

# TEACHERS' KNOWLEDGE OF PHONEMIC AWARENESS AND ITS INSTRUCTION IN ESL LEARNING SUB-URBAN PRIMARY SCHOOL IN MALAYSIA

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**Abstract** Implying research findings in into classroom practice requires a teacher to have an elaborate understanding and knowledge of those aspects of spoken language that the writing system represents. Phonemic awareness (PA) is widely convinced to be essential, though not sufficient, as one of the component in early reading instruction. Numerous evidences showed that PA instruction is able to accelerate reading acquisition in most children and reduce the incidence of reading failure. However limited in English as Second Language (ESL) settings, evidence suggests that many teachers do not have the recommended conceptual knowledge or skills sufficient to provide effective PA instruction. To that end, this study examined, with respect to PA instruction, the competencies of 90 randomly selected Mersing primary school English teachers certified in education field. Data were collected anonymously on the Survey of Teacher PhAKS (Phonemic Awareness Knowledge and Skills), a 15-item, self-administered, multiple choice instrument adapted from 'Teacher Education in Phonemic Awareness Instruction' by Elaine Anne Cheesman (2004). Results of this study indicate that significant numbers of primary school English teachers in this sample appear to be inadequately prepared with respect to PA instruction. They have limited knowledge of the conceptual basis of PA, are generally unable to select task-appropriate materials or activities, and lack skill in analyzing written words into constituent phonemes.

**Index Terms**— (Phonological Awareness, Phonemic Awareness, Second Language Learning, Early Reading)

## I. INTRODUCTION

Every human being is born with the innate capacity to learn any language (Chomsky, 1981) and the very first reason to use language is to communicate or relay a message. As the growth process takes place, human acquire all primary language skills which are speaking, listening, reading and writing in the first language. Literacy and fluency were enhanced as formal and informal education begins as early as five years old. However, research has found that there are differences in acquiring first and second language due to nativity and environment. This study, therefore, is driven by the curiosity of the researcher towards the failure of most Malaysian in rural and sub-urban area to learn English as a second language (ESL) despite the whole twelve years of learning English as a subject in the schools.

In pursuance of being proficient in English, a sufficient reading skill is needed by every ESL learners. Weaver (1980) has characterized reading process into three different characterizations. The first definition of reading is pronouncing the words. Though it is not sufficient to define reading, this definition clearly supports that learners must have the ability to pronounce written words. Second definition mentions identifying words and getting their meaning. This definition, too, remains unsatisfactory since it implies that readers are essentially passive, and that reading is entirely a one-way process. Readers merely soak up the words and meanings signalled by the printed marks on the page. Thirdly, reading means bringing meaning to a text in order to get meaning from it. To get meanings, readers should actively search for meaning and bring meaning to what they have read. Basically, reading involves the use of all three language cue system: syntactic, semantic and grapho/phonetic (Weaver, 1980). In order to read and speak in English well, ESL learners must have the ability to recognize printed marks on the page and its pronunciation.

It has been acknowledged by many researchers that a number of specific skills and understandings are required as a fundamental for learning to read and for advancing in reading skill surpassing the beginning reading phase (Storch & Whitehurst, 2002). Of various skills generated over the years in this field, this study believes that phonological skills are able to help young learners in acquiring languages skills. Stahl (1990) in summarizing Adams' book *Beginning to Read: Thinking and Learning about Print* mentioned that many evidences from previous studies particularly suggest that, to become proficient readers, students must appreciate the alphabetic principle. They must acquire a sense of the correspondence between letters and sounds upon which it is based. Over the past 10 years, a lot of attention has been paid to the relationship between phonological awareness and the acquisition of literacy skills (Bruck, 1992).

Phonological awareness is the ability to detect and manipulate the sound structure of words into smaller units of sound, independent of their meaning (Phillips et al., 2008). One's awareness towards the sounds of speech in regards to intonation, rhythm, words that rhyme and separate sounds; these are all considered phonological awareness (Ng & Ng, 2014). Phonological awareness, the child's awareness that spoken words can be broken down or manipulated, is one of the critical skills in the acquisition of reading in an alphabetic orthography (Stanovich, Cunningham, & Cramer, 1984). To ensure the effectiveness of those skills mentioned in early reading, good and reputable settings such as competent teachers, well-planned syllabus,

positive environment and available facilities must be provided for young ESL learners. The focus of this study is on teachers' competency in delivering phonics lessons as instructed in the Primary School Standard Curriculum (KSSR).

The professional demands of teaching reading must be acknowledged, and, in turn, much-improved training opportunities must be available to prepare teachers better for the challenging task of teaching children to read. Correcting the lack of adequate preparation for most teachers would be an important step toward reducing the reading problems facing this nation. A central goal of this study is to specify foundations that we regard as essential for teacher preparation. In order for teachers to make informed decisions about how to work with individual children, they must have a conceptual foundation regarding reading acquisition and sources of reading difficulty. Their training should include information about how written language represents spoken language, about how language is structured, and about what is required for children to become skilled readers. Armed with those aforementioned kinds of conceptual knowledge, teachers would be genuinely empowered, knowing how to apprehend with insight how a child is progressing and what kinds of activities would be most helpful to promote growth in reading. With adequate pre-service training and in-service follow-up, the success rate for teachers in the kindergarten and primary schools could be markedly improved. Consequently, the demand for expensive intervention and remediation would be limited to the much smaller numbers of children with reading disabilities who truly require more concentrated instruction.

It is likely that many primary teachers are lacking in clear pedagogical understanding of the relevant constructs as well as lacking in appropriate curricular materials and, perhaps, motivation to change (McCutchen & Berninger, 1999). The research and instructional strategies summarized in this article can serve as one more tool for teachers and early childhood administrators in their efforts to provide all children with effective, meaningful, and robust primary school educational experiences that continue to fit the framework of developmentally appropriate practice while simultaneously working to close the educational gap.

Studies conducted at school level are important as English literacy in Malaysia is generally acquired through schooled English (Hazita Azman, 2009). Most of the school children, in particular, those who reside in the rural areas experience contacts with English language only during their English classes. Furthermore, students go through a formal, structured process of learning English throughout their eleven years of schooling and therefore it is reasonable to deduce that English literacy among Malaysian learners are highly conceptualized through school experience. School experience in learning English, as shown by studies discussed earlier, indicate a strong sense of looking at English language learning as mastering of specific language skills such as writing, reading and grammar.

As announced in the 2011 Budget, the government is bringing in 375 native-speaking teachers to teach English in schools. Though a number of groups have voiced their doubt of such a measure (MELTA, 2010), this action demonstrates the crucial need to improve the standard of English literacy among Malaysians learners. In order to understand the issues surrounding English literacy learning in Malaysia, this paper presents a synthesis of recent studies conducted in the area.

## II. LITERATURE REVIEW

Phonology, the combination of phonetics and phonemics, is an important component of second language learning and teaching. Based on personal observation, a number of ESL teachers in a particular school disregard teaching English phonology to their students in English language teaching departments in our country due to various possible reasons such as lack of phonological knowledge, time constraints, lack of beneficial teaching materials and so forth. A lot of arguments can be found in this huge body of phonological awareness research. While Anthony & Francis (2005) suggested that phonological awareness has influential effects on both children's development of oral and written language, Schuele & Boudreau (2008) stated that in pure form, phonological awareness does not involve prints because the tasks require child to analyze, make judgments about, or manipulates sounds in oral projection. As brief as it can be introduced, phonetic and phonemic awareness are the specific components of phonological awareness.

Phoneme understanding is referred to in general terms as phonological awareness. Phonological awareness, according to Kirby, Parrila, and Pfeiffer (2003), refers to —the awareness of the sound structure of words and the ability to manipulate sounds in words. PA is a specific component of phonological awareness. Torgesen (2004) referred to PA as the tasks that require children to identify or manipulate the phonemes in words that are presented orally. There are several components, or sub-skills, associated with phonological awareness: phoneme deletion, phoneme segmentation, phoneme categorization, syllabic awareness, rhyme awareness, and sound blending. Each of these components, or sub-skills, is referred to in research utilizing a variety of terms. Although there does not seem to be a consistency in the terminology associated with each sub-skill, the actual role of each component in phoneme development is similar between researchers. Young children demonstrate each of these components through their oral language. Children's receptive and expressive oral language development becomes increasingly significant as they enter kindergarten. Within the early years of a student's formal education, beginning reading skills will emerge from a phonological basis.

An important distinction to be made is between phonological awareness and PA. In this case, one is a subtype of the other. Phonological awareness represents a range of manipulation and detection skills across different sizes of sound pieces. PA, however, specifically refers to the ability to manipulate and detect the smallest sound pieces in words, the phonemes (e.g., /c/, /t/, and /wh/ all are phonemes). For example, the ability to say that the word *kid* has three phonemes, or to know that the sounds /k/ /i/ /d/ together makes up the word *lit*, are indications that a child possesses PA. Spoken words can be phonologically subdivided at several different levels of analysis. These include the syllable (in the word *mix*, /m/ and /ks/); the onset and rime within the syllable (/m/ and /I/ and /ks/, respectively); and the individual phonemes themselves (/m/, /I/, /k/, and /s/). The term phonological awareness refers to a general appreciation of the sounds of speech as distinct from their meaning. When that insight includes an understanding that words can be divided into a sequence of phonemes, this finer-grained sensitivity is termed PA.

Phonics has been recognized as an instrument for Malaysian primary students to build essential English reading and literacy skills

in the classroom. The Malaysian Ministry of Education (2011) KSSR strongly recommends the use of phonics when teaching students (aged between 7 and 12 years) critical literacy skills. Increasingly, beginning readers in Australia, the United Kingdom, New Zealand and the United States use phonics to assist them in acquiring English literacy and fluency skills (Ehri, 2003). There are a number of phonics methodologies that were brought to Malaysia and claim to help early English readers. One of them is done by Siik & Hawkins (2013) in a Chinese Malaysian primary school Kuching, Sarawak. This particular study explored the effectiveness of THRASS (teaching handwriting, reading and spelling skills) phonics ability in teaching English reading skills to ESL learners. THRASS phonics system includes 44 phonemes and systematic instruction for teachers to be applied in the classroom. They found that THRASS has a huge potential to help Malaysian young ESL learners to have a great kick-start in learning to read in English. Since phonics has direct influence to PA, it is very useful for the children to learn phonics along with PA.

Though limited, studies were conducted in local settings with the teachers as the subjects. In a study by Fern & Jiar (2014), they found that teachers put a lot of effort in choice of content focus, resources used and strategies employed in instructional practice. Although this is not deemed to be the best approach, it is the most common practice in Malaysia (Naimah et al., 2011). It demonstrates an emphasis towards explicit early literacy instruction geared at alphabetic code (letter naming, letter sound and capital and small letters), alphabetic principle (syllable decoding) and writing skill (copying letter). This trend is not surprising as the alphabet method, which focuses on letter name knowledge and syllable blending, is a conventional way of learning Malay language.

In his research, Kabilan (2001) found at some schools, teachers from different teaching option have to teach English due to shortage of qualified English language teachers. According to the observation and direct interaction with all of English teachers in a particular school, they seem to lack certain important qualities, identified by many researchers as requisite to become an efficient and effective English language teacher. Some of the identified factors are high degree of proficiency in and knowledge of the language (Haja Mohideen, 1995), function as transformative intellectuals (Johnson, 2006; Giroux, 1988), and reliable identity (Richards, 2008).

Although most children respond well to classroom instruction in PA, some children respond poorly or not responding at all (Torgesen, 2000). Some suggests that educators need a deeper level of understanding to provide effective instruction to these students. Some evidence suggests students with serious reading accuracy and fluency problems respond to instruction that is explicit, comprehensive, intensive, and supportive (Foorman & Torgesen, 2001). This instruction has been shown to actually change the way the brain functions as children read (Shaywitz et al., 2004). Effective PA instruction requires a teacher who thoroughly understands its implications for reading achievement in second language, has competent skills in ESL pedagogy, and has a complete understanding of the language content, scope, and sequence of instruction to provide more explicit, comprehensive, intensive, and supportive instruction.

### III. METHODOLOGY

Ninety randomly selected English primary school teachers from a district in Johor, Malaysia participated in this study. Individuals in this sample represented graduates of teacher education programs from various tertiary educations. The teachers in this sample were initially certified in Teaching English as Second Language (TESL) education (n = 52; 4 male, 48 female; mean age = 30.94 years, SD = 9.20), education in other subject than English (n = 118; 6 male, 112 female; mean age = 28.14 years, SD = 6.87), and non-educational course (n = 53; 1 male, 52 female; mean age = 28.02 years, SD = 6.26).

Participants in this study were asked to anonymously complete and return a 15-item multiple-choice instrument, the Survey of Teacher PhAKS (Phonemic Awareness, Knowledge, and Skills), which was developed by the first author and adapted to suit local settings. The survey was mailed to 175 teachers; 51.4% (90 people) returned completed forms. For each item, there were three possible choices. A fourth item, (d) I'm not sure, was included for each item to discourage random guessing. The survey included nine items to assess teacher knowledge about PA instruction. These items are shown in Table 1, with correct answers in bold type. The first six items pertaining to knowledge contained a phonic foil choice, an answer that better describes phonics (i.e., using the relationships between letters and speech sounds to read and spell) than PA (i.e., the ability to identify and work with the sounds of spoken language). Phonic foil items are italicized. The last six items in the survey assessed several key skills in phonological awareness, including the ability to identify, match, count, and delete phonemes in written words. These items are shown in Table 2, with correct answers in bold type.

For the Survey of Teacher PhAKS, judgmental evidence regarding item content was gathered prior to the development of the instrument. An initial pool of 25 items was rated by 17 expert judges selected by the investigator based on experience with PA instruction and professional accomplishments. These expert judges were experienced in one or more of the following: providing PA instruction to children, providing professional development to teachers about PA education, setting teacher standards at the state department of education level, or developing assessment instruments that include PA. These judges represent a cross-section of professions (e.g., university professors, special education teachers, academic language therapists, speech and language therapists, and state department of education consultants).

A 16-item pilot study was conducted with a convenience sample of 50 practical students and alumni (mean age = 28) enrolled in Faculty of Education, UKM for teacher preparation programs. Participation was voluntary, and responses were strictly anonymous. This sample included a mix of practical (n = 19) and alumni (n = 31) teachers, with an average teaching experience of less than 4 years. The final instrument was revised based on the results of the pilot study.

An analysis of the internal consistency reliability yielded a Kuder-Richardson 20 (K-R20)1 coefficient of .69. Because the Survey of Teacher PhAKS was intentionally brief to encourage respondents to return the survey, the Spearman-Brown Formula was used to estimate the reliability of scores from a similar test twice as long with homogeneous content (Isaac & Michael, 1995). Using this formula, doubling the number of test questions should increase the reliability to .82.

#### IV. RESULTS AND DISCUSSION

A series of analyses were conducted to examine (a) the level of knowledge about PA and PA skills, and (b) the ability to distinguish between PA and phonics.

##### A. Level of knowledge in PA and PA skills

The first research question in this study focused on the level of knowledge with respect to PA instruction. Table 1 shows the scores of the two endorsement groups for items related to knowledge about PA, PA skills, and the total instrument, with scores expressed as proportion correct of the maximum possible score for each item. In all endorsement groups, teachers performed slightly better in items related to PA skills than in items related to knowledge about PA instruction. However, scores in both categories were uniformly low. The distribution of raw scores on the 15-item instrument was positively skewed, ranging from 1 to 15 correct, with a mean of 8.6, a median of 8, and a mode of 6.

The first nine items on the instrument related to knowledge about PA instruction. Table 2 shows the mean scores for each

Although three quarters ( $M = .74$ ) of the non-optionist could recognize which activity explicitly linked spelling with PA (Item 7), they could not consistently recognize other activities that develop PA (Items 4, 5, and 6). The vast majority of these teachers did not appreciate that identifying the initial consonant sound within the consonant blend *s* required more refined PA than isolating the single sound /*sh*/, represented by the digraph *sh* (Item 8).

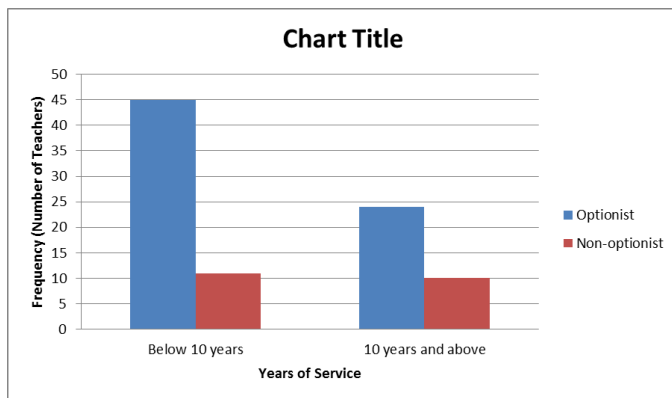


Figure 1 Summaries of the descriptive information by years of service and certification endorsement

item choice in items related to PA knowledge by years of service category, with scores expressed as proportion correct of the maximum possible score for each item. Correct responses are shown in bold type. Items 1 to 4 measured one's understanding of key definitions and content related to PA instruction; Items 5 to 7 measured one's ability to identify activities that develop PA; Item 8 analyzed one's understanding of task difficulty; and Item 9 concerned the type of student PA instruction potentially benefits.

Although a majority of the novice teachers ( $M = .94$ ) thought PA instruction potentially benefits most children in kindergarten and Year 1 (Item 9), little more than half ( $M = .56$ ) understood the purpose of PA instruction (Item 3). Fewer still ( $M = .41$ ) were able to identify the definition of PA (Item 2); most equated PA with understanding the relationships between letters and the sounds they represent. Nonetheless, three quarters of the teachers ( $M = .74$ ) knew that a phoneme was a speech sound, not a letter (Item 1). Recognizing activities that foster an awareness of phonemes was equally problematic.



Item		Years of Service							
		10 years and below	Above 10 years						
1	A phoneme is:			5	(d) I'm not sure.				
	(a) the smallest part of written language.	.14	.11				A student has broad phonological awareness and now needs explicit phonemic awareness instruction. What type of activity focuses on phonemic awareness skills?		
	(b) the smallest part of spoken language.	.74	.74				(a) Color the pictures that begin with the letter b.	.28	.31
	(c) a word part that contains a vowel sound.	.08	.09				(b) Count the syllables in the word hotdog.	.11	.15
	(d) I'm not sure.	.04	.06			(c) Count the sounds in the word cake.	.57	.52	
						(d) I'm not sure.	.05	.02	
2	Phonemic awareness is:			6					
	(a) the same thing as phonics.	.00	.00				An example of explicit phonemic awareness instruction is:		
	(b) understanding the relationships between letters and the sounds they represent.	.59	.45				(a) teaching letter-sound correspondences.	.24	.23
	(c) ability to identify and work with the individual sounds in spoken words.	.41	.55				(b) choosing the word in a set of four words that has the "odd" sound.	.32	.35
	(d) I'm not sure.	.00	.00			(c) reading words in the same word family, e.g. at, sat, ma t, cat.	.34	.38	
						(d) I'm not sure.	.10	.04	
3	Effective phonemic awareness instruction teaches children to:			7					
	(a) convert letters or letter combinations into sounds.	.38	.25				Which activity explicitly links spelling with phonemic awareness?		
	(b) notice, think about, and work with sounds in spoken language.	.56	.61				(a) Make as many words as you can using only the letters p, a, s, l.	.05	.07
	(c) discriminate one letter from the other letters of the alphabet.	.04	.10				(b) Say a word, then name the letters out loud. Write the word.	.17	.17
	(d) I'm not sure.	.02	.04			(c) Say a word, then tap out the sounds in the word. Write the letters for these sounds.	.72	.70	
						(d) I'm not sure.	.06	.06	
4	The student's first lessons in phonemic awareness involve:			8					
	(a) learning letter-sound relationships.	.60	.55				Which task requires more refined phoneme awareness?		
	(b) matching spoken words with printed words.	.02	.00				(a) What is the first sound in sled?	.23	.26
	(c) identifying sounds shared among words.	.33	.41				(b) What is the first sound in shed?	.45	.45
		.05	.04			(c) The tasks are the same.	.22	.17	
						(d) I'm not sure.	.10	.11	

Phonemic awareness instruction			
9	(a) is only meant for students at-risk for reading failure.	.01	.04
	(b) potentially benefits most children in kindergarten and Year 1.	.94	.92
	(c) is not appropriate for older students (7+ years old) who have reading problems.	.01	.00
	(d) I'm not sure.	.04	.04
Total Mean Score		.53	.60

Table 2 Mean Item Scores for Correct Answers and Foils in Items Related to Conceptual Knowledge

Note: Means are proportions correct of the maximum possible score for each item. Correct answers are in bold type. Phonic foil choices are italicized. PA = phonemic awareness; T = total sample average score.

Six items related to PA skills (Table 3). Items 10, 11, and 12 measured one's ability to identify and match phonemes in written words, Items 13 and 14 measured one's ability to count phonemes in written words with consonant blends, and Item 15 measured one's ability to recognize what is left of a word after deleting an individual sound from that word.

Many of the teachers in this sample had difficulty disentangling speech sounds from spelling. When asked to identify and match phonemes in written words when the spelling of the sound differed, most were able to correctly identify words with the same final and medial vowel sounds (Items 10 and 12). However, consonant sounds appeared to be more problematic than vowel sounds when the spelling was not transparent. When asked to match words with a common final consonant sound in Item 11, nearly one third of the participants selected words with matching final letters (house-hose; of-off) instead of sounds (please-buzz).

Counting sounds in words with consonant blends (i.e., two adjacent letters representing two distinct phonemes) proved difficult for half the sample. For Item 13, the proportion of teachers who incorrectly counted three phonemes in the word grape ( $M = .49$ ) was similar to those who correctly identified four phonemes ( $M = .51$ ). Fewer teachers ( $M = .39$ ) were able to identify that ape, lake, and break were arranged sequentially by the number of phonemes in each word (Item 14). These results support the confusion noted with consonant blends in Item 8 and suggest that the teachers who identified three, not four, sounds may consider the consonant sounds in the onset gr and br to be one phoneme.

Participants also had difficulty deleting a consonant sound when the spelling was not transparent. Item 15 required teachers to identify the resulting word from a list of three choices if the sound /k/ were deleted from the word mixed. Slightly more than half ( $M = .58$ ) understood the correct answer to be mist, but a substantial proportion selected mid, suggesting that, besides being unaware that the letter x

represents two sounds, /k/ and /s/, teachers were attending to the final letter d, not the sound /t/ of suffix ed. Overall, these results suggest that a significant minority of teachers have difficulty distinguishing the sounds of speech from the letters that imperfectly represent them.

### B. PA or Phonics?

The second question dealt with the ability to distinguish PA and phonics. Recall that within the multiple-choice options for the first six items on the Survey of Teacher PhAKS were "phonic foils," choices that better described phonics (i.e., using the relationships between letters and speech sounds to read and spell) rather than PA (i.e., the ability to identify and work with the sounds of spoken language). In Table 2, the phonic foil choices are italicized.

An analysis of the errors in this study suggests that a substantial proportion of teachers consistently confused PA with phonics. One quarter of this sample did not understand that a phoneme represents spoken, not written language (Item 1). More than half believed that PA is "understanding the relationship between letters and sounds they represent" (Item 2); that effective PA instruction teaches children to convert letters into sounds rather than notice, think about, and work with the sounds in spoken language (Item 3); and that the student's first lessons in PA involved learning letter-sound relationships rather than identifying sounds shared among words (Item 4). Responses to Item 6 showed that more teachers in this sample equate explicit PA instruction with reading words in the same word family than teaching letter-sound correspondences or the correct answer, choosing the word in a set of four words that has the "odd" sound. Overall, these results suggest that among the first-year teachers in this sample, differences between PA and how it differs from phonics instruction are not yet fully established.

Item		Years of Service	
		10 years and below	Above 10 years
10	Can the words shoe, do, flew, and you be used to illustrate oral rhyming?		
	(a) yes	.84	.87
	(b) no	.03	.02
	(c) only you, do, and shoe, but not flew	.05	.04
	(d) I'm not sure.	.08	.07
11	An example of matching words with the same final sound is:		
	(a) please - buzz	.65	.56
	(b) house - hose	.20	.23
	(c) of - off	.10	.11

	(d) I'm not sure.	.05	.10
2	An example of grouping words with a common vowel sound is		
	(a) kin, fist, kind	.06	.04
	(b) paid, said, maid	.07	.06
	(c) son, blood, touch	.86	.89
	(d) I'm not sure.	.01	.02
3	You are helping students break a word into its separate sounds. How many sounds are in the word grape?		
	(a) three	.49	.52
	(b) four	.50	.46
	(c) five	.01	.02
	(d) I'm not sure.	.00	.00
4	Which list shows a systematic sequence in counting sounds in words, from easy to complex?		
	(a) ape, lake, break	.39	.42
	(b) hop, shop, shops	.48	.41
	(c) toe, bow, float	.05	.06
	(d) I'm not sure.	.08	.11
5	If you said the word mixed without the sound /k/, you would say:		
	(a) mid	.31	.39
	(b) mist	.56	.55
	(c) mitt	.10	.04
	(d) I'm not sure.	.03	.02
Total Mean Score		.63	.64

## V. CONCLUSION

In this study, a large proportion of teachers (a) have limited understanding of what constitutes PA instruction, (b) cannot reliably distinguish PA and phonics, and (c) cannot reliably identify or count phonemes in written words when the spelling is not transparent. The focus of this study was limited to the outcome knowledge and skills

with respect to PA instruction of recent graduates of teacher education programs and did not investigate the exact content of teacher education programs. It could well be that PA and other essential elements of scientifically validated reading instruction were taught as part of these teachers' education. However, results of this study suggest that graduates of teacher preparation programs enter the profession without the requisite foundational knowledge in PA. This adds to the evidence that teachers are often licensed to teach without having acquired sufficient depth of essential knowledge and skills related to beginning reading instruction (Bos et al., 2001; Moats & Foorman, 2003). Proficiency as measured by this instrument is equally low among all three certification endorsement groups.

Teaching phoneme analysis skills to teacher candidates within the context of a conventional university course is not a simple matter, though. In studies of teacher education (McCutchen et al., 2002; Moats & Foorman, 2003; Spear-Swerling & Brucker, 2003, 2004, 2006), researchers demonstrated that teachers can acquire some level of knowledge and skills in the structure of language through a combination of instruction and practice. However, teacher candidates' word reading accuracy and spelling ability can also influence their acquisition of word-structure knowledge (Spear-Swerling & Brucker, 2006), suggesting that some teacher candidates may need more time to internalize the material. In this sample, 87% of the teachers reported having at least an introduction to PA activities at least one time in their teacher education.

This suggests that teacher preparation programs do provide some instruction in PA, but this information is not fully retained by the graduates. Teacher education candidates may require instruction that is more intense and explicit to fully understand PA and its instruction and to fully appreciate how PA differs from phonics instruction. Future studies that explore the amount of repetition needed by teacher candidates may be warranted. This study also raises hard questions about reliable ways to measure PA in teachers, short of individually administered oral tests. In that many first- and second-grade children can segment words with consonant blends, like the word grape (Schatschneider, Francis, Foorman, Fletcher, & Mehta, 1999), it may be that tasks involving more difficult cognitive aspects, such as phoneme deletion and showing a systematic sequence of counting sounds in words, may prove to be a more reliable way to measure teachers' understanding of PA and PA skills than simply counting sounds or tasks involving phoneme identity. Previous investigations of PA skills in teachers (Scarborough et al., 1998; Spear-Swerling & Brucker, 2003) have measured segmentation abilities by means of both indicating the number of phonemes detected in a given word and also underlining or circling the letter or letters that correspond to the individual phonemes (e.g., SH I P or S K A T E). This latter measurement technique provides more detailed information regarding the respondents' understanding of letter sound correspondences and is a methodology that is important to consider in future investigations of this nature.

Although some teacher preparation programs, textbook publishers, state departments of education, and providers of professional development courses are indeed attempting to translate research findings for teacher education, others may be making superficial changes in terminology with little change in actual content or practice (Moats, 2007; Shankweiler & Fowler, 2004). In 2006, the Colorado Reading Directorate was charged with the responsibility of reviewing and evaluating university course syllabi for all state teacher preparation programs that touched on literacy (Colorado Department

of Education, 2006). Similar investigations concerning the depth of reading-related content of university teacher education curricula may be justified.

As Moats and Lyon (1996) asserted, “professors of education and special education . . . who have a thorough knowledge of language structure themselves and who are skilled at teaching it to educators are uncommon” (p. 83). If schools of education do not sufficiently prepare teachers to provide competent reading instruction, the burden of educating teachers shifts to individual school districts (Walsh, 2006). A persisting topic for the field of teacher education is demonstration of meaningful outcomes for both content knowledge and instructional skills that correspond to state licensing standards in the field of beginning reading instruction.

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