

Early Childhood Educators' Knowledge of Early Literacy Development¹

Courtney Crim

University of Texas at San Antonio

Jacqueline Hawkins

University of Houston

Jenifer Thornton

University of Texas at San Antonio

Holly Boon Rosof

University of Houston

Juanita Copley

University of Houston

Emily Thomas

University of Houston

The foundation of all learning is rooted in the development of language and literacy abilities. Literacy development begins well before children enter school and can accelerate in an early childhood classroom setting. As teacher educators, we often hear about the importance of literacy development. In particular, the significance of phonological

Courtney Crim is an assistant professor in the Department of Interdisciplinary Learning and Teaching at the University of Texas at San Antonio, San Antonio, Texas; Jacqueline Hawkins is an associate professor and Associate Dean for Institutional Effectiveness and Outreach at the University of Houston, Houston, Texas; Jenifer Thornton is an assistant professor in the Department of Interdisciplinary Learning and Teaching at the University of Texas at San Antonio, San Antonio, Texas; Holly Boon Rosof is an independent consultant with the Department of Educational Psychology at the University of Houston, Houston, Texas; Juanita Copley is a professor in the Department of Curriculum and Instruction at the University of Houston, Houston, Texas; and Emily Thomas is a graduate student in the Department of Educational Psychology at the University of Houston, Houston, Texas.

awareness to emergent readers and writers is emphasized. Teachers must be adequately prepared to teach important phonological awareness skills and must have a basic understanding of language structure. This study explores the extent to which early childhood educators are knowledgeable in regard to these components of early literacy. If teachers are knowledgeable in phonological awareness and language structure, then they have the potential to positively impact students' early literacy development.

Phonological awareness is defined as "...one's sensitivity to, or explicit awareness of, the phonological structure of the words in one's language" (Torgesen, Wagner, & Rashotte, 1994, p. 276). Awareness of the structure of spoken language develops as children's understandings of "phonological units" move from larger (words, syllables) to smaller (morphemes, phonemes) units of speech (Pullen & Justice, 2003, p.88). For young children, phonological awareness can be evaluated through the use of activities that require attentiveness to rhyme and/or alliteration and through the use of tasks that require an individual "to identify, isolate, or blend the individual phonemes in words" (Torgesen, Wagner, & Rashotte, 1994, p. 276).

Phonological awareness is a crucial stage in literacy development. This early stage forms the foundation of learning, as the literacy skills developed in early childhood are strongly linked to a child's future reading success (Muter & Snowling, 1998; Torgesen, Wagner, & Rashotte, 1994). A child's knowledge of letters, ability to distinguish syllables, rhymes, and phonemes, and understanding of phoneme-grapheme correspondence are all variables that influence the acquisition of language skills (Whitehurst & Lonigan, 1998). Nation and Hulme (1997) report that the capability to segment phonemes is a strong predictor of reading and spelling abilities in young children. The importance of building a strong phonological foundation is evident. Studies show that children who exhibit proficient phonological awareness in kindergarten learn to read with greater ease than children who do not demonstrate the same level of proficiency (Torgesen, Wagner, & Rashotte, 1994). These same researchers concluded that although there are many variables that contribute to a child's ability to read, phonological awareness is the skill that is most closely related to future reading success. Furthermore, there is evidence that phonological awareness is essential for the development of decoding skills (Pullen & Justice, 2003).

Language structure has been identified as an area significant to future reading development (Moats, 1994; Spear-Swerling, Brucker & Alfano, 2005). The understanding of morphemic structure in words supports beginning readers in both reading and spelling. It also supports

progression to advanced stages of reading and spelling as learners “must become aware that the spelling of meaningful word parts often stays constant even when pronunciation changes from one word to another” (Moats, 1994) as exemplified in the words *progress* and *progression*. In order to foster this knowledge in children, teachers must themselves have knowledge of word meaning and structure.

There is a growing body of research that demonstrates the dangers associated with delayed development of phonological awareness in young children. Children who have difficulties developing certain early literacy skills, such as phonological sensitivity, may be at risk for reading difficulties or failing to learn how to read (Burgess, 1999). These young children may also develop difficulties in other areas. In a 1987 study cited by Jerger (1996), researchers concluded that difficulties with phonological awareness tasks could lead to difficulties in other tasks involving linguistic abilities. For children lacking these skills, Ball and Blachman (1991) determined that instruction in phonological awareness could significantly improve kindergarten students’ early reading and spelling aptitudes. Evidence, in fact, supports the conclusion that early literacy skills are significantly impacted by early, consistent, and accurate instruction in the areas of phonological and phonemic awareness (Mather, Bos & Babur, 2001; Bos, Mather, Dickson, Podhajski, & Chard, 2001; Torgesen, Wagner, & Rashotte, 1994). In light of this research, we must ask: Are teachers in early childhood classrooms settings prepared to teach these skills?

In order to positively impact and expand a child’s knowledge in these crucial areas, teachers must themselves be knowledgeable. If the teachers do not know and understand the basic principles of phonological awareness, it follows that teaching these skills to young children would be an impossible task. Recent studies indicate that some teachers lack appropriate knowledge in the area of language structure, phonology, and other basic skills related to beginning reading instruction (Cunningham, Perry, Stanovich, & Stanovich, 2004; Mather, Bos, & Babur, 2001; Bos, et al., 2001; McCutchen, Harry, Cunningham, Cox, Sidman, & Covill, 2002; Moats, & Foorman, 2003). In one 2002 study, kindergarten teachers were given the Informal Survey of Linguistic Knowledge, a measure designed to assess knowledge of language structure. Teachers’ lack of knowledge about phonology and language structure, as reflected in the survey, led researchers to wonder if many of the teachers “had the phonological knowledge necessary to assist struggling beginning readers” (McCutchen, Harry, & Cox, 2002, p. 218). In another longitudinal study of reading instruction, researchers reached similar conclusions, citing “surprising gaps in teachers’ insights about learning to read” (Moats &

Foorman, 2003, p.36). Researchers also concluded that teachers' increased understanding of the role of phonological awareness in literacy instruction could impact and enhance student performance. Consequently, it is important to assess early childhood teachers' understanding of basic literacy development as they work with our youngest learners.

The Early Childhood C³ Coaching: Quality Professional Development Grant (*Collegial, Cognitive, and Collaborative*) was designed to improve the educational experiences of prekindergarten children in low-income, high-need communities by providing meaningful, scientifically based professional development opportunities for their teachers. The model addressed three areas of instruction: literacy, mathematics and socialization. It promoted opportunities for teachers to work with and learn from other educators and provided research on how young children learn, as well as effective research-based instructional strategies. Unlike other studies, the C³ grant targeted only educators of young children (ages 3, 4 and 5)—the age of particular importance for developing phonological awareness skills. An important first step for the grant team was to assess teacher knowledge. It is only after we assess teachers' understandings that we can move toward developing effective literacy training opportunities.

Research Questions

A large urban research university received a professional development grant funded by the U.S. Department of Education. From eight districts in the greater Houston area, the C³ grant team identified sixteen elementary campuses with the lowest-income, highest need populations. Databases from the Texas Education Agency were used to analyze the income levels, special education levels, and bilingual compositions in determining the schools with greatest needs. The grant team randomly selected teachers from these campuses to participate in three years of professional development activities. This professional development model was designed to (a) train teams of educators with differing roles and levels of expertise (*collegial*), (b) provide research on children's learning and effective instructional strategies (*cognitive*), and (c) implement research-based programs that incorporate perspectives within a variety of experience levels (*collaborative*).

A portion of the professional development initiative began by investigating participating teachers' knowledge relating to early phonological awareness. Specifically, the grant team sought to determine teachers' ability to identify syllables, morphemes, and phonemes: areas of critical importance for student learning and achievement. Information was

obtained using a modified version of the Informal Survey of Linguistic Knowledge (Moats, 1994). Through analysis of this assessment, the following questions concerning the extent of participating teachers' knowledge about early language are addressed:

1. What knowledge do early childhood educators have in the area of syllabication identification?
2. What knowledge do early childhood educators have in the area of morpheme identification?
3. What knowledge do early childhood educators have in the area of phoneme identification?

Method

Participants and Setting

The sample for this study consisted of 64, randomly selected early childhood educators who voluntarily agreed to participate in the professional opportunities offered by the C³ Coaching Grant beginning in the 2003-2004 school year. The majority of participating teachers were female (95.5%) with a mean age of 39.7 years. Teachers averaged 9.8 years of teaching experience and reported holding their current position for an average of 4.7 years. All participating teachers worked with preschool children (ages 3, 4 and 5) in public school prekindergarten (PK), kindergarten (K) and PPCD (Preschool Program for Children with Disabilities) classrooms, community or school-based Head Start classrooms, or community-based preschool/childcare classrooms. Teachers reported earning various degrees including associate's degrees (11%), bachelor's degrees (77%) and master's degrees (11%). Thirty percent reported that their teaching certification was attained through an alternative certification program.

The setting for this study encompassed urban, suburban, and rural communities in southeast Texas. The Houston metropolitan area supports broad diversity with no racial or ethnic majority (5% Asian, 18% Black, 33% Hispanic, and 42% White). One of the largest school districts in this county currently serves more than 210,000 students. Of these students, 79% are economically disadvantaged (eligible for free or reduced lunch). The county as a whole serves approximately 700,000 students, 55% of whom receive free or reduced lunches, further indicating the low socioeconomic level of the children in this area. The participating county includes schools that are comprised of large numbers of English Language Learners and students with disabilities (Copley, Hawkins,

Padron, & Houston, 2003). Research indicates that children entering school with risk factors such as poverty, limited English proficiency and physical and developmental disabilities are more likely to experience failure by second and third grade (Zill & West, 2001).

Initial Professional Development Retreat

The C³ Coaching grant initially provided retreats for prekindergarten teachers in the county during the fall of the school year, regardless of program affiliation (i.e., public school PK or PPCD, Head Start or childcare). The retreat offered one-and-a-half days of whole group as well as numerous breakout sessions for the 64 attendants. The purpose of the retreat was to (a) introduce participants to one another and to the researchers and trainers on the grant team, (b) determine participants' existing knowledge in literacy and mathematics and (c) give participants an overview of the long-term professional development goals established by the university grant team. Teachers participated in various "getting to know you" activities and, on the final day, completed demographic questionnaires and initial assessments in mathematics and literacy. The prekindergarten retreat was offered at no cost to participants and was scheduled in a central location to facilitate maximum participation. At the conclusion of the retreat, participants received various classroom materials such as big books and appropriate classroom literature as well as a monetary stipend.

Instrument

This study addressed early childhood educators' initial background knowledge of language. Specifically, understanding of syllabication, morpheme knowledge and sound presence in words were evaluated. As the literature shows, these areas are significant to the development of language and literacy in young children. The instrument used to assess this knowledge was adapted from the Informal Survey of Linguistic Knowledge (Moats, 1994). The survey elicits participants' background knowledge of basic language. This fifteen-item survey is designed to gauge participants' general word knowledge, their ability to identify phonemes, morphemes, vowels, blends and digraphs, types of syllables, and the ability to use various spelling rules. The most relevant tasks associated with the prekindergarten guidelines, identification of syllables, morphemes, and phonemes, comprised the three sections for evaluation in this study.

Participants completed the survey during the last day of the retreat prior to any intervention that targeted literacy development. They

gave responses in the form of a number indicating how many syllables, morphemes or phonemes were in the word prompts (e.g., the word *salamander* has 4 syllables). Fifty-four surveys were collected, returned and analyzed to ascertain the group's general knowledge of early literacy.

Scoring

Evaluation of teacher knowledge was conducted using portions of three of the 14 sections on the Informal Survey of Linguistic Knowledge that most closely aligned with prekindergarten literacy guidelines. These three sections contained several items that focused on the identification of syllables, phonemes, and morphemes within words. In these three sections, investigators analyzed the individual responses to items. An item analysis reports the percentage for correct and incorrect responses for each item in the section. When participants completed a majority of the assessment, but left some questions unanswered, researchers coded these non-responses as incorrect. This process allowed for a more thorough analysis of the participants' responses and enabled researchers to determine if an individual knew the number of syllables in one word in the section, but not for another.

Results

Results indicate that participating early childhood teachers had difficulty identifying specific print-to-speech concepts of the English language structure—basic skills related to beginning reading instruction. These concepts include counting syllables in words and identifying the number of morphemes and phonemes in words.

Syllabication

For the section targeting syllabication, the separation of words into syllables, participants responded by identifying the number of syllables in eight different words. Participating teachers had an accuracy rate that ranged between 67.5% and 95% (see Table 1). Teachers were often successful in identifying the number of syllables in longer words. For example, 92.5 % of the teachers knew that *salamander*, *unbelievable*, and *psychometrics* had four, five, and four syllables respectively. Two and three syllable words, however, were more problematic for the teachers. Only 67.5% of the participants could correctly identify the number of syllables in the words *attached* and *crocodile*. Eighty percent of the participating teachers correctly identified the number of syllables in the word *gardener*, which has three syllables. It is possible that a

southwestern dialect variation could account for the 20% of teachers who incorrectly identified *gardener* as having only two syllables. As responses were written and researchers did not record the participants' pronunciation, there is not an accurate way to account for the possibility of dialect variation in this study. Ninety-five percent of the participants were able to identify *finger* as having two syllables and 92.5% correctly identified that the word *pies* contained only one syllable.

Morphemes

Morphemes are the smallest units of meaning in a word. One word can have several morphemes as reflected in the word *unreliable*, (un + rely + able), or just one as in the word *rose*. Response accuracy for participating teachers on the morpheme section of the survey indicated that morpheme identification was more problematic than syllable counting. The percentage of teachers who did not complete this task accurately varied from 67.5 to 95 %. Over half (56%) of the participants did not attempt the morpheme task, choosing instead to leave this section, or portions of this section, incomplete. Teachers identified words containing one morpheme, like *salamander*, *crocodile*, and *finger*, inaccurately by 85%, 82.5% and 82.5% respectively (see Table 2). Likewise, 90% and 67.5% of the teachers respectively identified two morpheme words, *pies* and *gardener*, inaccurately. Three morpheme words, *attached*, *unbelievable*, and *psychometrics*, also had high inaccuracy rates of 95%, 82.5%, and 92.5% respectively.

Table 1
Teachers' Accuracy in Identifying Syllables in Words (n=54)

Word	Number of Syllables	% Teachers Responding Correctly*	% Teachers Responding Incorrectly*
Salamander	4	92.5%	7.5%
Crocodile	3	67.5%	32.5%
Attached	2	67.5%	32.5%
Unbelievable	5	92.5%	7.5%
Finger	2	95%	5%
Pies	1	92.5%	7.5%
Gardener	3	80%	20%
Psychometrics	4	92.5%	7.5%

* Results rounded to the nearest whole or half percentage point

Phonemes

Phonemes are the smallest sound units in speech that help to distinguish one word from another. Identification of the number of phonemes in words was challenging for participating teachers. The percentage of participants who responded inaccurately fell between 40% and 85% (see Table 3). However, unlike the morpheme task, only 11% of the participants left this portion incomplete. The word *boil* was least difficult for the teachers, with 60% of the group identifying the number of phonemes accurately. When asked to count the number of phonemes in words with multi-letter graphemes (two or more letters corresponding to one speech sound; e.g., /th/ in *thank*), fewer teachers responded correctly. For instance, when given the word *king*, 62.5% of the teachers were not able to iden-

Table 2
Teachers' Accuracy in Identifying Morphemes in Words (n=54)

Word	Number of Morphemes	% Teachers Responding Correctly*	% Teachers Responding Incorrectly*
Salamander	1	15%	85%
Crocodile	1	17.5%	82.5%
Attached	3	5%	95%
Unbelievable	3	17.5%	82.5%
Finger	1	17.5%	82.5%
Pies	2	10%	90%
Gardener	2	32.5%	67.5%
Psychometrics	3	7.5%	92.5%

* Results rounded to the nearest whole or half percentage point

Table 3
Teacher Accuracy in Identifying Phonemes in Words (n=54)

Word	Number of Phonemes	% Teachers Responding Correctly*	% Teachers Responding Incorrectly*
Ox	3	15%	85%
Boil	3	60%	40%
King	3	37.5%	62.5%
Thank	4	37.5%	62.5%
Straight	5	22.5%	77.5%
Shout	3	55%	45%
Precious	6	15%	85%

* Results rounded to the nearest whole or half percentage point.

tify that the word had three phonemes, /k/, /in/, /g/. Similarly, 62.5% of the teachers misidentified the number of phonemes in the word *thank*. Words with consonant blends were also difficult with 77.5% and 85% of the teachers inaccurately identifying the number of phonemes in the words *straight* and *precious*, respectively. Furthermore, knowledge of a single grapheme containing more than one sound (e.g., /x/ in the word *ox*) was also problematic for these teachers. Again, a high inaccuracy rate of 85% was noted and over 65% of the teachers identified this word (*ox*) as having only two phonemes.

Discussion

Early childhood teachers were most successful in recognizing the number of syllables in words. However, responses were inconsistent. It appears that some participants may have used only pronunciation guidelines rather than identifying syllables by vowels when determining the number of syllables in the word. For example, the word *gardener* has three syllables, but some teachers identified it as having only two syllables (20%). This may be due to dialect differences in which teachers pronounced the word orally as “gard/ner” rather than “gar/den/er.” This is not necessarily an incorrect approach, but when dialect or pronunciation is different from the written word, syllables may be identified incorrectly.

It is important for early childhood educators and those who work with children to be aware of variations in pronunciation, especially as classrooms become more linguistically diverse. When early childhood teachers are able to identify syllables in words, they can then help students learn how to identify syllables correctly. Syllabication skills will help young students develop a much stronger foundation for building future literacy skills. Most of the teachers in this study had an understanding of syllabication, but some still struggled in this area. Addressing these skills, not only at the inservice level, but also with preservice teachers is necessary. If teachers in the field do not demonstrate knowledge of early literacy skills, teacher training programs must take a critical look at the knowledge of their teacher candidates.

The lowest performance on the survey was in the area of morpheme identification. This was also the area in which 56% of teachers did not attempt to respond. This may be indicative of participants' lack of morpheme knowledge, but it could also reflect their overall uneasiness in completing the task. Of the participants who attempted the task, over 80% responded incorrectly to the majority of the questions. It also appears from responses that 16% of the participants thought morphemes corresponded to the actual number of letters in the word. For example,

these participants incorrectly responded that a word with four letters, such as *pies*, had four morphemes instead of counting one for the word *pie* and an additional morpheme for the plural suffix.

The area of word meaning (morpheme) is a component of early literacy that needs strong focus in teacher professional development. Teachers need an accurate understanding of how morphemes relate to the creation of words so that they can correctly facilitate this understanding in their students (Spear-Swerling, Brucker, & Alfano, 2005). Without this understanding of word structure, students cannot have a firm foundation in phonological awareness.

Identification of phonemes in words also proved to be problematic for early childhood teachers, although to a lesser extent than morpheme identification. Inaccuracy rates for items in this section ranged from 40-85%. Again, this low performance could be because some participating teachers appeared to count the number of letters in words instead of the number of sounds. Although not consistent, this approach emerged several times in the responses. The data also suggest that a significant number of participating teachers seemed unaware that letter combinations can often represent single (e.g., *th*) or multiple (e.g., *x*) phonemes in English.

English is an alphabetic language, meaning that graphemes in the word are represented by phonetic sounds. English is a complex language with 26 letters that, either alone or in combination, represent roughly 44 phonemes (Moats, 1995). There are several ways to spell these phonemes and more than one way to pronounce these letters. Further, there are approximately 98 different phoneme-grapheme associations that children need to learn in order to read and write in English. Standard use of the English language requires knowledge of these associations. Clearly, the results from this assessment are of importance to practicing teachers as well as educators of preservice teachers. If emergent readers and writers are to grasp these associations, all teachers need to have basic foundational knowledge of the English language so that they may teach these skills. Knowledge of letter sounds solidifies the foundation for early reading success (Moats, 1995). Unfortunately, as indicated by this study, there are early childhood teachers who, based on their existing knowledge, may not be successful in building an adequate foundation for early literacy in their classrooms.

The overall lack of knowledge in basic early literacy skills demonstrated by prekindergarten teachers as evaluated in this survey supports that early childhood educators, in fact, do need professional development in the area of literacy. Furthermore, results indicate that these gaps may need to be more fully addressed in teacher preparation programs. Responses indicate that the basic literacy skills that link closely with

phonological awareness (syllabication, morpheme identification and phoneme identification) are not solidified in the minds of the educators who participated in the study. Only by increasing teacher knowledge in the area of phonological awareness can we then hope to impact the children in the early childhood classroom. Appropriate training of teachers needs to begin with teacher preparation programs. Without this foundation, which is so clearly articulated in the literature, students will not have the opportunities to develop a strong foundation in phonological awareness. This strong foundation can only be built upon by training programs and professional development that provide early childhood teachers with the knowledge and skills necessary for supporting students' early literacy development.

Through discussions and conversations, teachers in this study informally indicated their strong desire to help students grow as literacy learners. In the area of phonological awareness, however, data analyses indicated they did not have the skills necessary to do so. Future professional development provided by this grant will strive to help teachers acquire the necessary skills and knowledge needed to implement instructional practices that support phonological awareness in young children.

The findings of this study intensify the concern that many early childhood educators are not adequately prepared to teach young children how to identify syllables, morphemes, and phonemes. As these three areas have been linked to future reading achievement (Moats, 1994; Torgesen, Wagner, & Rashotte, 1994), a vast number of young children may be at serious risk for missing this critical stage in literacy development and succeeding as literacy learners. Clearly, appropriate instruction in these areas of phonological awareness can increase a student's success with early literacy skills (Mather, Bos, & Babur, 2001; Bos et al., 2001; Torgesen, Wagner, & Rashotte, 1994). The children in the classrooms targeted in this study, already identified as high need due to language and socioeconomic status, do not have teachers that currently have the necessary skills to provide appropriate and systematic instruction in phonological awareness. Again, teachers did not indicate an unwillingness to do this; rather, it appears they did not have adequate knowledge to incorporate these instructional practices in their classrooms.

In light of these findings, this study has possible limitations in the area of instrumentation and generalizability. The survey instrument was not originally designed for use with prekindergarten teachers. To address this issue, researchers used only portions of survey that most closely aligned with prekindergarten guidelines. Additionally, as the teachers received compensation for their participation and were all from low-income, high need areas, there could be limitations in generalizability.

To enhance overall generalizability, researchers used random selection of participants.

Based on previous research (Moats & Foorman, 2003) it is understood that increasing a teacher's knowledge of the role of phonological awareness in literacy instruction can enhance student performance. Therefore, it is recommended that these teachers receive systematic and ongoing professional development to increase their understanding of phonological awareness and its crucial role in early literacy development. In order to impact young learners' literacy development in a positive way, we must first solidify early childhood educators' knowledge about syllable, morpheme, and phoneme identification through teacher training and professional development opportunities. Through informal dialogue, the educators who provided us with these data expressed great willingness to acquire new knowledge and practice new skills that would be supportive of the educational needs of the students in their classrooms. These teachers emerged from the retreat as the first cohort to participate in an ongoing professional development grant. Future studies will explore the impact of this training on teachers' knowledge, literacy environments, and student achievement.

Note

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