



Kindergarten and first grade teachers' content and pedagogical content knowledge of reading and associations with teacher characteristics at rural low-wealth schools

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HIGHLIGHTS

- Content knowledge and pedagogical content knowledge of reading can be distinguished.
- Content knowledge and pedagogical content knowledge did not vary substantially.
- Years of experience is significantly related to teacher knowledge.
- Rural teachers' experience can be used as a leverage point to enhance knowledge.
- Experiential learning components appear important in teacher education programs.

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ABSTRACT

Although often assessed as one construct, teachers have been shown to draw on both content and pedagogical content knowledge as they teach reading. Factor analysis on sixty-six primary teachers in rural low-wealth districts illustrated that teacher knowledge of reading can be distinguished separately as content and pedagogical content knowledge, with teachers having roughly equal levels of knowledge across domains. Multiple regression analyses demonstrated teaching experience was the only teacher characteristic to be significantly associated with both domains of teacher knowledge, implicating the necessity of increasing experiential learning components in teacher education.

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1. Introduction

Knowledge alone is not sufficient for effective reading instruction; yet, knowledgeable teachers are necessary to help children become proficient readers (Darling-Hammond & Bransford, 2007; Darling-Hammond, 2000a; Piasta, Connor, Fishman, & Morrison, 2009; Risko et al., 2008). Some of the impetus for preparing more knowledgeable teachers for the classroom is due to findings that only 36% of students in the United States are proficient in reading by fourth grade (National Center for Education Statistics, 2015), with this percentage even lower for students living in high-poverty

rural areas (24%; National Center for Education Statistics, 2015). The 'Peter Effect,' the principle that teachers cannot teach what they do not themselves know, is spurring many states to recognize the need to recruit and retain highly-knowledgeable teachers (Applegate & Applegate, 2004; Binks-Cantrell, Washburn, Joshi, & Hougen, 2012; Moats, 2014). As such, more states are requiring preservice teachers to demonstrate knowledge of reading on licensure exams (Rowland, 2015). Although the content and format of licensure exams varies, they generally assess proficiency of reading and writing development and instructional decision-making; thereby, capturing what are arguably separate domains: *content knowledge*, knowledge of the subject matter, and *pedagogical content knowledge*, knowledge of how to teach the subject matter (Shulman, 1986).

Despite the importance placed on teacher knowledge, little is known about the distinction between these domains. Researchers

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have generally measured content and pedagogical content knowledge as one construct, even though evidence indicates that they may be separate domains of knowledge (McCutchen et al., 2002; Moats, 1994; Piasta et al., 2009). This conflation has led to a limited understanding of how each domain may depict unique aspects of teacher knowledge. Furthermore, a limited body of research has examined how teacher characteristics, such as teacher qualifications, may be associated with content and pedagogical content knowledge of reading, particularly among rural teachers who may have different training and experiences compared to urban and suburban teachers (Monk, 2007). This study sought to examine whether the assessment of kindergarten and first grade teachers' knowledge of reading in rural low-wealth districts could be measured as separate domains of content knowledge and pedagogical content knowledge. Furthermore, given the theoretical importance of these constructs (Shulman, 1986), teachers' characteristics of reading methods courses, education level, and teaching experience were associated with each domain to understand how potentially malleable characteristics of teachers might influence how they acquire knowledge of reading. The current study contributes to recommendations for how pre-service teacher education and in-service professional development programs might enhance teacher knowledge of reading, particularly in low-resourced rural areas. In the remainder of this introductory section, we describe (a) the content and pedagogical content knowledge required for teaching early reading and how they affect instruction, as well as the history of research in this area; (b) how teacher knowledge has been proposed to be related to teacher qualifications in previous studies, and theoretical reasons for these associations; and (c) the importance of this study for teachers in rural low-wealth settings.

1.1. Content knowledge and pedagogical content knowledge

For several decades, researchers have proposed that various domains of teacher knowledge exist, and that teachers draw on varying aspects of knowledge to support student learning (Ball, Thames, & Phelps, 2008; Shulman, 1986). Within early reading, content knowledge (knowledge of the subject matter) and pedagogical content knowledge (knowledge of how to teach the subject matter) have predominately been investigated (McCutchen et al., 2002; Moats, 1994; Piasta et al., 2009). Content knowledge in early reading includes basic linguistic concepts, such as the ability to manipulate phonemes (smallest unit of sound, e.g.,/b/); understanding of the relationships among word structure (the admissible formation of words), syntax (grammatical rules of sentence structure), and semantics (the meaning of a word, phrase, sentence, or text); and the ability to explain text organization (how a text is structured; International Dyslexia Association, 2010; International Reading Association, 2007, 2010; McCutchen & Berninger, 1999). Pedagogical content knowledge for early reading instruction includes the possession of multiple decoding and comprehension instructional strategies, knowledge of how best to design instruction, as well as an understanding of the most appropriate ways to respond to student misunderstandings (International Dyslexia Association, 2010; International Reading Association, 2007, 2010). Although teacher knowledge is proposed to be comprised of these domains, research on teacher knowledge of early reading often treats knowledge as one construct (McCutchen et al., 2002a,b; Moats, 1994, 1999; Moats & Foorman, 2003; Piasta et al., 2009). Teacher knowledge regarding early reading is likely multifaceted; yet, there are no known empirical investigations of the domains composing teacher knowledge of early reading and how these may be differentially predicted by various teacher characteristics. Improved understanding of what constitutes teacher knowledge of

reading could lead to a better understanding of the ways in which knowledge may matter for early reading.

1.2. Knowledge of early reading

Teaching early reading requires unique content and pedagogical content knowledge (Moats, 2009). Teachers need to understand the developmental progression of literacy and have the ability to make an internal process tangible for young students (Allington, 2013). A concept that is frequently difficult for both students and teachers is phonological awareness, including its subordinate component, phonemic awareness. Phonological awareness is the recognition that words are made up of a variety of sound units, including syllables (part of a word that contains a single vowel sound and that is pronounced as a unit), onsets (the part of the syllable preceding the vowel), rimes (the part of the syllable consisting of its vowel and any consonant sounds that come after it), and phonemes (the smallest unit of sound, e.g.,/b/). Effective teachers have highly-developed phonological awareness, understand that children's phonological awareness and especially phonemic awareness is a critical precursor before understanding the sound/symbol relationships in reading English words, and possess instructional strategies that help young students develop phonological awareness (Gillon, 2018; Snow, Burns & Griffin, 1998). Phonological awareness enables students to segment and blend syllables, onsets, and rimes, and to identify and produce rhymes, which have been associated with early reading skills (Adams, 1990; Gellert & Elbro, 2017). Without phonological awareness, students are not able to segment and blend sounds to decode and encode words. Although phonological awareness does not explicitly relate to students' learning of sound/symbol relationships, phonics (a method of teaching reading by associating sounds with letters) focuses on these important letter-sound correspondences (Adams, 1990). Both phonological awareness and phonics instruction, along with efforts to improve students' oral language, vocabulary, fluency, and comprehension skills, can be considered important aspects of what teachers need to know when teaching reading (Allington, 2002). Teachers must be able to identify the most appropriate instructional need (content knowledge) and to provide appropriate instruction that targets that need (pedagogical content knowledge).

On a range of assessments designed to measure classroom teachers' knowledge of early reading, teachers have been able to answer as few as 32% of items (Moats, 1994; McCutchen et al., 2002), and as many as 68% (Bos, Mather, Dickson, Podhajski, & Chard, 2001; McCutchen et al., 2002). Across studies, many teachers exhibited misunderstandings of the content of reading (Cohen, Mather, Schneider, & White, 2017; Crim, Hawkins, Thornton, Boon Rosof, Copley, & Thomas, 2008; Cunningham, Etter, Platas, Wheeler, & Campbell, 2015; Stark, Snow, Eadie, & Goldfeld, 2016; Tetley & Jones, 2014; Washburn, Joshi, & Binks-Cantrell, 2011). These misunderstandings included a lack of knowledge of terminology (e.g., *phonics*, *phoneme*); gaps in teachers' own phonological awareness, such as not being able to segment phonemes accurately; and mistook teaching *phonological awareness* with teaching *letter-sound correspondences*. Teachers also exhibited misunderstandings about the relationship between listening and reading comprehension, the appropriateness of particular instructional strategies, and an inability to make appropriate pedagogical decisions when presented with student responses (e.g., selecting instructional strategies focused on comprehension when presented with student responses indicating phonics instruction was necessary). Similar findings of teachers' low reading content knowledge have been found in international settings (Aro & Björn, 2016; Zhao, Joshi, Dixon, & Huang, 2016). The reasons why early elementary classroom teachers are largely unable to answer most reading-related

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