerling and Brucker (2003): Pre-service and inservice teachers often lack knowledge about word structure. This study examined teacher education students' knowledge about word structure and measured improvements in their knowledge as a result of instruction, as assessed by three tasks: graphophonemic segmentation, classification of pseudowords by syllable type, and classification of real words as phonetically regular or irregular. Subjects were from a special education certification program, including both pre-service and inservice teachers.

The task which was not affected by preparation was a graphophonemic segmentation task, which suggests that the participants' preparation did not address or improve this type of knowledge (Spear-Swerling & Brucker, 2003). The researchers also found that experience with teaching reading did not increase teachers' word-structure knowledge, but participants with preparation did perform better on two out of three pre-test tasks. Perhaps one the most startling facts from their study was that "none of the participants, including many who were already elementary or special educators responsible for teaching reading, performed at a high level on all three tasks at pre-test, and few performed at a high level on any task," as well as the fact that "almost none had had intensive structured phonics preparation" (Spear-Swerling & Brucker, 2003, p. 89). The authors found "conclusions support the viewpoint that teacher education must include information about English word structure for educators who will teach reading and suggest that sufficiently intensive instruction may be important in developing word-structure knowledge" (p. 72).

Assessments of kindergarten through third grade teachers' actual and perceived reading-related subject matter knowledge were performed by Cunningham et al. (2004). The authors found that not only do teachers know very little about children's literature, phonemic awareness, and phonics, but also that teachers overestimate their knowledge of reading and are unaware of what they do and do not know:

The results of our study indicate that the knowledge base of many K-3 teachers is not aligned with the large and convergent body of research demonstrating the key role that component processes such as phoneme awareness and the alphabetic principle play in learning to read. The appropriate response to these findings would be to act to improve the level of knowledge of our teachers in these critical domains. We should continue to turn our attention toward improving teacher preparation and teacher development in the area of early literacy by highlighting the direction that reading education for both preservice and in-service teachers might take. (p. 161)

An examination of pre-service, general and special education teachers' attitudes towards and knowledge of metalinguistics (awareness of language structure) in the process of learning to read was performed in Australia (Fielding-Barnsley and Purdie, 2005). Subjects in the study consisted of 93 pre-service teachers, 209 general teachers, and 38 special education teachers from Queensland, Australia, who were surveyed using an adapted questionnaire from the *Teacher attitudes about early reading and spelling survey* and the *Survey of linguistic knowledge*. While teachers demonstrated a positive attitude towards the importance and role of metalinguistics in the process of learning to read (for both meaning-based and, particularly, code-based reading instruction and independent of years of teaching

experience), results indicated a poor knowledge of metalinguistics in the process of learning to read. However, an interesting note is that special education teachers performed statistically significantly higher than both other groups on aspects of attitude and knowledge.

As one might hypothesize, specialist teachers demonstrated the most knowledge, although as a group they only achieved a 73% success rate on the 10 questions (of which, no one had a perfect score). Pre-service and general teachers scored an average of 54% and 62% correct answers, respectively. Overall, teachers exhibited more basic knowledge but were less successful on the more complex aspects of language. For example, 92% of subjects demonstrated knowledge of short vowel sounds and 89% correctly counted the number of syllables in “unbelievable,” while 54% of subjects were not able to give the correct definition for a syllable (authors’ definition: a pronounceable group of letters containing a vowel). Furthermore, only 24% of participants were able to correctly count the sounds in words (e.g. “box”). On questions that required knowledge of voiced/unvoiced sounds, diphthongs, and schwas, the participating teachers scored 20%, 22%, and 31%, respectively.

### **Improving the Situation: Teacher Training in Basic Language Constructs**

The critical features of effective teacher training programs in reading must include a balance of oral language, phonemic awareness, phonics, word identification, fluency, vocabulary, comprehension, the assessment of all aspects of literacy learning and managing literacy instruction across grade levels (International Reading Association, 2003). As the findings of Bos and colleagues suggest that teachers generally lack the knowledge or

preparation to adequately instruct students with dyslexia and related reading problems, the authors suggest important implications for teacher training:

Teacher preparation does not apparently include sufficient or indepth content training (Hill, 2000) and may seriously impact implementation of recommendations such as those offered by the National Reading Panel (NICHD, 2000) for the use of systematic phonics instruction. We concur with Lyon (1999) that teacher preparation and professional development programs...must “develop preparation programs to foster the necessary content and pedagogical expertise at both preservice and inservice levels” (p. 8).

(p. 117)

As research suggests that training can increase teachers’ knowledge and use of systematic instruction that will assist at-risk children with reading development (Bos et al., 1999; McCutchen & Berninger, 1999; O’Connor, 1999) and given the great amount of research that emphasizes the importance of teaching phonological awareness and phonics, teacher training programs must instill teachers with the foundational knowledge necessary for providing early systematic research-based reading instruction.

In 1999, Moats prepared a paper entitled *Teaching Reading Is Rocket Science: What Expert Teachers of Reading Should Know and Be Able To Do for the American Federation of Teachers*. Moats took the stance that preventing reading failure was a top priority for education and took stock of teacher preparation in reading. She found that the difficulty of teaching reading had been underestimated in that “teaching reading is a job for an expert” (p. 4) and “to understand printed language well enough to teach is explicitly requires disciplined study of its systems and forms, both spoken and written” (p. 6). Teachers’ under-preparation to

teach reading was attributed to the knowledge base for teaching reading as being “hidden, extensive, and complex” (p. 11) in that “only recently has basic research allowed the community of reading scientists and educators to agree on what needs to be done” (p. 2), as well as a lack or absence of meaningful professional standards; a lack or absence of textbooks with “accuracy, currency, depth, clarity, and relevance” (p. 13) in the teaching of reading; and uninformative classroom instructional programs. Components of an improved curriculum for teacher preparation, as well as inservice professional development are outlined: (1) Knowledge of the psychology of reading and reading development (including basic facts about reading, the characteristics of poor and novice readers, and how reading and spelling develop): “Learning to read is not natural or easy for most children. Reading is an acquired skill.” (p. 10); (2) Language as the foundation for reading instruction (including the knowledge of language structure and application to teaching for phonetics, phonology, morphology, orthography, semantics, and syntax and text structure): “Language knowledge and language proficiency differentiate good and poor readers.” (p. 15); (3) Practical skills of instruction in a comprehensive reading program (including opportunities for supervised experience and use of validated instructional practices): “At every level, teachers need to connect the teaching of skills with the joy of reading and writing, using read-alouds and the motivating activities popularized by the whole language movement.” (p. 21); and (4) Assessment of classroom reading and writing skills.

Suggestions for the future of teacher preparation and professional development in reading outlined by Moats eight years ago include: (1) Research should guide the profession; (2) Establish core standards, curriculum, and entry level assessments for new teachers; (3) Align teacher education curricula, standards for students and licensing requirements for

teachers; (4) Create professional development institutes for professors and master teachers; (5) Press the developers of textbooks and instructional materials to improve their products; (6) Promote high quality professional development for teachers; and (7) Invest in teaching. Yet, in 2006, NCTQ (Walsh, Glaser, & Wilcox, 2006) analyzed the syllabi and textbooks of 72 elementary education programs and found that 15% taught all of the components of the science of reading and 4 of the 226 texts used were found acceptable for teaching the science of reading. Highlighting the need for improved teacher preparation to teach reading, writing, and spelling is done to prompt action rather than criticism. Just as children deserve to be taught to read by their teachers, teachers deserve to be prepared with the knowledge, skills, and supported practice that will enable them to successfully teach reading.

Other researchers sought to determine links among teacher knowledge, teacher practice, and student learning (McCutchen, Abbott, Green, Beretvas, Cox, Potter, et al., 2002a). The study consisted of 44 subjects, with 24 teachers in the experimental group and 20 teachers in the control group, all with varying degrees of teaching experience. The teachers' knowledge of the structure of language was assessed through the administration of the Informal Survey of Linguistic Knowledge (developed by Moats, 1994; Moats & Lyon, 1996), and the teachers' general knowledge was assessed through the administration of a 45-item cultural literacy test (developed by Stanovich and Cunningham, 1993). Teacher practice was measured through observations of all participating teachers' literacy instruction across the school year, which were recorded with extensive field notes and then coded based on four broad categories: knowledge affordance, literacy activity, textual context, and group context. (Reliability of coding procedures was assessed through double-coding 10%

of the classroom observations, which produced reasonably high reliability correlations [ $r=.72-.99$ ].)

Data was also collected from 492 kindergarten and 287 first-grade students across 43 classrooms (23 experimental and 20 control classrooms). Student learning was measured through the administration of four assessments (in September, November, February, and May), including measures of the students' phonological awareness (Test of Phonological Awareness [TOPA]; Torgesen & Bryant, 1994), listening comprehension (from the Metropolitan Readiness Tests [MRT6]; Nurss & McGauvran, 1995), and orthographic fluency (a timed alphabet writing task validated by Berninger & Rutberg, 1992). At the end of the year only, kindergartners' word reading was assessed using the Gates-MacGinitie (MacGinitie & MacGinitie, 1989). Student learning was measured in the first-grade classrooms through three assessments (in September, January, and May), including measures of children's phonological awareness (the TOPA, early elementary level), reading comprehension (from grade-appropriate Gates- MacGinitie Comprehension and Vocabulary subtests), orthographic fluency (Berninger & Rutberg, 1992), spelling (a group-administered adaptation of the Spelling subtest of the Wechsler Individual Achievement Test [WIAT]; Wechsler, 1991), and composition (using developed story prompts).

The primary intervention (or treatment for the experimental group) took the form of an intensive two-week instructional institute that involved day-long (approximately 9 a.m. to 4 p.m.) interactions between teachers and a team of university researchers. Considerable time was devoted to deepening the experimental group teachers' understanding of research about learning disabilities and effective instruction, stressing the importance of explicit instruction in phonological and orthographic awareness (see McCutchen & Berninger, 1999



for a detailed description of such instruction). The teachers in the experimental group attended the institute during the summer prior to classroom observations, and these teachers and the university team reconvened for three follow-up sessions in October, February, and May to discuss implementation, address emergent issues, and review topics requested by teachers.

Preliminary data on teacher knowledge replicated the same findings of Moats (1994) eight years later: Although some teachers are familiar with some terms, teachers still do not possess an explicit understanding of English phonology. Results also found that teachers can more adequately match students with age-appropriate texts than support student acquisition of phonological awareness. “However, comparisons between experimental group teachers’ pre- and posttest scores on the Moats phonological survey indicated that this group did deepen their phonological knowledge after our instruction,  $F(1, 23) = 11.43$ ,  $MSE = 59.33$ ,  $p < .01$ ” (McCutchen et al., 2002, p. 75).

As for kindergarten teacher practice, experimental group teachers spent statistically significant more time on activities directed toward phonological awareness ( $M = 7.8$  minutes) than control group teachers ( $M = 3.3$  minutes) across the year, with an effect size of .82. Both experimental group teachers and control group teachers spent considerable time on orthographic activities ( $M = 7.04$  minutes and  $M = 5.85$  minutes, respectively). First grade experimental group teachers spent statistically significant more time on explicit comprehension instruction ( $M = 1.89$  minutes) than control group teachers ( $M = .02$  minutes), with an effect size of .72. Again, both groups of teachers spent no statistically significant differences on orthographic activities.

In kindergarten, when the teachers' implementation score was used as the predictor of starting point and growth, the teacher's use of phonological awareness strategies was statistically significantly related to students growth in phonological awareness [ $t(19) = 4.13$ ,  $p < .001$ ]. Furthermore, HLM analyses of growth in alphabet production showed that the effect of experimental condition on growth was statistically significant [ $t(19) = 2.42$ ,  $p < .026$ ]. "Children in the experimental conditional gained, on average, about 50% more in letter production than children in control classrooms" (McCutchen et al., 2002, p. 77). There was no statistically significant difference in listening comprehension scores, and thus, emphasis on phonological and orthographic activities did not compromise the students' listening comprehension growth. And finally, when teachers' actual use of phonological awareness teaching strategies was used as a predictor, teachers' use of more phonological awareness activities was statistically significantly related to students' end-of-year score on the word reading measure [ $t(20) = 2.50$ ,  $p < .023$ ].

For the first grade students, HLM analyses of phonological awareness indicated that condition was statistically significantly related to growth in phonological awareness [ $t(18) = 2.15$ ,  $p < .05$ ], with an average 36% increase in the slope of growth curves of children in the experimental classrooms. In reading comprehension, HLM analyses showed a statistically significant difference in growth [ $t(18) = 3.03$ ,  $p < .003$ ] between students in the experimental and control classrooms, with an average 60% increase in the slope of growth curves of children in experimental classrooms. Again, for reading vocabulary, HLM analyses showed a statistically significant difference in growth [ $t(18) = 2.23$ ,  $p < .039$ ] favoring students in the experimental classrooms whose slope analyses showed an average 29% increase in the slope of growth curves compared with children in control classrooms.

In spelling, a statistically significant difference in growth [ $t(18) = 3.54, p < .003$ ] was indicated, with a 37% increase in the slope of growth curves of children in experimental classrooms compared with children in control classrooms. And finally, HLM analyses indicated a statistically significant intercept difference associated with condition [ $t(18) = 2.11, p < .05$ ] and in growth [ $t(18) = 3.5, p < .003$ ] in composition fluency, with an average 100% increase in the slope of growth curves of children in experimental classrooms compared with children in control classrooms.

The findings of this study add to the mounting number of research studies that have documented a causal relationship between explicit alphabetic instruction and student learning (Ball & Blachman, 1991; Bradley & Bryant, 1985; Cunningham, 1990; Foorman et al., 1998; Foorman et al., 1997a; Lundberg et al., 1988; O'Connor, 1999; Torgesen, 1997; Vellutino et al., 1996). By focusing on teacher knowledge, teacher-generated instructional activities, and more advanced reading and writing skills, this study also yielded three important findings: (1) We can deepen teachers' own knowledge of the role of phonological and orthographic information in literacy instruction; (2) teachers can use that knowledge to change classroom practice; and (3) changes in teacher knowledge and classroom practice can improve student learning.

Other researchers examined the word-structure knowledge of new teachers and evaluated the progress of children tutored by a subgroup of the teachers (Spear-Swerling & Brucker, 2004). To assess teachers' word-structure knowledge, graphophonemic segmentation, classification of pseudowords by syllable type, and classification of real words as phonetically regular or irregular tasks were administered. Several measures of basic reading and spelling skills were used to assess the tutored children's progress. Results

indicated that the new teachers who received the word-structure instruction outperformed a control group of teachers who did not receive such instruction in knowledge of word structure at post-testing time. Furthermore, children who received tutoring improved statistically significantly from pre-test to post-test on all assessments. Statistically significant correlations were made between teachers' post-test knowledge on the graphophonemic segmentation / irregular words tasks and tutored children's progress in decoding phonetically regular words. Error analyses also indicated links between teachers' patterns of word-structure knowledge and children's patterns of decoding progress. Conclusions were drawn that word-structure knowledge is indeed important to effective teaching of word decoding, and therefore, there is a strong need include information about English word structure in both pre-service teacher preparation and inservice teacher training.

In this study, course instruction was consistently a more important influence on post-test performance than was prior background (on all three measures for Group 1 and on two out of three for Group 2). Furthermore, subjects in Group 1 (who supervised tutoring) scored higher on post-tests in comparison to the scores of Group 2 (who did not supervise tutoring, although they had statistically significant higher backgrounds). But because these differences were not statistically significant, it cannot be concluded that supervised tutoring experiences enhances teachers' word-structure knowledge beyond the benefits provided by course instruction. Another interesting note is that even after six hours of course instruction in word structure, many new teachers still performed below ceiling on the post-test (particularly in irregular word tasks), which suggests a need for more instruction.

Although it was not possible for the authors to obtain a control group of untutored children for comparison, tutored children consistently showed statistically significant progress in all specific areas of tutoring and the teachers' post-test performance patterns on the word-structure knowledge measures (including knowledge of letter sounds, decoding and spelling of phonetically regular words, and reading and spelling of irregular words). "This pattern suggests that knowledge acquired as part of course instruction influenced novice teachers' abilities to teach word decoding effectively" (p. 354).

Overall, the results yielded from this study support the belief (e.g., Brady & Moats, 1997; McCutchen & Berninger, 1999; Moats, 1994, 2000) that an understanding of word structure is important to effective decoding instruction. The novice teachers in this study were beginning to acquire some competence in teaching word-level reading skills, but results suggest that further preparation in this area was needed for the most benefit. Better pre-service preparation in English word structure could allow inservice professional development to focus on topics such as meeting individual differences and grouping children. Notable characteristics of the tutoring program which appeared particularly helpful in balancing the needs of the novice teachers and tutored children include:

- the use of a structured lesson plan emphasizing one or two basic techniques for developing specific skills
- focused assessments providing clear information about skills to work on in tutoring
- opportunities for novice teachers to practice administering assessments, as well as various instructional techniques, in university classroom sessions.

(p. 356)

The literature seems to consistently concur that the linguistic components of the English language need to be explicitly taught to teachers of reading, as informed teachers must understand the interdependence of these components in effective reading instruction.

- Learning vocabulary is facilitated by phonological processing (Baddeley, Gathercole, & Papagno, 1998)
- Proficiency in writing and spelling is related to proficiency in word attack strategies (Berninger & Richards, 2002)

Such understanding of the structure of the English language will enable teachers to analyze students errors in oral reading, written language (spelling, syntax, and semantics), and reading comprehension. Perhaps most importantly: “Results suggest that when effective practice is in the hands (**and heads**) of teachers, who work on the educational front lines, we may begin to hope for progress in the only reading war that really matters - the one against reading and writing disability” (McCutchen et al., 2002, pp. 81-82).

## CHAPTER III

### METHODOLOGY

The initial intent of this study was to determine whether university instructors of early reading education possess the knowledge of basic language constructs that the literature claims to be essential for early reading instruction and student success in learning to read (and additionally, if their pre-service teachers possess or lack this knowledge after coursework). The second intent of this study was to determine whether a university instructor professional development program in scientifically-based reading research would improve university instructor knowledge of basic language constructs (and hence, also improve their pre-service teachers' knowledge after coursework).

#### **The Instrument of Measurement**

##### *Survey of Basic Language Constructs*

To measure the university instructor and pre-service teachers' knowledge, a survey was developed that consists of 46 items refined from a former 52-item survey used in initial pilot studies (Joshi, Binks, Dean, & Graham, 2006). The survey is based on surveys and questionnaires used by other researchers in the field (Bos et al., 2001; McCutchen et al.,

2002b; Moats, 1994). Reliability for the survey scores for the data in hand was found to be 0.903 (Cronbach's  $\alpha$ ). (Copies of the university instructor and pre-service teacher surveys can be found in Appendices A and B. An answer key to the survey can be found in Appendix C.) The items assess both the teachers' perceived self-expertise in the different reading and literacy-related areas, as well as their knowledge of and own skills in different basic language constructs. Background information was collected for each participant on the survey, such as gender, race, location, and professional development experience.

Different types of knowledge assessed on the survey include definition of terms (e.g., phoneme and morpheme) and own ability to perform reading-related tasks (e.g., identification of the number of speech sounds in words like box and moon or of the number of morphemes in words like observer and heaven). Figure 1 outlines the item breakdown of the survey. Specific item categorizations may be found in Appendix D.



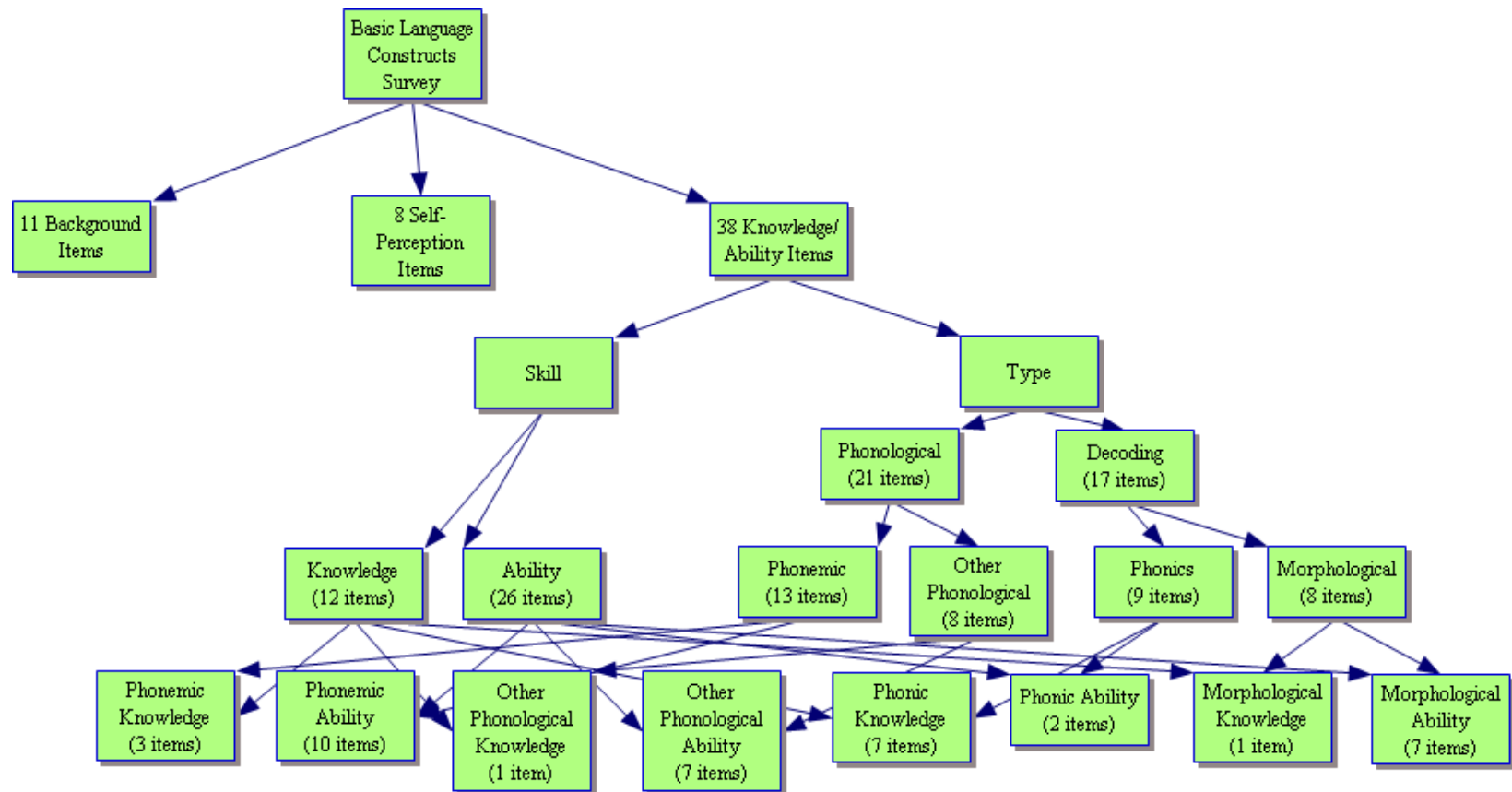


Figure 1 *Breakdown of Survey Items*

Note: Although there are 27 different numbered items on the survey, the actual total number of answers to be scored and evaluated for analysis per survey will total 46 when considering each separate answer into the total number. Eight items assess perception, while 19 [38] items assess knowledge.

### **The Participants**

University instructors include persons whom have instructed early childhood-4<sup>th</sup> grade (EC-4) pre-service teachers in reading education within the past academic year. The non-HEC (Higher Education Collaborative) university instructors include those who have voluntarily enrolled in the Higher Education Collaborative professional development prior to their actual participation in the program. The HEC university instructors include those who have voluntarily enrolled in the Higher Education Collaborative professional development and have participated in the program for a minimum of two years. Currently, HEC membership is comprised of over 200 instructors from nearly 70 teacher education programs, including those at public and private universities and colleges, community colleges, and alternative certification programs in Texas. Participation in the knowledge survey of basic language constructs was voluntary, both before and after HEC participation. Demographic information was collected and is presented in Table 1 for comparison in a non-respondent study. No significant differences were found between the overall population of university instructors in HEC and the university instructor survey respondents, offering some evidence that the university instructors who did not agree to participate are similar to those who did participate in the survey.

Table 1

*Demographic Comparison between Overall HEC Population and the University Instructor Survey Respondents*

*(HEC, 2006)*

	<b><u>Overall</u></b>	<b><u>Respondents</u></b>
<b><u>Category</u></b>		
<b><u>Total</u></b>	227	114
<b><u>Ethnic Distribution</u></b>		
White	84.58	89.45
Hispanic	8.81	6.35
Black	5.29	4.20
Other	2.64	0
<b><u>Gender</u></b>		
Male	12.78	13.04
Female	87.22	86.96
<b><u>Location</u></b>		
West Texas	5.10	4.17
North Texas	32.81	36.96
East Texas	12.35	15.22
South Texas	34.16	30.43
Central Texas	15.58	13.22

*Note.* All the values represent percentages with the exception of the Total, which is the actual number of university instructors.

Pre-service teacher participants were EC-4 teacher certification students and surveyed at the conclusion of their reading education coursework. Pre-service teacher participants were attending public and private universities and colleges, community colleges, and/or alternative certification programs in Texas for their teacher certification. Both pre-service teachers taught by HEC members and pre-service teachers not taught by HEC members were surveyed in their self-perception, knowledge, and ability in basic language constructs. The pre-service teachers taught by a HEC member(s) must have taken a reading education course from an HEC member within the past academic year. The purpose for including pre-service teachers in this study was to determine whether university instructor knowledge (lack of or increased) carries over to their pre-service teachers. Participation in the survey of basic language constructs was voluntary, for both those taught and those not taught by HEC members. Demographic information was recorded for comparison in a non-respondent study, as displayed in Table 2. No statistically significant differences were found between the overall population of new EC-4 teachers in Texas and the pre-service teacher survey respondents, offering some evidence that the pre-service teachers who did not agree to participate are similar to those who did participate in the survey.

Table 2

*Demographic Comparison between Overall New EC-4 Teacher Population in Texas and the Pre-Service Teacher Survey Respondents*

*(Fuller & Berry, 2006)*

	<b>Overall</b>	<b>Respondents</b>
<b><u>Category</u></b>		
<b><u>Ethnic Distribution</u></b>		
White	74.87	81.81
Hispanic	13.90	10.91
Black	3.21	1.82
Other	8.02	5.46
<b><u>Gender</u></b>		
Male	6	3.64
Female	94	96.36

*Note.* All the values represent percentages.

All survey participants were strongly discouraged from using outside resources to complete the survey through a prefaced statement as well as limited time to complete the survey (45 minutes, with the average time to complete the survey during pilot testing being 20 minutes) and the ability to only access the survey once. The participants were informed that the responses shall remain anonymous and no form of individual evaluation will be conducted. However, university information for each participant was obtained for respondent analysis purposes. Figure 2 displays the breakdown of survey participants.

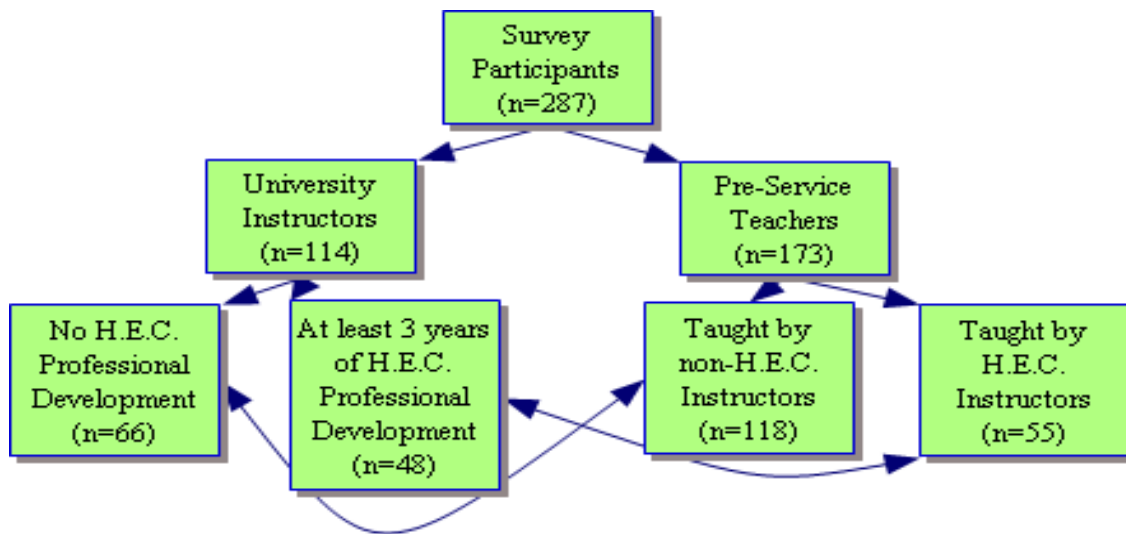


Figure 2  
*Breakdown of Survey Participants*

### The Intervention

The Higher Education Collaborative (HEC) is a professional development program formed in 2000 and funded by the Texas Education Agency (TEA) designed for university instructors of reading education. Its purpose within the Texas Reading First Initiative is to engage faculty members from Texas colleges and universities to actively support efforts to improve the reading achievement of Texas students. Figure 3 outlines the membership growth of HEC since its conception in the year 2000.

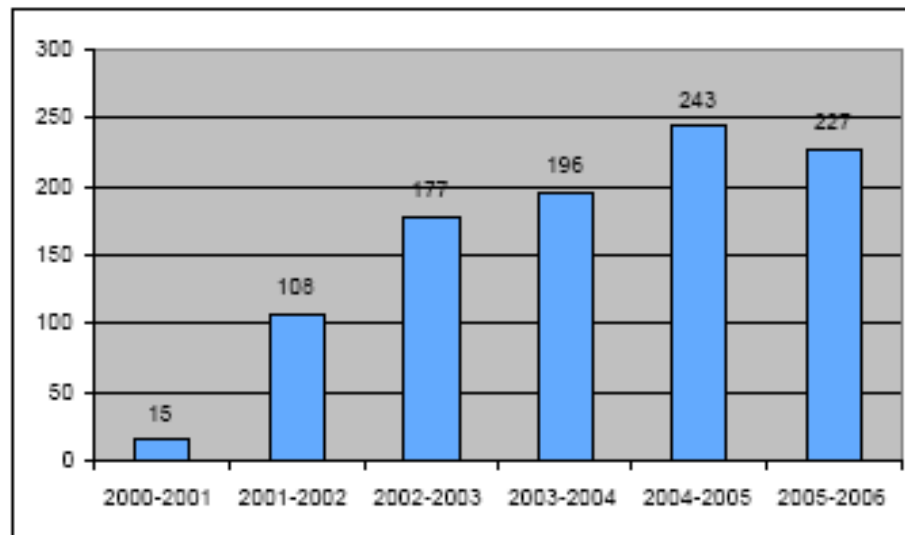


Figure 3  
*HEC Membership Growth*  
 (HEC, 2006)

The main goal of HEC is to support the alignment of teacher preparation course curricula with scientifically-based reading research (SBRR). Its specific objectives include:

1. Assure that teacher educators and educational administration educators are knowledgeable about components of SBRR and incorporate these critical components into teacher preparation courses.
2. Provide materials based on SBRR to teacher educators for use in preparing EC-4 teachers.
3. Establish a community of members who collaborate in the ongoing process of adjusting their instruction and materials to ensure the preparation of highly qualified teachers.

This program of professional development for teacher educators addresses topics such as early intervention and reading remediation materials, programs, and approaches and ensures that HEC professional development is provided by qualified, highly-trained providers. Rather than relying on how they were initially taught, or what they intuitively think is effective in teaching struggling students, faculty members of the HEC are provided with knowledge and practices validated by SBRR and scientifically based reading instruction (SBRI).

HEC members submit their revised syllabi (revised since participating in HEC) each year to be reviewed for the integration of SBRR information (which is followed by recommendations). There has been a 175% increase in the integration of SBRR in teacher educators' syllabi after the attendances of seminars. Table 3 outlines syllabi evaluation scores from the 2005-2006 school year.

Table 3

*HEC Syllabi Evaluation Scores*

*(HEC, 2006)*

	Number of	Average
Syllabi	syllabi	score
Old	40	3.75
Revised	133	5.94



To meet the professional development goal and objectives of HEC, members are invited to attend collaborative seminars in which they discuss research-based practices with leaders in the field of reading and engage in discussions with peers on how best to incorporate these practices into their courses. The HEC provides the financial support for members to attend seminars and a means to collaborate with colleagues. Members are asked to evaluate the presentations and sessions they attend at the conclusion of each seminar, based on the following seven questions:

1. The speaker was sufficiently prepared.
2. The speaker showed mastery of the topic presented.
3. The speaker communicated effectively and presented information clearly.
4. This session increased my understanding of the topic.
5. The materials/research presented were up-to-date and useful.
6. What I learned in the session has useful implications for my classroom.
7. I would recommend the session to my colleagues. (HEC, 2006)

Figures 4, 5, and 6 display HEC members' evaluations of different speakers' presentations from these seminars in October 2005, February 2006, and May 2006, respectively.

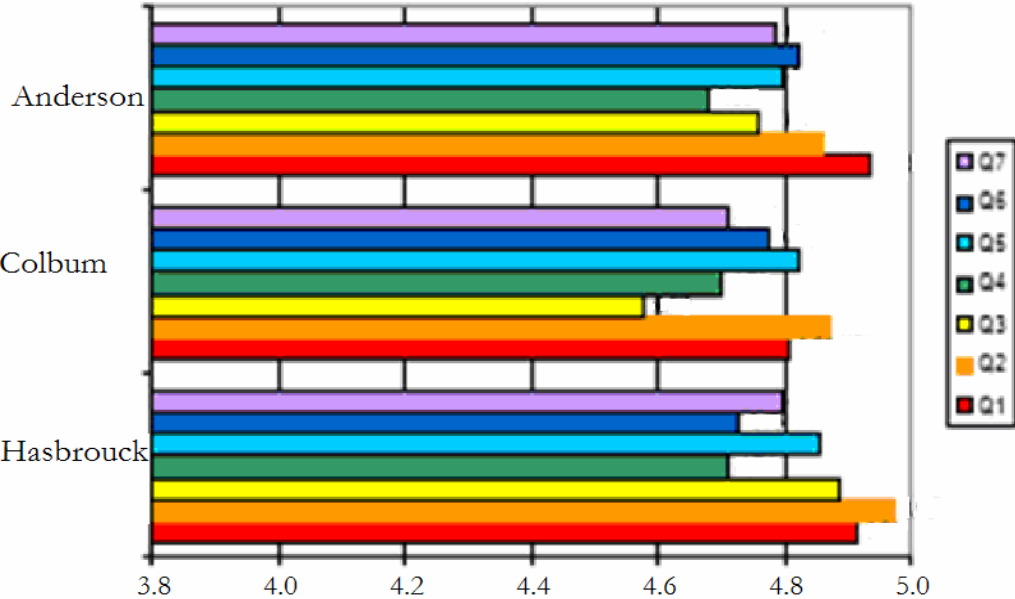


Figure 4  
*Evaluations of HEC Seminar Speakers' Presentations, October 2005*  
(HEC, 2006)

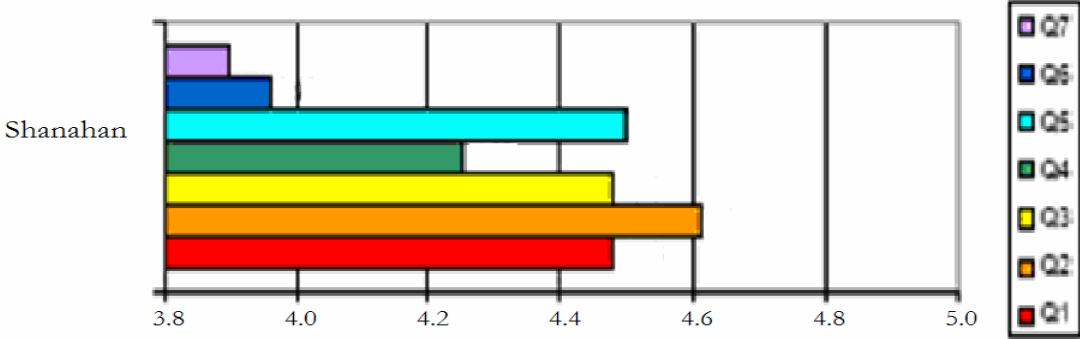


Figure 5  
*Evaluations of HEC Seminar Speakers' Presentations, February 2006*  
(HEC, 2006)

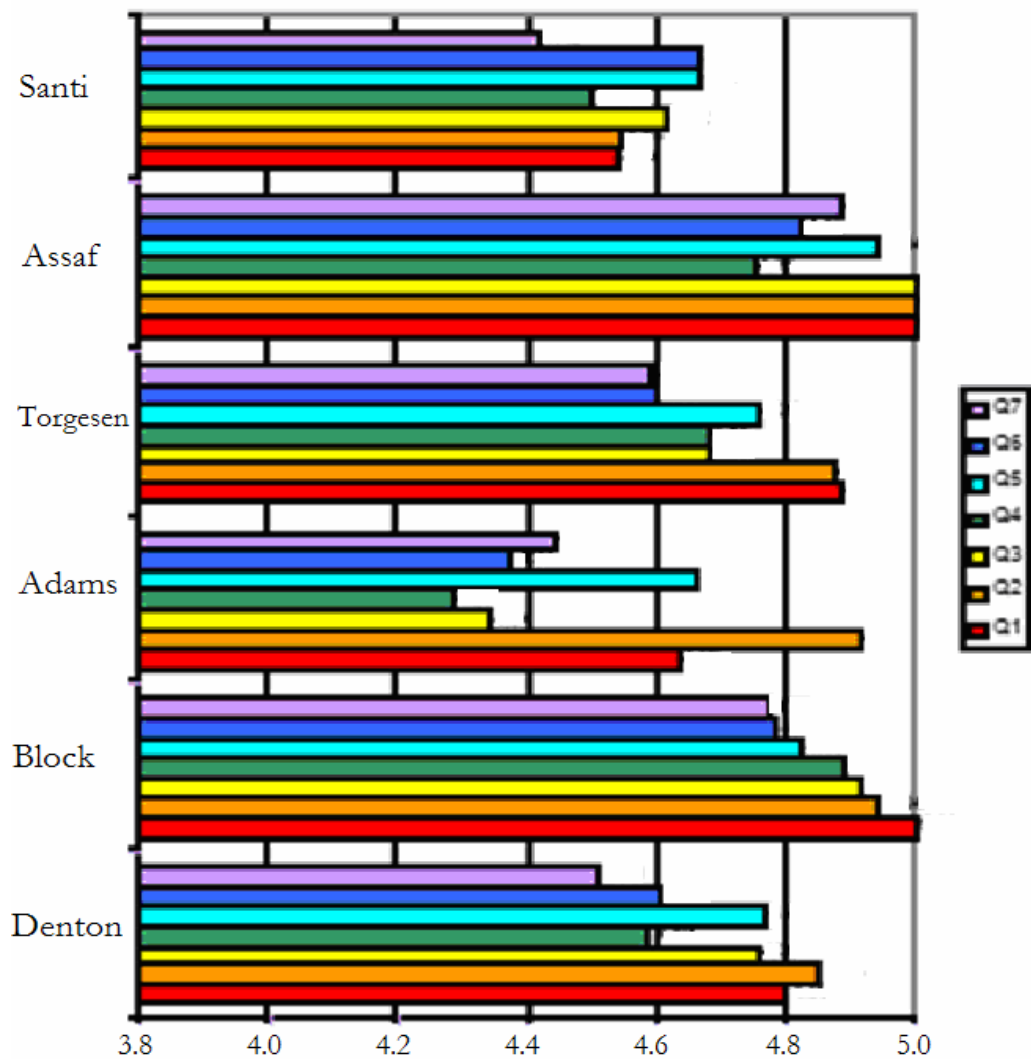


Figure 6  
*Evaluations of HEC Seminar Speakers' Presentations, May 2006*  
 (HEC, 2006)

Members also receive materials designed to assist with the integration of SBRR into their courses. Table 4 outlines materials disseminated to HEC members during the 2005-2006 school year. Figure 7 displays members' ratings of the materials' usefulness.

Table 4

*Materials Disseminated to HEC Members**(HEC, 2006)*

Title	Number
National Research Council: Starting Out Right	45
National Research Council: Preventing Reading Difficulties	44
PRE: A Focus on Fluency and Assessing Reading Fluency	43
Put Reading First Parent Information Brochures (Spanish and English)	43
Kindergarten Online Teacher Reading Academy (OTRA) CD	71
First Grade Online Teacher Reading Academy (OTRA) CD	71
Second Grade Online Teacher Reading Academy (OTRA) CD	72
Third Grade Online Teacher Reading Academy (OTRA) CD	46
Put Reading First Booklet	47
Special Education Reading Project (SERP) Elementary Institute	120
Special Education Reading Project (SERP) Secondary Institute	120
New Light on Literacy: Early Reading Intervention for English Language Learners	43
Developing Literacy in Second-language Learners	95

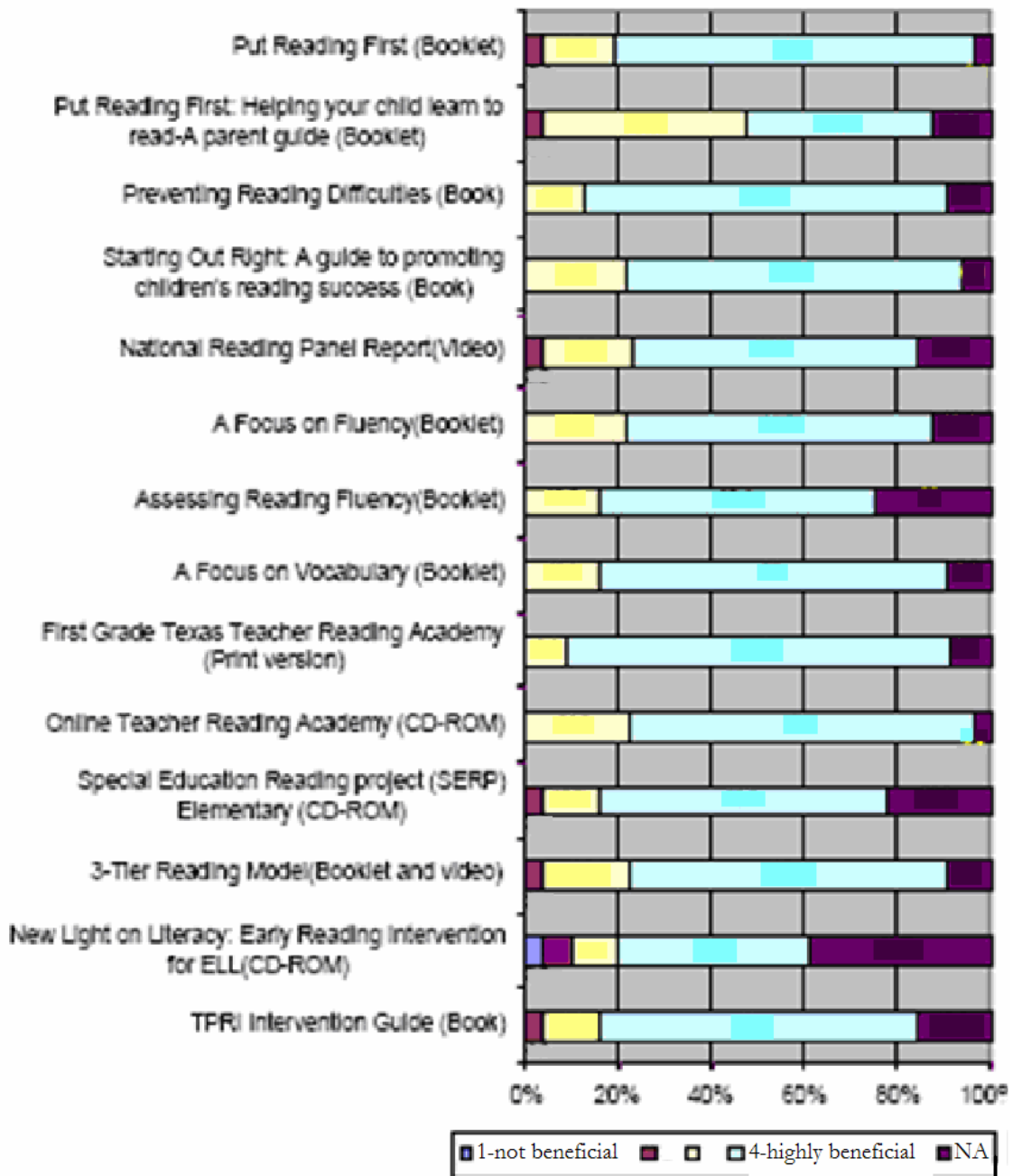


Figure 7  
*HEC Members' Ratings of the Materials' Usefulness*  
 (HEC, 2006)

Furthermore, collaboration among members is enhanced through the implementation of an online community, HEC Online, where faculty members can share information. Research reports, sample syllabi, and other information are posted online. Members can participate in a running dialog regarding issues of concern, as well as participate in special features such as conversing with a reading expert on the “Ask an Expert” feature. Table 5 indicates the frequency usage of HEC Online by members. Figure 8 displays members’ ratings of the benefits of HEC Online. HEC members share journal articles; discuss textbook selection, student assignments and activities; and collaborate on research and publications. Participants may request an HEC staff member, as well as other HEC members, to model lessons, review syllabi, assist with course content alignment, and make presentations for students and faculty at their respective institutions. Additionally, project staff members provide ongoing assistance through site visits and online support.

Table 5

*Frequency Usage of HEC Online (HEC, 2006)*

Frequency	Number of Users	Criteria
High	3	30 or more topics/responses
Dependable	2	20-29 topics/responses
Occasional	5	10-19 topics/responses
Infrequent	29	1-9 topics/responses
Login - no post	52	
Nonusers	136	
Total	227	Total active members of 2005-2006

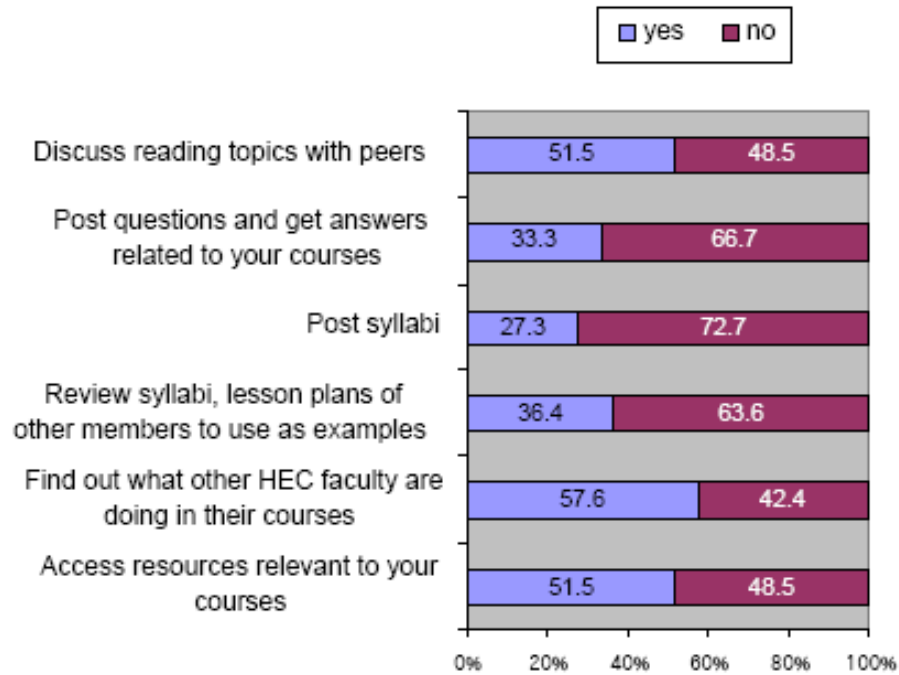


Figure 8  
*HEC Members' Ratings of the Benefits of HEC Online*  
 (HEC, 2006)

Members have reported that there are six activities that are most useful to them:

1. Dissemination of research-based materials for use in the college classroom;
2. Online support and collaborative opportunities;
3. Opportunities to attend seminars and dialog with experts and colleagues in the field;
4. Opportunities to present and disseminate their own research and effective teaching strategies;

5. Sharing syllabi that integrate SBRR and instruction;
6. Review of syllabi by HEC staff and members and the provision of feedback to further integrate current research.

Through classroom observations and review of syllabi, HEC staff document to what extent faculty integrate SBRR into courses. HEC administrators also respond to the needs and feedback solicited through member questionnaires, teacher candidate surveys, and evaluation forms by adjusting the activities as appropriate to further enhance the implementation of SBRR in pre-service courses.

### **The Analysis**

Self-perception items were measured on a Likert scale of the anchors 1=minimal, 2=moderate, 3=very good, and 4=expert. All knowledge/ability item responses were objectively scored as either right or wrong for the analysis. Overall survey scores as well as individual item scores were used for analysis within and between groups. Items were also categorized by type (e.g., phonological, phonemic-specific, phonic, and morphemic) as well as by skill (knowledge and ability) for further analysis within and between groups (see Figure 1 and Appendix D). The survey was analyzed for reliability. Items were also analyzed for



difficulty and discrimination. The within group analysis was used to determine patterns in knowledge and abilities among the different constructs (phonological, phonemic, phonics, and morphological), while the between group analysis was used to look for similarities and differences between the different sample subset groups. In addition to correlations analyzed between university instructor and pre-service teacher scores, correlations were analyzed between the various groups' professional development participation, self perceptions, and actual knowledge/ability performance. Statistical analyses for between group analyses include an investigation of statistically significant differences and strength of effects through multivariate analysis of variance (MANOVA). Structural equation modeling was employed to investigate performance score patterns on the different knowledge/ability survey item categories for the entire sample. Figure 9 displays various relationships among participants and data examined during the various analyses.

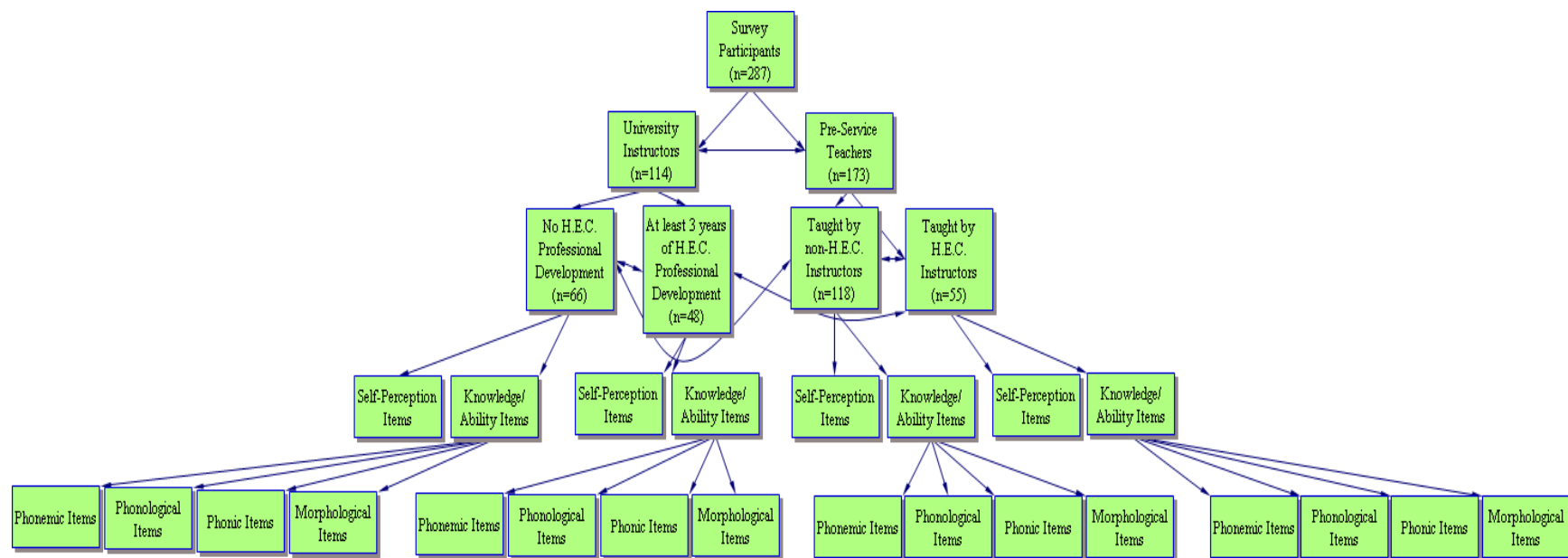


Figure 9  
*Relationships Among Participants and Data for Analysis*

## CHAPTER IV

### RESULTS

This chapter presents the results of the study. The statistical analyses that were conducted on the data are reported in three sections. The first section is the preliminary analyses, which provides results regarding analysis of the instrument of measurement. The second section includes descriptive statistics regarding the survey performance of all four population subsets on the different categories of survey items. The third section includes inferential statistics regarding both within group and between group analyses.

The first eight items of the basic language constructs survey assess self-perception of the participants' knowledge and ability in the teaching of reading. Self-perception item scores range from the anchors of 1=minimal to 4=expert. The remaining 38 items of the basic language constructs survey assess the participants' knowledge or ability in phonology, phonemics, phonics, or morphology. The knowledge/ability items were scored either right or wrong with a 1 or 0, respectively. The sample was characterized by two variables: participation or non-participation (primary for university instructors, secondary for pre-service teachers) in the Higher Education Collaborative (HEC) professional development and professional classification/rank as either a university instructor or pre-service teacher. The combination of these two characteristics can lead to four sample subsets: non-HEC university instructors, HEC university instructors, non-HEC pre-service teachers, and HEC pre-service teachers.

## Preliminary Analyses

### *Item Difficulty*

Item difficulty is the proportion of participants who answered the item correctly. The larger the proportion or the higher the difficulty index, the easier is the item (Wood, 1960). Item difficulty has been computed by dividing the number of participants answering the item correctly by the total number of participants answering the item. Such a  $p$  value is implicative of both the item and the sample taking the test or survey. Additionally, these  $p$  values also provide a common measure of the difficulty of test or survey items that measure completely different domains.

An item with a  $p$  value of 0.0 or a  $p$  value of 1.0 does not contribute to measuring individual differences and therefore would typically not be considered a good item. Item difficulty has a profound effect on both the variability of test scores and the precision with which test scores discriminate among different groups of examinees, as extreme  $p$  values directly restrict the variability of test scores (Thorndike Cunningham, Thorndike, & Hagen, 1991).

Furthermore, Thompson and Levitov (1985) stated that “items tend to improve test reliability when the percentage of students who correctly answer the item is halfway between the percentage expected to correctly answer if pure guessing governed responses and the percentage (100%) who would correctly answer if everyone knew the answer” (pp. 164-165). According to Thompson and Levitov (1985), the ideal difficulty for a four alternative multiple choice item would be halfway between the percentage of pure guess

(25%) and 100%,  $[(25\% + \{(100\% - 25\%)/2\}) = 62.5]$  in order to maximize score reliability.

Table 6 displays the difficulty coefficients for the knowledge/ability items of the basic language constructs survey.

Table 6

*Difficulty Coefficients for Knowledge/Ability Items*

Item	Difficulty Coefficients
9. Definition of phoneme (phonemic knowledge)	0.8798
10. “tife” – find (phonic ability)	0.8954
11. Consonant blend (phonic knowledge)	0.6261
12. Phoneme counting (phonemic ability):	
Box	0.3522
Grass	0.6017
Ship	0.8662
Moon	0.8930
Brush	0.5986
Knee	0.8359
Through	0.6174
13. Phoneme deletion (phonemic knowledge)	0.6182
14. Soft c (phonic knowledge)	0.7585

Table 6 continued

Item	Difficulty Coefficients
15. chef-shoe (phonemic ability)	0.9334
16. ice-sigh (phonemic ability)	0.6763
17. enough-funny (phonemic ability)	0.7229
18. Silent letters (phonic ability)	0.3975
19. Syllable and morpheme counting (phonological and morphological ability):	
Disassemble – syllables	0.9017
Disassemble - morphemes	0.3214
Heaven – syllables	0.9404
Heaven – morphemes	0.3970
Observer – syllables	0.9401
Observer- morphemes	0.3247
Spinster – syllables	0.9139
Spinster – morphemes	0.2094
Pedestal – syllables	0.9477
Pedestal – morphemes	0.2715
Frogs – syllables	0.8325
Frogs – morphemes	0.3606
Teacher – syllables	0.9368
Teacher – morphemes	0.5125

Table 6 continued

Item	Difficulty Coefficients
20. Final stable syllable (phonic knowledge)	0.3100
21. Closed syllables (phonic knowledge)	0.6173
22. Open Syllable (phonic knowledge)	0.4192
23. Definition of phonological awareness (phonological knowledge)	0.6235
24. Definition of phonemic awareness (phonemic knowledge)	0.5060
25. Initial 'c' rule (phonic knowledge)	0.5519
26. Initial 'k' rule (phonic knowledge)	0.3874
27. Definition of morpheme (morphemic knowledge)	0.6076

No items on the basic language constructs survey have a difficulty coefficient of 0.0 or 1.0, meaning no item is completely useless at measuring individual differences.

Furthermore, most of the items on the basic language constructs survey include five to six alternatives, making the ideal difficulty between 65 and 66.667%. Fourteen of the 38 knowledge/ability items have difficulty coefficients falling within 0.10 of the optimal 0.65-0.6667. The overall mean of the difficulty coefficients for all of the knowledge/ability items on the basic language constructs survey 0.6344 (0.2324), almost exactly at the ideal difficulty level.

### *Item Discrimination*

Theoretically, a good item discriminates between participants who do well on a test or survey and those who do poorly. The discrimination index,  $D$ , can be used to determine the discriminating power of an item by comparing the number of participants with high test or survey scores (top 27%) who answered an item correctly with the number of participants with low scores (bottom 27%) who answered the same item correctly (Wiersma & Jurs, 1990). An item with high discrimination will have more participants in the top-scoring group than the bottom-scoring group whom have answered the item correctly.

A poorly-discriminating item which is answered correctly or incorrectly by all participants will have a discrimination index equal to zero. Just as the higher the discrimination index, the better the item (because such a value indicates that the item discriminates in favor of the upper group), “when more students in the lower group than in the upper group select the right answer to an item, the item actually has negative validity. Assuming that the criterion itself has validity, the item is not only useless but is actually serving to decrease the validity of the test” (Wood, 1960, p. 87). Table 7 displays the discrimination indexes for the knowledge/ability items of the basic language constructs survey.

Table 7

#### *Discrimination Indexes for Knowledge/Ability Items*

Item	Discrimination Index
9. Phoneme Definition (phonemic knowledge)	0.2963



Table 7 continued

Item	Discrimination Index
10. “tife” – find (phonic ability)	0.2716
11. Consonant blend (phonic knowledge)	0.4691
12. Phoneme counting (phonemic ability):	
Box	0.5802
Grass	0.5556
Ship	0.5062
Moon	0.4938
Brush	0.5432
Knee	0.3827
Through	0.5185
13. Phoneme deletion (phonemic knowledge)	0.3580
14. Soft c (phonic knowledge)	0.5185
15. chef-shoe (phonemic ability)	0.2840
16. ice-sigh (phonemic ability)	0.5926
17. enough-funny (phonemic ability)	0.5309
18. Silent letters (phonic ability)	0.3210
19. Syllable and morpheme counting (phonological ability & morphological ability):	
Disassemble – syllables	0.1852
Disassemble - morphemes	0.5802

Table 7 continued

Item	Discrimination Index
Heaven – syllables	0.1852
Heaven – morphemes	0.8025
Observer – syllables	0.1235
Observer- morphemes	0.5802
Spinster – syllables	0.1728
Spinster – morphemes	0.3951
Pedestal – syllables	0.1481
Pedestal – morphemes	0.5802
Frogs – syllables	0.3210
Frogs – morphemes	0.6049
Teacher – syllables	0.1975
Teacher – morphemes	0.7531
20. Final stable syllable (phonic knowledge)	0.5432
21. Closed syllables (phonic knowledge)	0.7407
22. Open Syllable (phonic knowledge)	0.7778
23. Definition of phonological awareness (phonological knowledge)	0.3704
24. Phoneme awareness (phonemic knowledge)	0.5185
25. Initial ‘c’ rule (phonic knowledge)	0.5802
26. Initial ‘k’ rule (phonic knowledge)	0.4074

Table 7 continued

Item	Discrimination Index
27. Definition of morpheme (morphemic knowledge)	0.7778

As a general rule of thumb, Ebel and Frisbie (1986) suggest that items with a discrimination index of 0.40 and greater are very good items, 0.30 to 0.39 are reasonably good but possibly subject to improvement, 0.20 to 0.29 are marginal items and need some revision, and below 0.19 are considered poor items and need major revision or should be eliminated. The discrimination indexes for knowledge/ability items of the basic language constructs survey range from 0.1235 to 0.7778, with a mean of 0.4623 (*0.1883*). Thirty of the 38 knowledge/ability items on the basic language constructs survey have discrimination indexes ranging from 0.30-1.00 (good range), while most of the syllable counting items (within item 19) need major revision or elimination.

#### *Reliability*

The reliability for the self-perception and knowledge/ability scores on the basic language constructs survey with 46 items was found to be 0.903 using Cronbach's alpha. Thompson and Levitov (1985) suggest analyzing reliability estimates for test scores to determine an item's usefulness to the test as a whole: "The total test reliability is reported first and then each item is removed from the test and the reliability for the test less that item is calculated" (p.167). It is then possible for the test developer to eliminate certain items to enable test scores to have the greater reliability. The reliability analysis for scores on the basic language constructs survey is presented in Table 8.

Table 8

*Reliability Analysis*

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
q1	40.13	86.411	.636	.897
q2	40.26	86.157	.636	.897
q3	39.54	94.473	.298	.902
q4	39.82	90.149	.540	.898
q5	39.85	89.820	.515	.899
q6	39.83	92.412	.301	.903
q7	40.57	91.918	.356	.902
q8	40.03	89.807	.462	.900
q9	41.64	95.468	.257	.902
q10	41.62	95.501	.272	.902
q11	41.95	93.123	.412	.900
q12a	42.23	92.311	.560	.899
q12b	41.94	93.549	.367	.901
q12c	41.72	94.265	.361	.901
q12d	41.70	94.329	.368	.901
q12e	41.97	93.348	.387	.901
q12f	41.70	94.408	.361	.901
q12g	41.93	93.775	.344	.901
q13	41.92	94.357	.285	.902
q14	41.80	93.235	.438	.900
q15	41.64	95.748	.218	.902
q16	41.93	93.460	.379	.901
q17	41.86	94.193	.313	.902
q18	42.13	94.794	.244	.902
q19as	41.60	95.968	.222	.902
q19am	42.23	93.029	.473	.900
q19bs	41.56	95.974	.280	.902
q19bm	42.16	91.515	.615	.898
q19cs	41.56	96.450	.189	.902
q19cm	42.22	93.429	.421	.900
q19ds	41.59	96.249	.180	.903
q19dm	42.33	94.221	.398	.901
q19es	41.56	96.213	.244	.902
q19em	42.28	93.453	.456	.900
q19fs	41.69	95.053	.278	.902
q19fm	42.20	92.845	.480	.900
q19gs	41.57	95.938	.272	.902
q19gm	42.04	92.089	.520	.899
q20	42.25	93.475	.434	.900
q21	41.97	91.495	.585	.898
q22	42.16	91.422	.624	.898
q23	41.91	94.870	.231	.903
q24	42.06	93.357	.387	.901
q25	41.99	93.196	.401	.901
q26	42.14	94.624	.263	.902
q27	41.95	91.935	.539	.899

Generally, reliability scores of 0.80 and higher are recommended for research purposes (0.70 for exploratory purposes). When alpha-if-item-deleted statistics are higher than the Cronbach's alpha for scores on the full scale, the item is harmful to reliability. Such an item would be considered to not be performing properly, at least in the surveyed sample. Given the Cronbach's alpha of 0.903 for scores on the full scale and that no alpha-if-item deleted statistics exceed this alpha, the statistics from Table 8 suggest that the items worked well in the present sample.

### **Descriptive Statistics**

Table 9 displays the means and standard deviations for the scores of each of the sample subsets (non-HEC university instructors, HEC university instructors, non-HEC pre-service teachers, and HEC pre-service teachers) on each item of the basic language constructs survey. Note that items 1-8 measure self-perception on a Likert scale with anchors of 1=minimal, 2=moderate, 3=very good, and 4=expert, while items 9-27 are ability/knowledge items that were scored as either right or wrong. Therefore, the means for items 9-27 can be thought of as the proportions of participants answering the given survey item correctly.

Table 9

*Means and Standard Deviations for Scores of Sample Subsets by Item*

Survey Items	Non-HEC University Instructors (n=66)	HEC University Instructors (n=48)	Non-HEC Pre-Service Teachers (n=118)	HEC Pre-Service Teachers (n=55)
<u>Self-Perception:</u>				
1. Phonemic Awareness	2.561 (0.806)	3.146 (0.652)	1.856 (0.683)	2.618 (0.733)
2. Phonics	2.515 (0.864)	3.000 (0.619)	1.627 (0.638)	2.600 (0.655)
3. Fluency	2.889 (0.583)	3.146 (0.618)	1.721 (0.738)	2.727 (0.757)
4. Vocabulary	2.889 (0.471)	3.191 (0.495)	2.280 (0.652)	2.764 (0.607)
5. Comprehension	3.056 (0.639)	3.149 (0.551)	2.153 (0.687)	2.855 (0.558)
6. Children's Literature	2.803 (0.808)	2.915 (0.747)	2.492 (0.663)	2.673 (0.771)
7. Teaching literacy skills to ELLs	2.042 (0.849)	2.354 (0.729)	1.720 (0.625)	1.927 (0.716)
8. Using assessment to inform reading instruction	2.813 (0.790)	2.915 (0.686)	2.093 (0.667)	2.418 (0.809)

Table 9 continued

Survey Items	Non-HEC University Instructors (n=66)	HEC University Instructors (n=48)	Non-HEC Pre-Service Teachers (n=118)	HEC Pre-Service Teachers (n=55)
Total for Perception	2.7159 <i>(0.7096)</i>	2.9870 <i>(0.6911)</i>	2.1525 <i>(0.7440)</i>	2.5727 <i>(0.7511)</i>
<u>Knowledge and</u>				
<u>Ability:</u>				
9. Definition of phoneme (phonemic knowledge)	0.773 <i>(0.422)</i>	0.979 <i>(0.144)</i>	0.822 <i>(0.384)</i>	0.945 <i>(0.229)</i>
10. “tife” – find (phonic ability)	0.909 <i>(0.290)</i>	0.979 <i>(0.144)</i>	0.839 <i>(0.369)</i>	0.855 <i>(0.356)</i>
11. Consonant blend (phonic knowledge)	0.742 <i>(0.441)</i>	0.875 <i>(0.334)</i>	0.305 <i>(0.462)</i>	0.582 <i>(0.498)</i>
12. Phoneme counting (phonemic ability):				
Box	0.364 <i>(0.485)</i>	0.583 <i>(0.498)</i>	0.025 <i>(0.158)</i>	0.436 <i>(0.501)</i>
Grass	0.621 <i>(0.489)</i>	0.625 <i>(0.489)</i>	0.415 <i>(0.495)</i>	0.745 <i>(0.440)</i>

Table 9 continued

Survey Items	Non-HEC University Instructors (n=66)	HEC University Instructors (n=48)	Non-HEC Pre-Service Teachers (n=118)	HEC Pre-Service Teachers (n=55)
Ship	0.854 <i>(0.357)</i>	0.938 <i>(0.245)</i>	0.746 <i>(0.437)</i>	0.927 <i>(0.262)</i>
Moon	0.896 <i>(0.309)</i>	0.958 <i>(0.202)</i>	0.754 <i>(0.432)</i>	0.964 <i>(0.189)</i>
Brush	0.636 <i>(0.485)</i>	0.646 <i>(0.483)</i>	0.331 <i>(0.472)</i>	0.782 <i>(0.417)</i>
Knee	0.818 <i>(0.389)</i>	0.896 <i>(0.309)</i>	0.720 <i>(0.451)</i>	0.909 <i>(0.290)</i>
Through	0.621 <i>(0.489)</i>	0.688 <i>(0.468)</i>	0.415 <i>(0.495)</i>	0.745 <i>(0.440)</i>
13. Phoneme deletion (phonemic knowledge)	0.697 <i>(0.463)</i>	0.729 <i>(0.449)</i>	0.483 <i>(0.502)</i>	0.564 <i>(0.501)</i>
14. Soft c (phonic knowledge)*	0.879 <i>(0.329)</i>	0.854 <i>(0.357)</i>	0.483 <i>(0.502)</i>	0.818 <i>(0.389)</i>
15. chef-shoe (phonemic ability))	0.917 <i>(0.279)</i>	1.000 <i>(0.000)</i>	0.890 <i>(0.314)</i>	0.927 <i>(0.262)</i>
16. ice-sigh (phonemic ability)*	0.813 <i>(0.394)</i>	0.771 <i>(0.425)</i>	0.449 <i>(0.500)</i>	0.673 <i>(0.474)</i>



Table 9 continued

Survey Items	Non-HEC University Instructors (n=66)	HEC University Instructors (n=48)	Non-HEC Pre-Service Teachers (n=118)	HEC Pre-Service Teachers (n=55)
17. enough-funny  (phonemic ability)	0.771  (0.425)	0.792  (0.410)	0.602  (0.492)	0.727  (0.449)
18. Silent letters  (phonic ability)	0.409  (0.495)	0.521  (0.505)	0.297  (0.459)	0.364  (0.485)
19. Syllable and  morpheme counting  (phonological ability  and morphological  ability):				
Disassemble –  syllables**	0.909  (0.290)	0.938  (0.245)	0.924  (0.267)	0.836  (0.373)
Disassemble -  morphemes	0.197  (0.401)	0.583  (0.498)	0.178  (0.384)	0.327  (0.474)
Heaven – syllables**	0.924  (0.267)	0.979  (0.144)	0.949  (0.221)	0.909  (0.290)
Heaven –  morphemes	0.303  (0.463)	0.708  (0.459)	0.195  (0.398)	0.382  (0.490)
Observer –  syllables*/**	0.939  (0.240)	0.938  (0.245)	0.975  (0.158)	0.909  (0.290)

Table 9 continued

Survey Items	Non-HEC University Instructors (n=66)	HEC University Instructors (n=48)	Non-HEC Pre-Service Teachers (n=118)	HEC Pre-Service Teachers (n=55)
Observer-	0.182	0.542	0.212	0.364
morphemes	<i>(0.389)</i>	<i>(0.504)</i>	<i>(0.410)</i>	<i>(0.485)</i>
Spinster –	0.909	0.958	0.915	0.873
syllables**	<i>(0.290)</i>	<i>(0.202)</i>	<i>(0.280)</i>	<i>(0.336)</i>
Spinster –	0.136	0.500	0.100	0.091
morphemes**	<i>(0.346)</i>	<i>(0.505)</i>	<i>(0.314)</i>	<i>(0.290)</i>
Pedestal –	0.924	1.000	0.958	0.909
syllables**	<i>(0.267)</i>	<i>(0.000)</i>	<i>(0.202)</i>	<i>(0.290)</i>
Pedestal –	0.167	0.500	0.110	0.309
morphemes	<i>(0.376)</i>	<i>(0.505)</i>	<i>(0.314)</i>	<i>(0.466)</i>
Frogs – syllables	0.879	0.896	0.737	0.818
	<i>(0.329)</i>	<i>(0.309)</i>	<i>(0.442)</i>	<i>(0.389)</i>
Frogs – morphemes	0.242	0.667	0.169	0.364
	<i>(0.432)</i>	<i>(0.476)</i>	<i>(0.377)</i>	<i>(0.485)</i>
Teacher –	0.924	1.000	0.932	0.891
syllables**	<i>(0.267)</i>	<i>(0.000)</i>	<i>(0.252)</i>	<i>(0.315)</i>
Teacher –	0.364	0.729	0.339	0.618
morphemes	<i>(0.485)</i>	<i>(0.449)</i>	<i>(0.475)</i>	<i>(0.490)</i>

Table 9 continued

Survey Items	Non-HEC University Instructors (n=66)	HEC University Instructors (n=48)	Non-HEC Pre-Service Teachers (n=118)	HEC Pre-Service Teachers (n=55)
20. Final stable	0.242	0.458	0.085	0.455
(phonic knowledge)	<i>(0.432)</i>	<i>(0.504)</i>	<i>(0.280)</i>	<i>(0.503)</i>
21. Closed syllables	0.545	0.938	0.314	0.673
(phonic knowledge)	<i>(0.502)</i>	<i>(0.245)</i>	<i>(0.466)</i>	<i>(0.474)</i>
22. Open Syllable	0.485	0.708	0.102	0.382
(phonic knowledge)	<i>(0.504)</i>	<i>(0.459)</i>	<i>(0.304)</i>	<i>(0.490)</i>
23. Definition of	0.576	0.792	0.508	0.618
phonological	<i>(0.498)</i>	<i>(0.410)</i>	<i>(0.502)</i>	<i>(0.490)</i>
awareness				
(phonological				
knowledge)				
24. Definition of	0.485	0.667	0.254	0.618
phonemic awareness	<i>(0.504)</i>	<i>(0.476)</i>	<i>(0.437)</i>	<i>(0.490)</i>
(phonemic				
knowledge)				
25. Initial 'c' rule	0.530	0.688	0.390	0.600
(phonic knowledge)	<i>(0.503)</i>	<i>(0.468)</i>	<i>(0.490)</i>	<i>(0.494)</i>
26. Initial 'k' rule	0.258	0.479	0.322	0.491
(phonic knowledge)	<i>(0.441)</i>	<i>(0.505)</i>	<i>(0.469)</i>	<i>(0.505)</i>

Table 9 continued

Survey Items	Non-HEC University Instructors (n=66)	HEC University Instructors (n=48)	Non-HEC Pre-Service Teachers (n=118)	HEC Pre-Service Teachers (n=55)
27. Definition of morpheme (morphemic knowledge)	0.530 <i>(0.503)</i>	0.875 <i>(0.334)</i>	0.407 <i>(0.493)</i>	0.618 <i>(0.490)</i>
Total for Knowledge/Ability	0.615 <i>(0.198)</i>	0.773 <i>(0.161)</i>	0.491 <i>(0.120)</i>	0.658 <i>(0.181)</i>

\*Items in which non-HEC university instructors outperformed HEC university instructors.

\*\*Items in which non-HEC pre-service teachers outperformed HEC pre-service teachers.

Consistently, HEC participants perceived their own knowledge/abilities to teaching reading at higher levels than the self-perceptions of their counterparts on average. Additionally, HEC participants outperformed their non-HEC counterparts on all but nine of the 38 knowledge/ability items, of which were only slight disparities (<0.1). It is also interesting to note of the few items on which the non-HEC groups outperformed the HEC groups, most of these items were also the same items with the lowest discrimination indexes and highest (easiest) difficulty coefficients.

Table 10 displays the means and standard deviations for the scores of the four sample subsets on various item categories, as well as the overall sample. Eight of the items were categorized into the self-perception group. Of the remaining 38 items, they were first

categorized into one of two categories: knowledge or ability. These 38 items were then re-categorized into one of four categories: phonological, phonemic, phonics, or morphological.

Table 10

*Means and Standard Deviations for Scores of Sample Subsets by Item Category*

Item Category	Overall	Non-HEC University Instructors	HEC University Instructors	Non-HEC Pre-Service Teachers	HEC Pre- Service Teachers
Self-Perception	2.5022 (0.7949)	2.7159 (0.7096)	2.9870 (0.6911)	2.1525 (0.7440)	2.5727 (0.7511)
Knowledge	0.5261 (0.4994)	0.5619 (0.4965)	0.7535 (0.4314)	0.3729 (0.4837)	0.6136 (0.4873)
Ability	0.6221 (0.4849)	0.5950 (0.4910)	0.7821 (0.4130)	0.5511 (0.4975)	0.6790 (0.4670)
Phonological	0.8741 (0.3318)	0.8731 (0.3332)	0.9375 (0.2424)	0.8623 (0.3448)	0.8455 (0.3619)
Phonemic	0.6408 (0.4798)	0.6235 (0.4848)	0.7901 (0.4076)	0.5313 (0.4992)	0.7664 (0.4234)
Phonics	0.5029 (0.5001)	0.5556 (0.4973)	0.7222 (0.4484)	0.3484 (0.4767)	0.5798 (0.4941)
Morphological	0.3297 (0.4702)	0.2652 (0.4418)	0.6380 (0.4812)	0.2150 (0.4111)	0.3841 (0.4869)

Each sample subsets consistently scored higher on ability than knowledge on average. Additionally, each sample subset scored in rank order from highest to lowest: phonological, phonemic, phonics, and morphological. Again, the trend that HEC participants score higher on average than their non-HEC counterparts is seen, as Table 10 displays higher means for HEC participants than their non-HEC counterparts on every survey item category (with the exception of phonological-based survey items for pre-service teachers, of which favored the non-HEC pre-service teachers by less than .02). Figure 10 displays these results graphically.

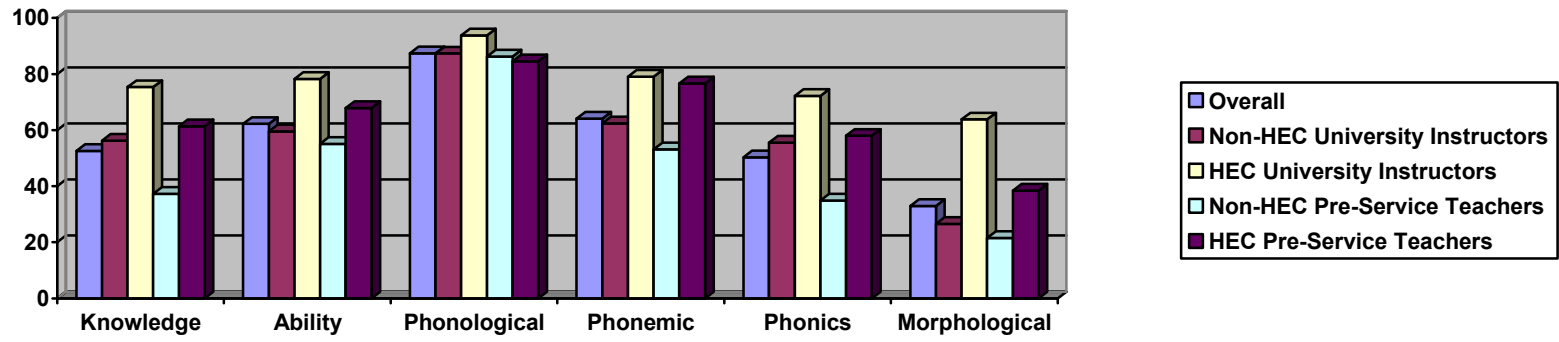


Figure 10  
*Means of Scores for Sample Subsets by Item Category*

As expected, the non-HEC pre-service teachers performed the lowest on each category of the survey, while the HEC university instructors performed best in each category of the survey. All sample subsets follow a similar trend of performing lowest on the morphological items and highest on the phonological items. They also follow a trend of performing higher on ability than knowledge based items. It also appears that the HEC sample subsets maintain a higher self-perception of their knowledge and abilities.

### **Inferential Statistics**

As inferential statistical analyses have been employed to investigate statistically significant relationships and/or differences among various variables within the sample, effect sizes will also be reported in addition to statistical significance ( $p$ ). Effect sizes “characterize the extent to which sample results diverge from the expectations specified in the null hypothesis” (Thompson, 2006, p. 6), and therefore a larger effect size is typically desired in research. The effect size reported in this study, eta-squared, is a variance-accounted-for effect size, which represents the ratio of the explained variance to the total variance. It is most simply computed by dividing the sum-of-squares for an effect by the sum-of-squares total. Variance-accounted-for effect sizes are similar to a squared correlation coefficient in that it is based on the fact that all analyses are correlational (Thompson, 1991). Hence, a variance-accounted-for effect size can be computed across analyses (e.g., t-test, ANOVA, etc.).



Table 12 presents results from a 2x2 multivariate analysis of variance (MANOVA) with HEC professional development participation (PD) and professional rank of university instructor or pre-service teacher (rank) as dependent variables and total score on the self-perception survey items and knowledge survey items (includes knowledge and ability items) as independent variables. The MANOVA results reveal a moderately statistically significant effects of professional development at  $p < 0.001$  ( $F(1, 286) = 49.93$ ) and rank at  $p < 0.001$  ( $F(1, 286) = 48.86$ ). However, one key assumption in analyses of variance lies in the assumption of homogeneity. Box's Test of Equality of Covariance Matrices indicates this assumption was not met with significance  $< 0.001$  (as significance should be at 0.05 or higher to show that the variances are similar). Table 11 presents the variance-covariance matrices results, which should be fairly equivalent across cells to meet this homogeneity of variance assumption. As revealed in the table, self-perception variance-covariance matrices are fairly similar, while the variance-covariance matrices for knowledge are highly variable. Therefore, since the assumption of homogeneity of variance is not met, overall results from the MANOVA are suspect, particularly for the knowledge items.



Since the results from the MANOVA were suspect due to the unmet assumption of homogeneity of variances and with regard to the fact that multiple univariate ANOVA tests may fail to reject the null hypotheses of no group differences, univariate ANOVA was used to analyze the effect of professional development and another univariate ANOVA was used to analyze the effect of rank. Table 13 presents the descriptive statistics from these two analyses, which displays PD participants outperforming non-PD participants on average, as well as university instructors outperforming pre-service teachers in general. The standard deviations across groups are fairly similar, lending positively towards the assumption of homogeneity of variance (with the exception of rank for the knowledge items).

The first ANOVA performed on the self-perception and knowledge survey item scores used professional development status as the dependent variable. Since there are only 2 groups within this particular analysis (non-PD = Group 1 and PD = Group 2), this would be considered analogous to a t-test. Table 14 displays the results. In this analysis, the assumption of homogeneity of variances for both sets of survey items is met with self-perception items at  $p=0.871$  and knowledge items at  $p=.147$ . Statistically significant effects of professional development status on both self-perception survey item scores and knowledge/ability survey item scores are seen at the  $p<0.001$  level, although effect sizes are small with eta-squareds of 0.143 and 0.221, respectively ( $F(1, 286) = 47.569$  and  $F(1, 286) = 80.698$ , respectively).

Table 13

Descriptive Statistics for ANOVAs

		Non- PD	PD	Fixed Effects	Random Effects	UI	PT	Fixed Effects	Random Effects	Total
Self-Percep	N	184	103			114	173			287
	Mean	18.837	22.126			22.640	18.289			20.017
	SD	3.7131	4.1508	3.8755		3.400	3.7257	3.6001		4.1791
	SE	0.2737	0.4090	0.2288	1.7062	0.3184	0.2833	0.2125	2.2203	0.2467
Knowledge	N	184	103			114	173			287
	Mean	19.935	27.049			25.228	20.682			22.488
	SD	6.1880	6.8562	6.4351		7.9956	6.1472	6.9392		7.2767
	SE	0.4562	0.6756	0.3799	3.6924	0.7489	0.4674	0.4096	2.3173	0.4295

Note: PD = professional development; UI = university instructor; PT= pre-service teachers; SD = standard deviation; SE = standard error.

Table 14

ANOVA for Professional Development (Non-PD and PD)

		Sum of	DF	Mean	F	Significance	eta-
		Squares		Square			squared
Self-Percep	Between	714.445	1	714.445	47.569	p<0.001	0.143
	Within	4280.468	285	15.019			
	Total	4994.913	286				
Knowledge	Between	3341.733	1	3341.733	80.698	p<0.001	0.221
	Within	11801.975	285	41.410			
	Total	15143.707	286				

An ANOVA was also calculated using rank (university instructor = 1; pre-service teacher = 2) as the dependent variable (again, analogous to a t-test with only two groups) with the self-perception and knowledge survey items. Results are displayed in Table 15. The assumption of homogeneity of variance was met for the self-perception survey items at  $p=0.075$  but not the knowledge/ability survey items at  $p<0.001$ . Therefore, looking specifically at the self-perception items, the results indicate an effect of rank on self-perception with an eta-squared of 0.261,  $F(1, 286)$  of 100.389, and significance at the  $p<0.001$  level. More care should be taken when interpreting the less significant results regarding the effect of rank on the knowledge item scores at the  $p<0.001$  level with an eta-squared of 0.094 ( $F(1, 286) = 29.492$ ).

Table 15

ANOVA for Rank (University Instructor and Pre-Service Teacher)

		Sum of Squares	DF	Mean Square	F	Significance	eta- squared
Self-Percep	Between	1301.109	1	1301.109	100.389	p<0.001	0.261
	Within	3693.804	285	12.961			
	Total	4994.913	286				
Knowledge	Between	1420.123	1	1420.123	29.492	p<0.001	0.094
	Within	13723.585	285	48.153			
	Total	15143.707	286				

In the analyses in which the assumption of homogeneity of variance was met, both professional development status and rank appear to have a statistically significant effect on survey participants' self-perceptions of their knowledge and abilities in teaching reading as well as their actual knowledge and ability in basic language constructs. While both variables seemed to have an effect, it is interesting to note that professional development had a larger effect than rank on perception and performance, perhaps indicative of the difference professional development can make even more so than professional rank.

Finally, structural equation modeling (SEM) was used to explore a theoretical model of the constructs measured by the basic language constructs survey: phonology, phonemics, phonics, and morphology, as well as knowledge and ability. SEM is used to examine the nature and alignment of survey items used to measure these constructs. Such analysis is

used to gain an understanding of the relative importance of these understandings in modeling and predicting trajectories of survey performance. Specifically, the analysis explores a model for participants' development of the understandings and components that are involved in basic language constructs of phonology, phonemics, phonics, and morphology, as well as knowledge and ability. Figure 11 displays the confirmatory factor analysis (CFA) model tested for phonology, phonemics, phonics, and morphology.

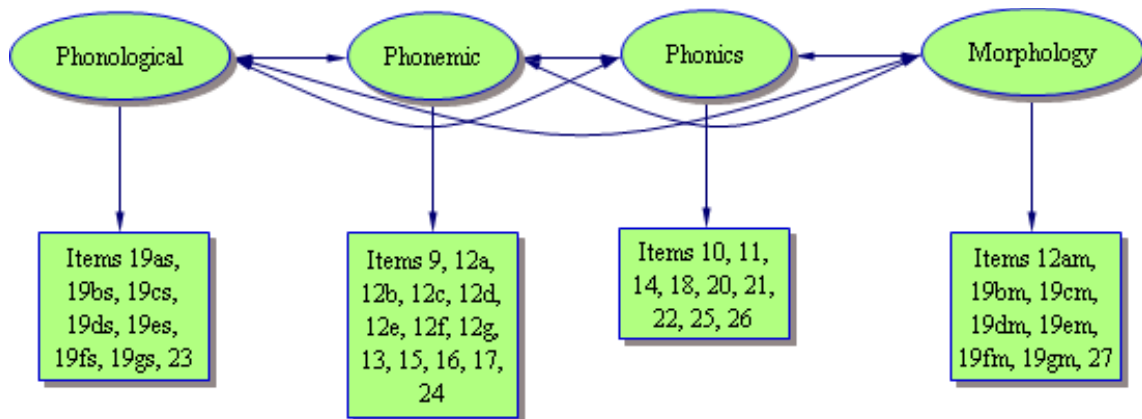


Figure 11  
*Phonology, Phonemics, Phonics, and Morphology Model*

The CFA model tested for knowledge and ability is displayed in Figure 12.

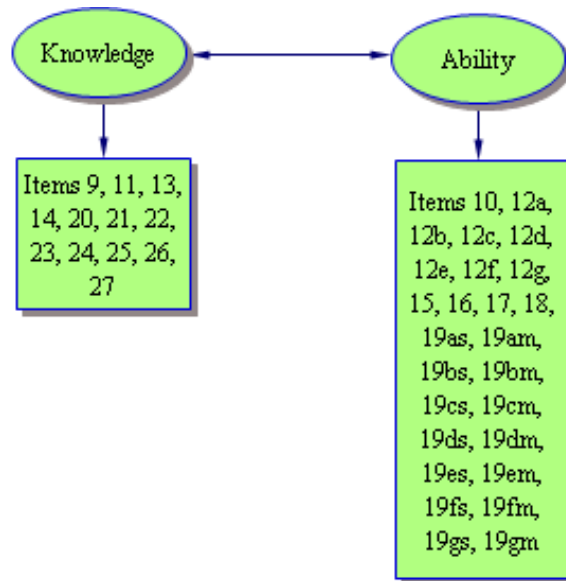


Figure 12  
*Knowledge and Ability Model*

Fit refers to the ability of a model to reproduce the data (Bollen & Long, 1993). The comparative fit index (CFI) is based directly on the non-centrality measure. Ideally, the CFI would be around 0.9. The CFI of 0.695 for the phonology, phonemics, phonics, and morphology model (Figure 11) represents a fair fit. THE CFI of 0.590 for the knowledge and ability model (Figure 12) represents a poor fit. The root mean square error of approximation (RMSEA) is based on the non-centrality parameter. Good models have an RMSEA of 0.05 or less, whereas models whose RMSEA is 0.10 or more are considered have poor fit. Both the phonology, phonemics, phonics, and morphology model and the knowledge and ability model both have RMSEAs between this range (0.079 and 0.091, respectively), representing fair fits. The confidence interval for RMSEA ideally produces a lower value of the 90% confidence interval very near zero and small upper value



(typically less than 0.08). The first model comes close to meeting this criteria (0.074, 0.038), again indicating a fair fit; while the second model has a poorer fit at (0.087, 0.096). The standardized root mean square residual (SRMR) is the standardized difference between the observed covariance and predicted covariance. A value of zero indicates perfect fit, and a value less than 0.08 is considered a good fit. Neither one of the models meet this criteria at 4.276 and 2.274, respectively. The akaike information criterion (AIC) indicates a better fit when it is smaller. The measure is not standardized and is not interpreted for a given model, therefore the absolute value of AIC has relatively little meaning. The model with the smaller AIC (in this case, the phonology, phonemics, phonics, and morphology model at 8900.082) would be preferred over the model with the larger AIC (the knowledge and ability model at 9303.538). Overall, these results indicate the first model of phonology, phonemics, phonics, and morphology to be a fair to good fit, while the model for knowledge and ability would be considered a poor to fair fit.

In order to determine models that would better fit the data than the ones tested in the aforementioned confirmatory factor analyses, exploratory factor analysis (EFA) was employed. Rather than testing pre-established theoretical models as in CFA, EFA analyzes the data from which theoretical models are then formed. EFA determines what sets of items “hang together” in a survey by examining the correlation matrix between the variables to identify those that tend to vary together. Factor loadings can be interpreted as standardized regression coefficients (regressing the factor on the measures) and represent how strongly each variable is related to each factor. Typically, factor loadings less than 0.3 are considered weak, loadings between 0.3 and 0.6 are considered moderate, and loadings greater than .06 are considered to be large. A varimax orthogonal rotation was used,

resulting in uncorrelated factors. Figure 13 displays a scree plot for the EFA, which graphs the amount of variability each of the factors is able to account for in descending order. The first six factors in the amount of variance accounted for were used for analysis.

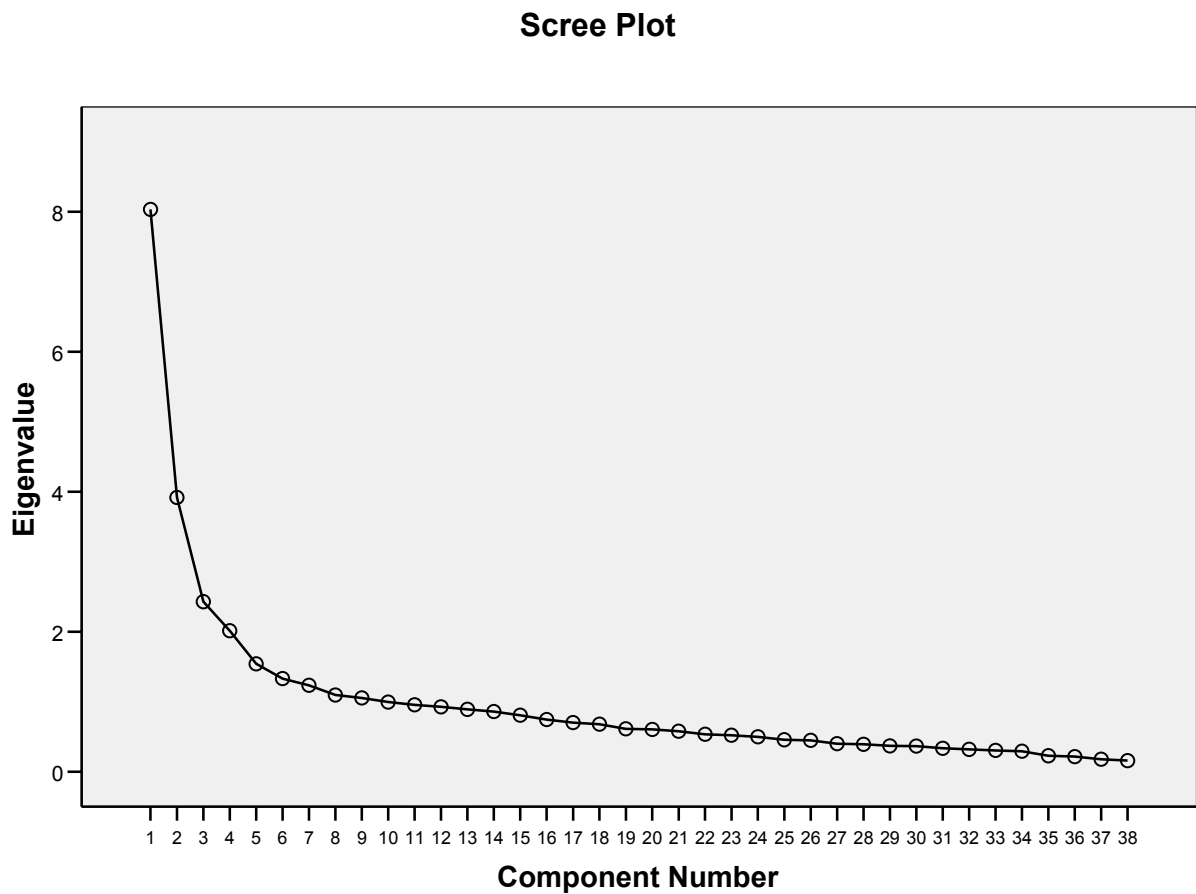


Figure 13  
Exploratory Factor Analysis Scree Plot

Table 16 displays the moderate to large rotated factor loadings for the first factor from the EFA. All items deal with morphology: counting the number of morphemes in a word or identifying the definition of the term “morpheme.” The first factor is therefore theoretically representative of measuring the latent variable of morphological knowledge and ability.

Table 16

## EFA Theoretical Model for Latent Factor 1: Morphology Knowledge and Ability

Items	Rotated Factor Loadings
19am: number of morphemes in “disassemble”	0.803
12bm: number of morphemes in “heaven”	0.841
12cm: number of morphemes in “observer”	0.737
12dm: number of morphemes in “spinster”	0.593
12em: number of morphemes in “pedestal”	0.793
12fm: number of morphemes in “frogs”	0.524
12em: number of morphemes in “teacher”	0.544
27: definition of morpheme	0.554

Table 17 displays the moderate to large rotated factor loadings for the second factor from the EFA. All items deal with counting the number of syllables in given words. The second factor is therefore theoretically representative of measuring the latent variable of

syllable counting ability. It is interesting to note that Item 12fs (number of syllable in “frogs”) is the only item with a moderate rotated factor loading, while all other syllable counting items have a large factor loading. Item 12fs is also the only item with a mono-syllable word, and therefore perhaps not as indicative of syllable counting ability as the other multi-syllabic items.

Table 17

EFA Theoretical Model for Latent Factor 2: Syllable Counting Ability

Items	Rotated Factor Loadings
19as: number of syllables in “disassemble”	0.676
19bs: number of syllables in “heaven”	0.855
12cs: number of syllables in “observer”	0.768
12ds: number of syllables in “spinster”	0.750
12es: number of syllables in “pedestal”	0.876
12fs: number of syllables in “frogs”	0.546
12es: number of syllables in “teacher”	0.853

Table 18 displays the moderate to large rotated factor loadings for the third factor from the EFA. All items deal with phonemes: identifying the definition of “phoneme,” counting the number of phonemes in given words, identifying the same initial phonemes in given words, and reversing the order of phonemes in given words. The third factor is

therefore theoretically representative of measuring the latent variable of basic phonemic awareness knowledge and ability.

Table 18

EFA Theoretical Model for Latent Factor 3: Basic Phonemic Awareness Knowledge and Ability

Items	Rotated Factor Loadings
9: definition of phoneme	0.567
12c: number of phonemes in “ship”	0.720
12d: number of phonemes in “moon”	0.762
15: identify pair of words with same beginning sound (chef-shoe)	0.748
16: reverse order of sounds in “ice” (sigh)	0.381
17: reverse order of sounds in “enough” (funny)	0.524

Table 19 displays the moderate to large rotated factor loadings for the fourth factor from the EFA. All items deal with being able to identify example of various phonics terminology: “soft c” and different syllable types (final stable, closed, open). The fourth factor is therefore theoretically representative of measuring the latent variable of phonics terminology knowledge.

Table 19

## EFA Theoretical Model for Latent Factor 4: Phonics Terminology Knowledge

Items	Rotated Factor Loadings
14: example of “soft c”	0.504
20: example of final stable syllable	0.451
21: example of closed syllables	0.513
22: example of open syllable	0.632

Table 20 displays the moderate to large rotated factor loadings for the fifth factor from the EFA. All items deal with phonemic awareness: counting the number of phonemes in given words and identifying the definition of “phonemic awareness.” As compared to the aforementioned basic phonemic awareness factor model, this factor is believed to measure a more advanced form of phonemic awareness in that the items require the participants not only to know what a phoneme is but understand what the application of phonemic awareness entails (Item 24) and count the number of phonemes in words containing multiple blends and digraphs each (grass, brush, knee, through) or two phonemes in one letter (box). Such items require the participants to be able to differentiate between letters and sounds, thus requiring heightened phonemic awareness to focus on the sounds specifically. It is interesting to note that those items containing words with an r-blend have the highest factor loadings, perhaps indicating an advanced phonemic awareness in being able to distinguish phonemes in r-blends. The fifth factor is therefore theoretically

representative of measuring the latent variable of advanced phonemic awareness knowledge and ability.

Table 20

EFA Theoretical Model for Latent Factor 5: Advanced Phonemic Awareness Knowledge and Ability

Items	Rotated Factor Loadings
12a: number of phonemes in “box”	0.391
12b: number of phonemes in “grass”	0.819
12e: number of phonemes in “brush”	0.823
12f: number of phonemes in “knee”	0.320
12g: number of phonemes in “through”	0.487
24: definition of phonemic awareness	0.322

Table 21 displays the moderate to large rotated factor loadings for the sixth factor from the EFA. All items deal with phonics rules: the initial ‘c’ rule and the initial ‘k’ rule. It is not surprising that these two items would appear to measure the same latent variable, as the two rules are highly related in that one is the converse of the other. Unlike the fourth factor of phonic terminology knowledge that required participants to know what a certain term meant in order to answer the item correctly, the items in the this factor do not require the participants to know specialized terminology but rather a rule for decoding/encoding

words. The sixth factor is therefore theoretically representative of measuring the latent variable of phonic rules knowledge.

Table 21

EFA Theoretical Model for Latent Factor 6: Phonic Rules Knowledge

Items	Rotated Factor Loadings
25: initial 'c' rule	0.765
26: initial 'k' rule	0.816

As compared to the CFA models of phonology, phonemics, phonics, and morphology as well as knowledge versus ability, the EFA models reveal that knowledge and ability are not always so easy to separate. In Factors 1, 3, and 5, knowledge and ability in morphology and phonemics are combined together, which is perhaps why the CFA model of knowledge and ability was a fair to poor fit. The EFA models also reveal that the type of knowledge and ability assessed in phonemics and phonics are often more specific (such as phonics terminology or rules and basic and advanced phonemic awareness) rather than just overall phonemics and phonics, also perhaps why the CFA model for phonemics, phonology, phonics, and morphology was only a fair fit. The theoretical models formed from the EFA give greater insight into the relationships between items on the survey.



## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to (1) investigate reading education university instructors' knowledge and ability pertaining to basic language constructs, (2) determine if participation in a professional development program geared towards scientifically-based reading research and research-based reading instruction for university instructors makes a difference in the instructors' basic language constructs knowledge and abilities, and (3) examine how university instructor knowledge and ability in basic language constructs carries over to the instructors' pre-service teacher students. While a lack of teacher expertise in such concepts has been demonstrated in previous studies, little research focuses on the knowledge and abilities of the "teachers of the teachers." Research has shown that professional development in research-based reading instruction and basic language constructs for inservice teachers produces positive effects on both the teachers' knowledge and abilities as well as their students' reading performance. This study sought to investigate if university instructor professional development might produce the same positive increases in knowledge and ability of basic language constructs in both the professional development participants themselves as well as their pre-service teacher students.

One ultimate question addressed in this study was: how can teacher preparation to teach reading effectively be improved? For educators and researchers, this study addressed an area of research that is vital to improving the high incidence of reading difficulties and low reading achievement and performance seen in U.S. schools today. More so than any

program, curriculum, or home background, a teacher ultimately has the power to enable (or disable) a child's success in reading. However, teachers must be prepared with the knowledge and abilities necessary for effective early reading instruction. Teachers cannot be expected to learn the essential basic language constructs needed in early reading instruction through field/teaching experience, reading programs, screening tests, or even individual pursuit. Rather, coursework has been proven to increase teachers' reading knowledge and ability, when such courses provide explicit instruction and ample practice in each construct. (Moats & Foorman, 2003; Spear-Swerling & Brucker, 2004) Ultimately, in order for reading education coursework to be improved, heightened university instructors' knowledge in these critical basic language constructs of reading is needed.

The participants in this study consisted of 287 university instructors of EC-4 reading education and EC-4 pre-service teachers at the conclusion of their coursework. Both the university instructors and pre-service teachers were documented as either having participated in a professional development program for university instructors of reading education (directly for the instructors or indirectly for the pre-service teachers) or not. Sixty-six of the university instructors and 118 of the pre-service teachers had not been involved with the professional development, while 48 of the university instructors and 55 of the pre-service teachers had been involved with the professional development. All participants completed a survey that assessed self-perception, knowledge, and ability related to basic language constructs. While participation in the survey was voluntary, the demographics of those who did participate were similar to those who did not. The 46-item survey included eight items assessing self-perception and 38 items assessing knowledge and ability in phonology, phonemics, phonics, and morphology.

The scores on the survey were analyzed for reliability using Cronbach's alpha, as well as for item difficulty and discrimination. Items and participants were grouped in different ways to compare descriptive statistics and performance. Inferentially, analysis of variance was employed to determine if participation in professional development and/or professional rank as either an instructor or student produced statistically significant results. Structural equation modeling was used to look at the fit of the models for the constructs and skills assessed by the survey.

### **Conclusions**

The results of this study and the research question addressed present some potentially important conclusions. While survey results highlight marked deficits in both pre-service teacher and university instructor knowledge and ability in basic language constructs, participation in the professional development program for university instructors of reading education indicated encouraging results that university instructor self-perception, knowledge, and ability in basic language constructs is greater when having participated in the professional development program and this higher self-perception, knowledge, and ability appears to carry over to pre-service teacher students as well. This conclusion is evidenced by overall higher performance on survey items by the professional development groups, as well as statistically significant correlations between professional development and survey results.

Reliability for the scores on the survey was notably high at 0.903. This indicates a high internal consistency among the scores, or high correlations between the item scores. None of the alpha-if-dropped coefficients were higher than the overall alpha of 0.903,

meaning the reliability would not increase with the removal of any of the survey items. The high reliability of the scores is particularly important since, although it was based off previous surveys, no previous reliability had been established for this exact survey. The high reliability is encouraging for use of the survey in future research.

Furthermore, the item difficulty coefficient results and item discrimination indexes were positive in that most items yielded optimal difficulty levels and high discrimination amongst participants. This is also encouraging for use of the survey in future research.

Descriptive statistics provided insight into the average and variance in performance of the four different sample subsets on each item of the survey, as well as groups of items on the survey. Notably, the university instructors who had participated in professional development scored higher on almost every item of the survey on average than university instructors who had not participated in the professional development program. The pre-service teachers taught by the professional development university instructors similarly scored higher on average on nearly every item of the survey than pre-service teachers who had not been taught by university instructors with the professional development. The few items in which the non-professional development subsets scored higher were very low disparities between the sample subsets and also were often the items with the highest (easiest) difficulty coefficients and lowest discrimination indexes, such as syllable counting. Syllable counting is considered to be one of the easiest phonological awareness tasks, so the high difficulty coefficients and lack of discrimination between participants is not surprising.

Additionally, descriptive statistics indicated a pattern followed by all four sample subsets: On average, participants scored highest on phonological-based items, next highest on phonemic-based items, followed by phonics-based item performance, and with the

lowest scores on morphological-based items. This trend seems to indicate a particular need for increased knowledge and training in phonics and especially morphology. Phonics and morphology are both critically important constructs for teachers to understand in order to teach related skills to their students.

Items were also grouped by whether they assessed knowledge or ability and analyzed descriptively. All four sample subsets performed poorer on knowledge than ability-based items. This trend seems to indicate that although these educators might implicitly be able to perform certain tasks or possess and apply some basic language constructs, they may not explicitly know or understand the construct. However, an explicit understand of such constructs is necessary in order to be able to teach it to students who need direct, explicit, and systematic instruction in early reading skills.

Overall, descriptive statistics were disappointing in that few of the university instructors and pre-service teachers scored as highly as thought to be necessary to effectively teach early reading skills to beginning readers. While most scores were lower than one would hope and expect, there seems to be a particular deficit in morphological- and phonic- based items for both pre-service teachers and university instructors. Such low performance, especially in knowledge of phonics and morphology, highlights a critical need for improvement in university instructors' knowledge that, if trends continue to follow between subsets, should carry over to their pre-service teachers.

Although the homogeneity of variance was not met to draw valid conclusions about the correlations with the knowledge and ability item performance scores on the surveys, self-perception scores were consistently correlated with professional development participation, indicating that those who had participated in professional development either

directly or indirectly had a higher confidence in their abilities to teach early reading skills. Additionally, when specifically looking at professional development alone as a dependent variable, professional development participation was correlated with higher performance on the knowledge and ability items. This provides encouraging results that professional development is effective in increasing both confidence and actual knowledge and ability. Additionally, professional development university instructors had statistically significantly higher self-perceptions than professional development pre-service teachers, and similarly non-professional development university instructors had statistically significantly higher self-perceptions than non-professional development pre-service teachers. This indicates that professional rank does play a role in confidence in knowledge and abilities. However, it is interesting to note that non-professional development university instructors and professional development pre-service teachers had similar self-perceptions, validating the role of professional development involvement in increasing self-perception. It is important that educators are confident in their knowledge and abilities to teach early reading skills, as poor confidence can lead to poor performance (including instructional performance).

The structural equation modeling indicated that the items categorized as phonological, phonemic, phonic, and morphological were a decent fit to the model design. This indicates that such items do a decent job at assessing the constructs associated with the overall basic language construct knowledge and ability. The divisions between knowledge and ability were not as clearly divided, leading to the conclusion that it is often hard to distinguish or separate the two skills.

Overall conclusions from the results of this study indicate that both university instructors of reading education and pre-service teachers at the end of their coursework lack

much of the basic knowledge needed for effective early reading instruction. However, there is also hope that the professional development of university instructors of reading education can lead to improved self-perception, knowledge, and abilities in phonology, phonemics, phonics, and morphology, and that this improvement carries over to their pre-service teachers. Heightened teacher knowledge of such constructs has been proven to be correlated with heightened student reading achievement. In theory, the conclusion is that professional development of university instructors of reading education will ultimately lead to increased student reading success.

### **Recommendations**

Reading is a basic skill for survival and those who have reading difficulties in early grades continue to struggle in school and in life. However, evidence based reading practices are available (see components of good reading instruction identified by the National Reading Panel, NICHD, 2000), but, unfortunately, classroom teachers are not provided with this information at the colleges of education. The results of this study showed that university instructors are not knowledgeable in the basic language constructs, which highlights the *strong need* for increased preparation of pre-service teachers to teach the linguistic components of the English language through teacher training programs that explicitly teach the interdependence of these components in effective reading instruction. Similar to Spear-Swerling and Brucker (2003), “conclusions support the viewpoint that teacher education must include information about English word structure for educators who will teach reading and suggest that sufficiently intensive instruction may be important in developing word-structure knowledge” (p. 72).

At this time, there are no other known forums available that systematically and consistently provide ongoing professional development and collaborative opportunities for university instructors of reading education. Cunningham, Perry, Stanovich, and Stanovich (2004) concluded, “*We should continue to turn our attention toward improving teacher preparation and teacher development in the area of early literacy by highlighting the direction that reading education for both preservice and in-service teachers might take?*” (*italics added*, p. 161). In order for teacher preparation in reading education to be improved, an increase of university instructors’ knowledge the critical components of basic language constructs is needed.

Further research is needed to expand upon how to improve university instructors’ knowledge and ability in basic language constructs (particularly morphology), as well as how instructors can most effectively instill this knowledge and ability in pre-service teachers so that it carries over into classroom practice. Furthermore, the study could be expanded upon with the inclusion of fluency, vocabulary, and comprehension survey items, as well as instructional-based items (in addition to the knowledge and ability-based items).



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**APPENDIX A**

**TEACHER KNOWLEDGE SURVEY OF BASIC LANGUAGE CONSTRUCTS  
FOR UNIVERSITY INSTRUCTORS**

Participation in this survey is voluntary, and there are no foreseeable risks associated with your participation or non-participation. Results from the survey will remain anonymous and will in no way be used to evaluate any person or university individually.

The survey is designed for university instructors who have been members of HEC for at least two years and preservice/new teachers in EC-4 teacher certification.

You may only access the survey ONCE and will have 45 MINUTES to complete it. Please do not use any outside resources in answering the items. Some of the items will be more difficult than others (it is not expected that you will be able to answer every item correctly), but we just want to see what you know off the top of your head.

We sincerely appreciate your help in participating in this survey.

**Reading Constructs Survey**

Thank you for participating in this survey. The information you provide will be invaluable in our efforts to ascertain what teacher candidates are learning about early reading instruction. The survey results are anonymous, and no individual or institution will be identified.

Please remember you may only access the survey ONCE and will have 45 MINUTES to complete it (see start time below).

Please do not use any outside resources in answering the items. Some of the items will be more difficult than others (it is not expected that you will be able to answer every item correctly).

Upon completion of the ENTIRE survey within 45 minutes, please click the "submit" button at the end of the page.

Start Time: 12/01/07 06:12:19

i. Please provide your highest degree level (e.g., M.S., M.Ed., Ph.D., Ed.D.):

ii. Please provide the university name from which you obtained your highest degree:

iii. Please provide the specialty area of your highest degree (e.g., Reading/Language Arts, Curriculum & Instruction, Educational Administration, etc.):

iv. Please provide the university or teacher preparation program name at which you have taught/worked most recently:

v. Please provide the course subject(s) you have taught or helped to administer most recently (e.g., introduction to elementary-level reading, assessment in early childhood reading, children's literature, content area literacy, etc.):

vi. Please provide your GENDER:

vii. Please provide your RACE/ETHNICITY:

viii. Please provide the NUMBER of years you have been a member of HEC:

ix. Please list the HEC services and/or materials you have attended and/or used during your HEC

membership (including, but not limited to: HEC seminars, other conference/meetings/training publicized by HEC, slides, handouts, videos, books, HEC Online, Ask the Expert, collaboration with other members, assignment and teaching strategies sharing, presentation of own research, site visits, online support, observations of members teaching, and syllabus suggestions):

x. Please list any other professional development experiences (including but not limited to university-sponsored professional developments and/or professional organization membership/conference attendance) related to the teaching of reading:

xi. Please list any previous teaching or administration experiences at the elementary, middle school, or secondary level:

Please evaluate your knowledge of:

1. Phonemic Awareness

MINIMAL    MODERATE    VERY GOOD    EXPERT

2. Phonics

MINIMAL    MODERATE    VERY GOOD    EXPERT

3. Fluency

MINIMAL    MODERATE    VERY GOOD    EXPERT

4. Vocabulary

MINIMAL    MODERATE    VERY GOOD    EXPERT

5. Comprehension

MINIMAL  MODERATE  VERY GOOD  EXPERT

6. Children's Literature

MINIMAL  MODERATE  VERY GOOD  EXPERT

7. Teaching literacy skills to ELLs

MINIMAL  MODERATE  VERY GOOD  EXPERT

8. Using assessment to inform reading instruction

MINIMAL  MODERATE  VERY GOOD  EXPERT

9. A phoneme refers to

- a single letter.
- a single speech sound.
- a single unit of meaning.
- a grapheme.
- no idea

10. If tife is a word, the letter "i" would probably sound like the "i" in:

- if
- beautiful
- find
- ceiling
- sing
- no idea

11. A combination of two or three consonants pronounced so that each letter keeps its own identity is called:

- silent consonant
- consonant digraph
- diphthong
- consonant blend

no idea

12. How many speech sounds are in the following words? For example, the word "cat" has 3 speech sounds 'k'-'a'-'t'. Speech sounds do not necessarily equal the number of letters.

<input type="text"/>	▼	box
<input type="text"/>	▼	grass
<input type="text"/>	▼	ship
<input type="text"/>	▼	moon
<input type="text"/>	▼	brush
<input type="text"/>	▼	knee
<input type="text"/>	▼	through

13. What type of task would the following be? "Say the word 'cat.' Now say the word without the /k/ sound."

- blending
- rhyming
- segmentation
- deletion
- no idea

14. A "soft c" is in the word:

- Chicago
- cat
- chair
- city
- none of the above
- no idea

15. Identify the pair of words that begins with the same sound:

- joke-goat
- chef-shoe
- quiet-giant
- chip-chemist
- no idea

(The next 2 items involve saying a word and then reversing the order of the sounds. For example, the word "back" would be "cab.")

16. If you say the word, and then reverse the order of the sounds, ice would be:

- easy
- sea
- size
- sigh
- no idea

17. If you say the word, and then reverse the order of the sounds, enough would be:

- fun
- phone
- funny
- one
- no idea

18. All of the following nonsense words have a silent letter, except:

- bamb
- wrin
- shipe
- knam
- phop
- no idea

19. For each of the words on the left, determine the number of syllables and the number of morphemes. **(Please be sure to give both the number of syllables and the number of morphemes, even though it may be the same number.)**

	# of syllables	# of morphemes
disassemble	<input type="text"/>	<input type="text"/>
heaven	<input type="text"/>	<input type="text"/>
observer	<input type="text"/>	<input type="text"/>

spinster	<input type="text"/>	<input type="text"/>
pedestal	<input type="text"/>	<input type="text"/>
frogs	<input type="text"/>	<input type="text"/>
teacher	<input type="text"/>	<input type="text"/>

20. Which of the following words has an example of a final stable syllable?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

21. Which of the following words has 2 closed syllables?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

22. Which of the following words contains an open syllable?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

23. Phonological awareness is:

- the ability to use letter-sound correspondences to decode.
- the understanding of how spoken language is broken down and manipulated.
- a teaching method for decoding skills.
- the same as phonics.

no idea

24. Phonemic awareness is:

- the same as phonological awareness.
- the understanding of how letters and sounds are put together to form words.
- the ability to break down and manipulate the individual sounds in spoken language.
- the ability to use sound-symbol correspondences to read new words.
- no idea

25. What is the rule that governs the use of 'c' in the initial position for /k/?

- 'c' is used for /k/ in the initial position before e, i, or y
- the use of 'c' for /k/ in the initial position is random and must be memorized
- 'c' is used for /k/ in the initial position before a, o, u, or any consonant
- none of the above
- no idea

26. What is the rule that governs the use of 'k' in the initial position for /k/?

- 'k' is used for /k/ in the initial position before e, i, or y
- the use of 'k' for /k/ in the initial position is random and must be memorized
- 'k' is used for /k/ in the initial position before a, o, u, or any consonant
- none of the above
- no idea

27. A morpheme refers to:

- a single letter.
- a single speech sound.
- a single unit of meaning
- a grapheme
- no idea

Submit Survey

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## APPENDIX B

### TEACHER KNOWLEDGE SURVEY OF BASIC LANGUAGE CONSTRUCTS

#### FOR PRE-SERVICE TEACHERS

Participation in this survey is voluntary, and there are no foreseeable risks associated with your participation or non-participation. Results from the survey will remain anonymous and will in no way be used to evaluate any person or university individually.

The survey is designed for university instructors who have been members of HEC for at least two years and preservice/new teachers in EC-4 teacher certification.

You may only access the survey ONCE and will have 45 MINUTES to complete it. Please do not use any outside resources in answering the items. Some of the items will be more difficult than others (it is not expected that you will be able to answer every item correctly), but we just want to see what you know off the top of your head.

We sincerely appreciate your help in participating in this survey.

#### **Basic Language Constructs Survey**

Thank you for participating in this survey. The information you provide will be invaluable in our efforts to ascertain what teacher candidates are learning about early reading instruction. The survey results are anonymous, and no individual or institution will be identified.

Please remember you may only access the survey ONCE and will have 45 MINUTES to complete it (see start time below).

Please do not use any outside resources in answering the items. Some of the items will be more difficult than others (it is not expected that you will be able to answer every item correctly).

Upon completion of the ENTIRE survey within 45 minutes, please click the "submit" button at the end of the page.

Start Time: 12/01/07 06:12:30

i. Please provide your highest degree you have obtained or are currently working on (e.g., B.S., B.A., M.S., M.Ed., etc.):

ii. Please provide the university name from which you obtained or will obtain your highest degree:

iii. Please provide the specialty area of your highest degree (e.g., Elementary Education, Middle School Education, English, Special Education, Business, Engineering, etc.):

iv. Please provide the university or teacher preparation program you attend(ed) (may or may not be the same answer as #i):

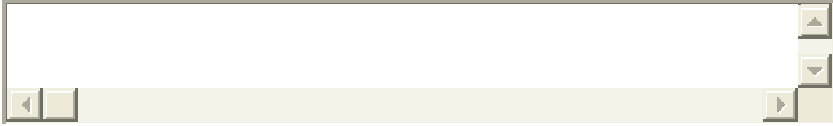
v. Please provide the reading education course subject(s) you have taken (e.g., introduction to elementary-level reading, assessment in early childhood reading, children's literature, content area literacy, etc.):

vi. Please provide your GENDER:

vii. Please provide your RACE/ETHNICITY:

viii. Please provide the NUMBER of courses you have taken related to reading education:

ix. Please briefly list the resources/materials, etc. you have found most helpful and/or useful in your teacher preparation to teach reading (including, but not limited to: teaching materials, PowerPoints, handouts, videos, books, online resources, journals/articles, group/project work with other education students, other course assignments, specific teaching strategies and activities, current reading research, field experiences with teachers or children, lesson plans, etc.):

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x. Please briefly list any other training in the teaching of reading (including but not limited to workshops, seminars, conferences, professional development, and/or professional organization meetings) you have had:

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xi. Please list any previous teaching or tutoring experiences you have had at the elementary, middle school, or high school level:

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Please evaluate your knowledge of:

1. Phonemic Awareness

- MINIMAL
- MODERATE
- VERY GOOD
- EXPERT

2. Phonics

- MINIMAL
- MODERATE
- VERY GOOD
- EXPERT

3. Fluency

- MINIMAL
- MODERATE
- VERY GOOD
- EXPERT

4. Vocabulary

- MINIMAL
- MODERATE
- VERY GOOD
- EXPERT

## 5. Comprehension

MINIMAL  MODERATE  VERY GOOD  EXPERT

## 6. Children's Literature

MINIMAL  MODERATE  VERY GOOD  EXPERT

## 7. Teaching literacy skills to ELLs

MINIMAL  MODERATE  VERY GOOD  EXPERT

## 8. Using assessment to inform reading instruction

MINIMAL  MODERATE  VERY GOOD  EXPERT

## 9. A phoneme refers to

- a single letter.
- a single speech sound.
- a single unit of meaning.
- a grapheme.
- no idea

## 10. If tife is a word, the letter "i" would probably sound like the "i" in:

- if
- beautiful
- find
- ceiling
- sing
- no idea

## 11. A combination of two or three consonants pronounced so that each letter keeps its own identity is called:

- silent consonant
- consonant digraph

- diphthong
- consonant blend
- no idea

12. How many speech sounds are in the following words? For example, the word "cat" has 3 speech sounds 'k'- 'a'- 't'. Speech sounds do not necessarily equal the number of letters.

<input type="text"/>	<input type="text"/>	box
<input type="text"/>	<input type="text"/>	grass
<input type="text"/>	<input type="text"/>	ship
<input type="text"/>	<input type="text"/>	moon
<input type="text"/>	<input type="text"/>	brush
<input type="text"/>	<input type="text"/>	knee
<input type="text"/>	<input type="text"/>	through

13. What type of task would the following be? "Say the word 'cat.' Now say the word without the /k/ sound."

- blending
- rhyming
- segmentation
- deletion
- no idea

14. A "soft c" is in the word:

- Chicago
- cat
- chair
- city
- none of the above
- no idea

15. Identify the pair of words that begins with the same sound:

- joke-goat
- chef-shoe
- quiet-giant

- chip-chemist
- no idea

(The next 2 items involve saying a word and then reversing the order of the sounds. For example, the word "back" would be "cab.")

16. If you say the word, and then reverse the order of the sounds, ice would be:

- easy
- sea
- size
- sigh
- no idea

17. If you say the word, and then reverse the order of the sounds, enough would be:

- fun
- phone
- funny
- one
- no idea

18. All of the following nonsense words have a silent letter, except:

- bamb
- wrin
- shipe
- knam
- phop
- no idea

19. For each of the words on the left, determine the number of syllables and the number of morphemes. **(Please be sure to give both the number of syllables and the number of morphemes, even though it may be the same number.)**

	# of syllables	# of morphemes
disassemble	<input type="text"/>	<input type="text"/>
heaven	<input type="text"/>	<input type="text"/>

observer	<input type="text"/>	<input type="text"/>
spinster	<input type="text"/>	<input type="text"/>
pedestal	<input type="text"/>	<input type="text"/>
frogs	<input type="text"/>	<input type="text"/>
teacher	<input type="text"/>	<input type="text"/>

20. Which of the following words has an example of a final stable syllable?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

21. Which of the following words has 2 closed syllables?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

22. Which of the following words contains an open syllable?

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

23. Phonological awareness is:

- the ability to use letter-sound correspondences to decode.
- the understanding of how spoken language is broken down and manipulated.

- a teaching method for decoding skills.
- the same as phonics.
- no idea

24. Phonemic awareness is:

- the same as phonological awareness.
- the understanding of how letters and sounds are put together to form words.
- the ability to break down and manipulate the individual sounds in spoken language.
- the ability to use sound-symbol correspondences to read new words.
- no idea

25. What is the rule that governs the use of 'c' in the initial position for /k/?

- 'c' is used for /k/ in the initial position before e, i, or y
- the use of 'c' for /k/ in the initial position is random and must be memorized
- 'c' is used for /k/ in the initial position before a, o, u, or any consonant
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- 'k' is used for /k/ in the initial position before a, o, u, or any consonant
- none of the above
- no idea

27. A morpheme refers to:

- a single letter.
- a single speech sound.
- a single unit of meaning
- a grapheme
- no idea

Submit Survey

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**APPENDIX C****ANSWER KEY FOR KNOWLEDGE AND ABILITY ITEMS****Basic Language Constructs Survey**

*Correct answers indicated with underline.*

9. A phoneme refers to

- a single letter.
- a single speech sound.
- a single unit of meaning.
- a grapheme.
- no idea

10. If tife is a word, the letter "i" would probably sound like the "i" in:

- if
- beautiful
- find
- ceiling
- sing
- no idea

11. A combination of two or three consonants pronounced so that each letter keeps its own identity is called:

- silent consonant
- consonant digraph
- diphthong
- consonant blend
- no idea

12. How many speech sounds are in the following words? For example, the word "cat" has 3 speech sounds 'k'- 'a'- 't'. Speech sounds do not necessarily equal the number of letters.

4      box

4 grass  
3 ship  
3 moon  
4 brush  
2 knee  
3 through

13. What type of task would the following be? "Say the word 'cat.' Now say the word without the /k/ sound."

- blending
- rhyming
- segmentation
- deletion
- no idea

14. A "soft c" is in the word:

- Chicago
- cat
- chair
- city
- none of the above
- no idea

15. Identify the pair of words that begins with the same sound:

- joke-goat
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- no idea

(The next 2 items involve saying a word and then reversing the order of the sounds. For example, the word "back" would be "cab.")

16. If you say the word, and then reverse the order of the sounds, ice would be:

- easy
- sea
- size

- sigh
- no idea

17. If you say the word, and then reverse the order of the sounds, enough would be:

- fun
- phone
- funny
- one
- no idea

18. All of the following nonsense words have a silent letter, except:

- bamb
- wrin
- shipe
- knam
- phop
- no idea

19. For each of the words on the left, determine the number of syllables and the number of morphemes. **(Please be sure to give both the number of syllables and the number of morphemes, even though it may be the same number.)**

	# of syllables	# of morphemes
disassemble	<u>4</u>	<u>2</u>
heaven	<u>2</u>	<u>1</u>
observer	<u>3</u>	<u>2</u>
spinster	<u>2</u>	<u>1</u>
pedestal	<u>3</u>	<u>1</u>
frogs	<u>1</u>	<u>2</u>
teacher	<u>2</u>	<u>2</u>

20. Which of the following words has an example of a final stable syllable?

- wave
- bacon
- paddle

- napkin
- none of the above
- no idea

21. Which of the following words has 2 closed syllables?

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22. Which of the following words contains an open syllable?

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- the same as phonics.
- no idea

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- the ability to use sound-symbol correspondences to read new words.
- no idea

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- a grapheme
- no idea

## APPENDIX D

### CATEGORIZATIONS FOR KNOWLEDGE AND ABILITY ITEMS

#### Skill

Knowledge = explicit knowledge of a term or concept (12 items)

Ability = implicit ability to perform task (26 items\*)

*\*While there is usually only one definition of a term or concept to be assessed for knowledge, there are often multiple ways to assess the abilities associated with a term or concept (e.g., asking the definition of phonemic awareness and asking the number of phonemes in five different words); hence, the larger number of ability-based items.*

#### Type

*Phonological:*

Phonemic = deals specifically with hearing or manipulating individual sounds (13 items)

Phonological = deals with hearing and manipulating sounds at the larger level (e.g., syllables, etc.) (8 items)

*Decoding:*

Phonics = the use of letter-sound correspondences, generalizations, rules, and patterns of the written language to decode a word (9 items)

Morphological = the use of units of meaning within a word to decode and/or Comprehend (8 items)

#### Basic Language Constructs Survey

*Categorizations indicated with underline.*

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a single letter.

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- a single unit of meaning.
- a grapheme.
- no idea

10. If tife is a word, the letter "i" would probably sound like the "i" in: - ability, phonics

- if
- beautiful
- find
- ceiling
- sing
- no idea

11. A combination of two or three consonants pronounced so that each letter keeps its own identity is called: - knowledge, phonics

- silent consonant
- consonant digraph
- diphthong
- consonant blend
- no idea

12. How many speech sounds are in the following words? For example, the word "cat" has 3 speech sounds 'k'-'a'-'t'. Speech sounds do not necessarily equal the number of letters. – ability, phonemic (7)

box  
grass  
ship  
moon  
brush  
knee  
through

13. What type of task would the following be? "Say the word 'cat.' Now say the word without the /k/ sound." – knowledge, phonemic

- blending
- rhyming
- segmentation

- deletion
- no idea

14. A "soft c" is in the word: - knowledge, phonics

- Chicago
- cat
- chair
- city
- none of the above
- no idea

15. Identify the pair of words that begins with the same sound: - ability, phonemic

- joke-goat
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- chip-chemist
- no idea

(The next 2 items involve saying a word and then reversing the order of the sounds. For example, the word "back" would be "cab.")

16. If you say the word, and then reverse the order of the sounds, ice would be: - ability, phonemic

- easy
- sea
- size
- sigh
- no idea

17. If you say the word, and then reverse the order of the sounds, enough would be: - ability, phonemic

- fun
- phone
- funny
- one
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18. All of the following nonsense words have a silent letter, except: - ability, phonics

- bamb
- wrin
- shipe
- knam
- phop
- no idea

19. For each of the words on the left, determine the number of syllables and the number of morphemes. (**Please be sure to give both the number of syllables and the number of morphemes, even though it may be the same number.**) – ability, phonological (7) and ability, morphological (7)

	# of syllables	# of morphemes
disassemble		
heaven		
observer		
spinster		
pedestal		
frogs		
teacher		

20. Which of the following words has an example of a final stable syllable? – knowledge, phonics

- wave
- bacon
- paddle
- napkin
- none of the above
- no idea

21. Which of the following words has 2 closed syllables? – knowledge, phonics

- wave
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- no idea

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- none of the above
- no idea

27. A morpheme refers to: - knowledge, morphology

- a single letter.
- a single speech sound.
- a single unit of meaning
- a grapheme
- no idea

## VITA

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### EDUCATIONAL EXPERIENCE

Ph.D., Texas A&M University, Curriculum and Instruction with emphasis in Reading and Language Arts Education, 2008.  
 M.Ed., Texas A&M University, Curriculum and Instruction with emphasis in Reading and Language Arts Education, 2004. *Reading Specialist & Master Reading Teacher Certification*.  
 B.S., Texas A&M University, Interdisciplinary Studies with emphasis in Early Childhood Education, 2002. *PK-6 Classroom Teacher Certification*.

### SELECTED PROFESSIONAL EXPERIENCE

Instructor, Dept. of Teaching, Learning & Culture, Texas A&M University, 2005-2007.  
 Language and Literacy Clinician, Texas A&M University, 2004-2007.  
 Editorial Assistant, *Reading & Writing: An Interdisciplinary Journal*, 2004-2007.  
 Lead Research Associate, *What Works*, University of Illinois at Chicago, 2005-2007.  
 Co-Chair, Educational Research Exchange, Texas A&M University, 2005-2007.  
 President, Brazos Valley International Dyslexia Association, 2005-2007.  
 Data Analyst, Mexican American & U.S. Latino Research Center, 2007.  
 Elementary Classroom Teacher, College Station and Hearne Independent School Districts, 2002-2004.

### SELECTED PUBLICATIONS

Binks, E. S. (2006). Alternative certification : The backdoor is open. In D. L. Smith & L. J. Smith (Eds.), *Restructuring high schools: Searching for solutions* (pp. 50-54). College Station, TX: Mid America Training and Development.  
 Binks, E. S. (2006). *Oral communications, nonliterary, and media literacy in english language arts..* College Station, TX : Accelerate Online Teacher Certification.  
 Joshi, R. M., Binks, E. S., Hougren, M., Graham, L., & Smith, D. L. (2008). The role of teacher education programs in preparing teachers for implementing evidence-based reading practices. In S. Rosenfield & V. Berninger (Eds.), *Handbook on implementing evidence based academic interventions*. Oxford University Press  
 Smith, D. L., Ezrailson, C. M., Binks, E. S., Delzer, L., Mohr, M. J., Warren, C. (2006). *'Connected Teacher' professional development module II: Improving mathematics understanding through reading strategies for the middle school teacher*. Austin, TX: Texas Education Agency.

### SELECTED PRESENTATIONS

Binks, E. S., Joshi, R. M., Dean, E. O., Graham, L., Boettcher, C. K., & Hairrell, A. (2006, November). *Roadblocks to reading acquisition: Is teacher knowledge one of them?* Paper presented at the annual meeting of the International Dyslexia Association, Indianapolis, IN.  
 Binks, E. S., & Eslami-Rasekh, Z. (2006, April). *Pre-service teachers' knowledge, attitudes, and perceptions of ELL reading assessment*. Paper presented at annual meeting of the American Educational Research Association, San Francisco, CA.  
 Binks, E. S., Smith, D. L., & Joshi, R. M. (2006, April). *Teachers as storytellers: A reflection process that moves beyond stories just for the students*. Paper presented at the meeting of American Educational Research Association, San Francisco, CA.