THE RELATIONSHIP OF LITERACY TEACHING EFFICACY BELIEFS
AND LITERACY PEDAGOGICAL CONTENT KNOWLEDGE
DURING STUDENT TEACHING

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ABSTRACT

The Relationship of Literacy Teaching Efficacy Beliefs and Literacy Pedagogical Content
Knowledge During Student Teaching

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Student literacy rates across the country are unacceptably low. Teacher preparation has emerged as a priority in both research and practice in efforts to improve the nation's literacy rates. Teacher knowledge and beliefs influence the quality of instruction teachers are able to implement. This study was designed to help educators and mentors of novice teachers understand the relationship between literacy pedagogical content knowledge and literacy teacher efficacy beliefs and changes to this relationship during the course of student teaching.

Using a sample of 36 pre-service teachers assigned to student teaching in kindergarten, first or second grade classrooms, literacy pedagogical content knowledge was measured in a multiple-choice assessment that covered a variety of early literacy instructional areas including phonology, orthography, vocabulary, morphology and comprehension. Literacy teaching efficacy beliefs was measured using a self-report questionnaire. Participants completed the survey at two time points, at the beginning and end of student teaching.

To determine if a literacy pedagogical content knowledge and literacy teaching efficacy beliefs demonstrated a relationship, Pearson correlations were calculated at both time points. Results of this study suggest that these constructs are not related and operate independently. Additionally this study suggested that while literacy teaching efficacy beliefs improved significantly over the course of student teaching, literacy pedagogical content knowledge did not. Results from this study can inform teacher educators, mentors of novice teaches and professional development programmers on the relationship of literacy pedagogical content knowledge and literacy teaching efficacy beliefs in pre-service teachers.

ACKNOWLEDGEMENTS

DEDICATION

To my sons, James and Brady, who push me constantly to grow and achieve. To my husband, who encourages and supports all of our dreams. This is but just one marker of our hard work. To my mother, Joanne Ford, who showed me strength as no one else could.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Statement of the problem**:**

Reading is essential to other areas of academic success (NICHD, 2001). Extensive

research and empirical evidence indicates that students that experience reading failure are more

likely to display problem behaviors, drop out of high school, and abuse drugs (Lyon, 2002;

Morgan, Farkas, Tufis, & Sperling, 2008; Snow, Burns, & Griffin, 1998). In the US, since the

release of "A Nation at Risk" (1983) concern regarding inadequate literacy rates has grown

progressively, as many perceive the decline in educational performance as akin to "an act of

war" (National Commission on Excellence in Education, 1983, p. 9). Numerous research studies

on literacy have since been performed. While typical patterns of reading development have been

documented (Ehri, 1995; Koralek & Collins, 1997; LaBerge & Samuels, 1974), researchers that

have conducted more recent studies in this field have pointed to a considerable degree of

variability in initial reading, as well as later literacy growth, once students begin formalized

schooling (Parrilla et al., 2005). Despite extensive efforts to improve literacy rates in the US,

toward the end of the 20th century, too many students experience difficulty learning to read

(Foorman et al., 1998). This is an issue that extends beyond literacy, as students who present

with early reading difficulties are unlikely to catch up with their peers and will struggle to

perform academically (Francis et al., 1996). These authors report that 74% of those that were

assessed as poor readers in the third grade failed to improve by the ninth grade.

While a number of factors are associated with reading failure, socio-economic status

(SES) is consistently recognized as a tremendous risk for overall educational failure and,

specifically, reading development (Arnold & Doctoroff, 2003). Several factors are associated

with low SES, such as low birth weight, poor nutrition, inadequate housing quality, and limited

access to healthcare, all of which undermine the student's ability to attend school and learn at the expected rate (Bradley & Corwyn, 2002). Moreover, low SES also affects parenting ability, which, when combined with the child's impaired cognitive functioning, can perpetuate these issues further (Arnold & Doctoroff, 2003). More specifically, low SES has been documented to have a strong negative relationship with emergent literacy skills, such as phonological awareness and letter knowledge (Phillips & Lonigan, 2009). Students from lower SES homes tend to enter school with significantly lower skills than their peers from higher SES homes (Arnold & Doctoroff, 2003). Unfortunately, this deficit appears to persist throughout education (Arnold & Doctoroff, 2003).

According to Phillips and Lonigan (2009), parental beliefs and values pertaining to literacy are also associated with lower reading success in students. The authors report that lower parental expectations for literacy achievement predict their child's scores on literacy measures, including letter knowledge and the ability to write his or her own name. Moreover, parents who believe in the value of reading for enjoyment, as opposed to those who view it as a skill to be mastered, are more likely to stimulate literacy activities at home, which results in their children being more likely to be interested in print (Phillips & Lonigan, 2009).

The behaviors that parents engage in during the early phases of their child's development have implications for his or her later development. For example, Hart and Risely (1992) documented significant differences in the quantity of language input parents provided in lower-SES homes. The authors found that lower levels of language exposure were associated with smaller vocabularies and quantities of speech production in their study sample. Researchers have also emphasized the value of parents engaging in shared reading with their children (Phillips & Lonigan, 2007). According to Baker et al. (1998), this is also linked to SES, as their

findings indicate that 90% of middle-income parents participated in shared reading activities with their children, compared to only 52% in lower-SES families. Numerous literature sources present evidence indicating that children from lower-SES homes are at higher risk for reading failure (Arnold & Doctoroff, 2003; Baker et al., 1998; Hart & Risley, 1992; Phillips & Lonigan, 2009). This finding has been reported in relation to several aspects of emergent literacy, including oral language, letter knowledge, and phonological processing skills (Phillips & Lonigan, 2009).

Several individual differences have also been associated with reading failure, including general cognitive ability, verbal ability, phonological memory, speech perception and production, and phonological sensitivity (Bowey, 2007). Based on his earlier work, Bowey (1995) reported that general cognitive ability predicted 15-22% of variance in first-grade reading. Later, he summarized this finding, stating that, in general, students with lower cognitive profiles tend to possess lower reading ability (Bowey, 2007).

The most recent assessment of national reading indicates that only 34% of American students are reading at proficient levels (U.S. Department of Education, Institute of Education Sciences [IES], 2013). While numerous studies in this field have helped identify some of the reasons behind the difficulty some students experience when learning to read (Arnold & Doctoroff, 2003; Bowey, 2007; Hart & Risley, 1992; Phillips & Lonigan, 2009; NICHD, 2000), concerns over low literacy rates have not been allayed by this knowledge. Nonetheless, teachers are under increasing pressure to solve this problem through their classroom instruction. This expectation can be justified as teachers have been found to be the most influential factor on what students learn (Cochran-Smith & Zeichner, 2005; National Council for Teaching and America's Future, 1996). Federal initiatives have identified qualified early childhood and elementary

teachers to be the best prevention against reading disabilities (NCLB, 2001). Moreover, it is widely believed that deficits in phonological processing, which appear to be a critical cause of poor reading (Fletcher et al., 1994; Velluntino et al., 2004), can be improved with appropriate instruction (Torgeson et al., 2001). Empirical evidence suggests that, when teachers implement appropriate interventions, the risk of reading failure (defined as falling below the 30th percentile on word-reading tasks) at the end of first grade declines significantly (Torgeson, 1999).

Given the importance of reading success to the subsequent academic performance, many researchers have attempted to identify the elements of instruction that are critical to reading competence. In the late 1990s, there was a historic call for a review of the research to simply determine the results of the increasing body of literature in this field, aiming to establish a consensus among the reported findings. A panel of literacy experts was convened for this purpose. Since literacy is a critical facet to a successful life, the issue is highly charged. The National Reading Panel (NICHD, 2001) conducted a meta-analysis of a selected body of literature and reported five critical facets of reading. These included phonemic awareness, defined as "the ability to notice, think about, and work with the individual sounds in spoken words" (Ambruster et al., 2001, p. 1); phonics, which includes the correspondence of letters to sounds; reading fluency, defined as "the ability to read a text accurately and quickly" (Ambruster et al., 2001, p. 19); vocabulary knowledge, referring to the knowledge of oral and written word meanings used to communicate; and text comprehension, which refers to the ability to understand and interact with text, and is thus the ultimate goal of al reading instruction (Ambruster et al., 2001). While the report was based on the analysis of numerous extant studies, its findings have been debated ever since its release. Critiques of the report can be grouped into three categories—the methodology of the meta-analysis; the way the authors interpreted the

research findings in order to reach their conclusions; and the statistical procedures used to examine the data (Camilli, Vargas, & Yuicko, 2003). While the results of the NRP have led to a contentious debate, these criticisms have not invalidated all of the results of the Panel's report. Nonetheless, discussion continues, in particular with relation to the correct balance between the degree of systematic and explicit instruction in phonics and the flexibility that can enable students to make their own inferences about the word structure (Stuebing et al., 2008). From a practical standpoint, these issues are exemplified in a debate of using a scripted curriculum, as opposed to a discovery-based one, in which students draw their conclusions from immersion in literature (Stuebing et al., 2008). The criticisms notwithstanding, the report has offered a valuable initial framework that can serve as a starting point for identifying critical components of reading.

Although academic literature has continued to examine critical facets of instruction and student-specific factors that predict reading failure, literacy rates have not reached the acceptable rates (IES, 2013). In order to establish the reasons for this disparity, researchers have investigated a wide variety of variables involved in teaching and classroom instruction. In this context, many authors posit that both societal and teachers' beliefs exert significant influence on the role of teacher practices (Armor et al., 1976; Darling-Hammond, 2000; Hoy & Spero, 2005; Ross, 1994; Szabo & Mokhtari, 2004; Woolfolk & Hoy, 1990). In particular, teaching efficacy has been shown to have powerful relationships with a variety of educational outcomes (Bandura, 1997; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Guskey and Passaro (1994) defined teacher efficacy beliefs as a "teacher's belief or conviction that they can influence how well students learn" (p. 628). Bandura (1986) provided a more precise definition, whereby teacher efficacy "is a generative ability requiring cognitive, social and behavioral sub-skills to be

successfully orchestrated" (p. 391).

The concept of teaching efficacy evolved from two theoretical orientations. Initially, measures included two items that were based on Julian Rotter's social learning theory, which theorized individuals' perception of reward contingencies (Armor et al., 1976). Subsequently, Alfred Bandura's social cognitive theory contributed substantially to the fledgling construct (Bandura, 1986). Bandura argued that teacher efficacy was a subtype of self-efficacy and was informed by four factors, namely mastery experiences, vicarious experiences, social persuasion, and emotional states (Bandura, 1986). However, in his later work, Bandura (1997) claimed that mastery experiences were the most influential in determining teacher efficacy, as they provide authentic practice from which the individual can make an evaluation of his or her competence. Student teaching, as the longest and final clinical experience in which teachers engage during their teacher preparation programming, provides the opportunity for pre-service teachers to evaluate their competence. Vicarious experiences also inform these evaluations, though to a lesser degree because the individual is not personally experiencing him or herself. Social persuasion, in the form of feedback or support, can also affect efficacy beliefs, as do emotional states (Bandura, 1986).

Teachers' efficacy beliefs have been linked to a variety of teacher behaviors and attitudes (e.g., Bandura, 1997; Tschannen-Moran et al., 1998) that, in turn, have implications for a number of student outcomes and beliefs (e.g., Henson, 2002; Midgley, Feldlaufer, & Eccles, 1989). Teachers possessing high efficacy beliefs are thought to set high goals for themselves and their students and would typically persist in the face of obstacles. They have also been found to remain in the profession longer, provide more dynamic instruction for difficult students, and practice more innovative instructional techniques (Glickman & Tamashiro, 1982; Guskey, 1984;

Murphy, 2013). Extensive research has established that teachers' attitudes and efficacy beliefs

play a significant role in student achievement (Armor et al., 1976; Darling-Hammond, 2000; Hoy

& Spero, 2005; Szabo & Mokhtari, 2004; Woolfolk & Hoy, 1990).

As cognitive processes that occur in teaching play an important role in academic

achievement, it can be inferred that they are also affected by teachers' efficacy beliefs. While

the nature of this role has not been clearly defined, some authors suggest that efficacy beliefs

mediate between knowledge and action (Raudenbush, Rowan & Cheong, 1992). The integrated

model of teaching efficacy beliefs (discussed below) supports this premise (Tschannen-Moran et

al., 1998). However, little research has specifically examined the relationship of teacher

knowledge and efficacy beliefs, and the attempts to examine these constructs within a given

content matter have been particularly rare.

Most studies conducted thus far have attempted to measure teachers' literacy knowledge

by focusing on literacy content knowledge. Their findings have indicated low performance of

both in-service and pre-service teachers (Bos et al., 2001; Cunningham et al., 2004; Mather, Bos,

& Babur, 2001; Moats, 1994, 2009; Spear-Swerling & Brucker, 2004, 2006; Spear-Swerling,

Brucker, & Alfano, 2005; Washburn, Joshi, & Cantrell, 2010). However, pre-service teachers

appear to perform at a lower level than their in-service peers on literacy content knowledge

(Mather et al., 2001). While these findings are informative, this body of evidence is restricted in

scope, focusing primarily on word structure content knowledge (Bos et al., 2001; Cunningham et

al., 2004; Mather et al., 2001; Moats, 1994; Spear-Swerling & Brucker, 2004, 2006; Spear-

Swerling et al., 2005). Accurate efficacy evaluations should be based on an evaluation of a

teachers' knowledge and skills, in relation to their ability to perform a specific teaching task.

However, literature suggests that pre-service teachers are not able to evaluate their own

knowledge of early literacy concepts accurately (Cunningham et al., 2004). More specifically, inexperienced teachers and pre-service teachers have been shown to overestimate their ability to deliver effective literacy instruction (Cunningham et al., 2004). However, these findings are mostly based on studies that have investigated the relationship between literacy content knowledge and feelings of competence. These measures, though simplistic, may be suggestive of efficacy beliefs, and have reported a significant relationship between efficacy beliefs and content knowledge. However, the direction of this relationship has been reported as both positive and negative (Cunningham et al., 2002; Spear-Swerling et al., 2005).

While much of the research into teachers' knowledge of literacy concepts has focused on literacy content knowledge, many representations of knowledge are relevant to all types of instruction (Shulman, 1987). For example, while most adults are expected to demonstrate competence in reading tasks, the body of knowledge teachers must possess for effective reading instruction differs from a common person's understanding of reading. Given that the act of teaching is not a solitary task, the translation of content knowledge into forms that are accessible to students may be particularly relevant to the analyses of teacher literacy knowledge and student literacy achievement.

Pedagogical content knowledge is described as "knowledge embedded into practice" (Snow et al., 1998, p. 11), and refers to the body of information that teachers require in order to teach a given content effectively. According to Shulman (1986), this type of knowledge includes "the most useful forms of representation . . . the most powerful analogies, illustrations, examples, explanations, and demonstrations" (p. 9). The synthesis of content knowledge with an awareness of the unique learning needs of one's students is thus critical to the construct of pedagogical content knowledge. Given that pre-service teachers have been found to have limited skills in this

area, the relationship between their literacy pedagogical content knowledge (LPCK) and literacy teaching efficacy beliefs (LTEB) needs to be examined. If LPCK contributes to LTEB, it may provide an avenue for improving teachers' literacy efficacy beliefs and potentially student outcomes.

Purpose

The purpose of this study was to examine the relationship between LTEB and LPCK in pre-service teachers during their student teaching placement. The aim was to examine the nature of the relationship between these constructs and to detect any changes to this relationship as pre-service teachers complete their student teaching.

In order to meet these objectives, the following research questions were examined:

Primary Research Questions

1. Is there a relationship between pre-service teacher literacy efficacy beliefs and literacy pedagogical content knowledge?

2. If so, does the magnitude of this relationship change during the course of student teaching?

Secondary Research Questions

1. Do literacy efficacy beliefs significantly change over the course of student teaching?

2. Does literacy pedagogical content knowledge significantly change over the course of student teaching?

Definition of Terms

Pre-service teachers

Pre-service teachers are the target population for this study. Thus, the study participants are students enrolled in a teacher preparation program who have not yet obtained teaching certification. In general, pre-service teachers have minimal to no experience as lead teachers in a

classroom environment. On the other hand, most have experienced a variety of situations in classroom environments as part of their coursework. All of the pre-service teachers that took part in this study are in the fourth year of their degree in early-childhood education and are beginning the student teaching placement as a part of their course requirement.

Teaching efficacy beliefs

Teaching efficacy beliefs refer to the teacher's "belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (Tschannen-Moran et al., 1998, p. 233). In the context of this study, this term is used to describe general teaching skills, as opposed to context-specific situations, unless otherwise stated.

Literacy teaching efficacy beliefs

Since teaching efficacy beliefs are seen as a context-specific construct, the focus of this study is on literacy teaching efficacy beliefs, which refer to a pre-service teacher's belief in his or her capability to organize and execute courses of action required to accomplish a literacy-teaching task successfully.

Literacy pedagogical content knowledge

According to the National Reading Panel, literacy pedagogical content knowledge refers to a specific body of knowledge required to teach literacy effectively. This body of knowledge includes, but is not limited to, an understanding of the five critical elements of reading instruction—phonemic awareness, phonics, fluency, vocabulary, and comprehension. Phelps and Schilling (2003) further asserted that the application and interpretation of this knowledge are important elements to this notion.

Student teaching

Student teaching is the culmination of clinical experiences with increasing degrees of active responsibility. This part of the curriculum typically consists of a 12-week placement in an elementary classroom. This experience includes observations, pre-teaching, planning, and eventually teaching a variety of the subjects for the given placement. Because literacy is the essential component of early elementary education, all of the teachers within the study sample are responsible for implementing effective literacy instruction.

CHAPTER 2: LITERATURE REVIEW

The present study sought to examine the presence of a relationship between literacy pre-service teacher efficacy and literacy pedagogical content knowledge as well as if any changes occur in this relationship during student teaching. following major bodies of literature are reviewed in this chapter: teacher efficacy, literacy teacher knowledge (including literacy content knowledge and pedagogical content knowledge), and the impact of teacher preparation on these variables. The section on teacher efficacy will give an overview of the construct and its measures, review correlates of teacher efficacy, and discuss teacher efficacy beliefs specific to literacy instruction. It will be followed by the section on teacher literacy knowledge, which will provide a discussion of literacy content knowledge, as well as an overview of pedagogical content knowledge and literacy pedagogical content knowledge. The final section on teacher preparation programs will provide a brief overview of the extant research on the content of literacy instruction in teacher preparation programming as well as the role of student teaching in teacher preparation programs.

Teacher Efficacy

Teachers are recognized as the most influential factor in determining students' learning potential and academic success (Cochran-Smith & Zeichner, 2005; National Council for Teaching and American's Future, 1996). While a variety of factors appear to constitute teachers' influence, their belief in their capabilities has been shown to have relationships with a number of critical variables, including innovation in teaching, retention in the field, and student achievement. In particular, teachers' sense of efficacy has been linked to many positive teacher behaviors and attitudes (e.g., Bandura, 1997; Tschannen-Moran et al., 1998), as well as student outcomes and attitudes (e.g., Henson, 2002; Midgley et al., 1989).

Teacher efficacy has been the focus of extensive studies for more than 25 years. As the construct evolved, researchers attempted to address the measurement, growth, and outcomes of efficacy beliefs. In the following section, the evolution of the construct of teacher efficacy beliefs will be addressed, beginning with its theoretical foundation through its present status. The measurement of teacher efficacy beliefs and its correlates will also be explored. The development of these beliefs in teachers will then be examined, aiming to describe how they take shape in pre-service teachers. Finally, the context-specific nature of the construct will be explored with a focus on literacy.

Origins of Teacher Efficacy

Teacher efficacy was first conceptualized on a whim because of the inclusion of two items in a RAND study on the effectiveness of a reading program (Armor et al., 1976). At the time, RAND researchers had read a recently published paper by Julian Rotter, emphasizing locus of control and reinforcement of actions within his Social Learning Theory (Rotter, 1966). Social learning theory postulated that rewards strengthen one's expectation that a given behavior will be followed by a given reinforcement in a future situation. Rotter (1966) argued that an individual's experience of reinforcement is predicated on whether the person believes the reward to be the result of his or her behavior or independent of it. In a study reviewing the effectiveness of a variety of teaching methods in minority students, RAND researchers capitalized on the implications of this concept for teachers (Tschannen-Moran et al., 1998). As a result, the first iteration of teacher efficacy aspired to measure teachers' perceptions of whether their ability to affect student learning is more influenced by their own abilities (indicating an internal locus of control), or factors external to them, such as motivation, or the students' socio-economic status (Tschannen-Moran et al., 1998). In order to establish this effect, RAND researchers asked the

13

participating teachers to identify how much they agreed with two statements designed to measure two facets of this capacity. The first stated, "When it comes right down to it, a teacher can't really do much because a student's motivation and performance depends on his or her home environment" (Armor et al., 1976, p. 23). Teachers who strongly agreed with this statement felt overpowered by the environmental influences over the students they taught. This item reflected what was later termed General Teaching Efficacy (GTE). The second item stated, "If I really try hard, I can get through to even the most difficult or unmotivated students" (p. 23). The authors posited that the teachers that identified with this statement felt that their abilities as a teacher could overpower other influences that may be detrimental to the learning process. This item captured teacher's Personal Teaching Efficacy (PTE). The results of these two items formed a teacher efficacy score and analyses revealed some surprising findings. For example, teacher efficacy was directly correlated with reading achievement in minority students (Armor et al., 1976). However, these results should be interpreted with caution, as the authors did not report or measure the classroom accounts of teaching. As a result, gains in student achievement resulting from elevated efficacy scores cannot be disassociated from effort, motivation, or a number of other variables present in a classroom system. Similarly, teachers who ascribe greater importance to their external locus of control may believe that their efforts would not yield satisfactory results and may consequently disengage.

Although the initial results of teacher efficacy studies indicated powerful correlates, due to the limitations stemming from the data collection and analysis methodologies, the construct still needed further explication. Without an accurate assessment of teacher's knowledge in a specific context, or a measure of a teaching ability, the impetus of impact of these beliefs would remain unclear.

Self-Efficacy's Contributions to Teaching Efficacy

The fledgling teaching efficacy construct was further developed through the theories of Alfred Bandura. According to Bandura's social cognitive theory, human behavior is influenced by variables outside of direct reinforcement. The theory maintains that behavior is based on a triad of influences, namely personal, behavioral, and environmental factors. In particular, Bandura postulated that people's beliefs are powerful influences over both motivation and action. In that respect, Bandura (1997) defined self-efficacy as a future-oriented belief "in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Self-efficacy influences how much effort an individual would expend on an activity and was found to be a powerful influence on motivation, achievement, and self-regulation (Schunk & Pajares, 2009). Similar to the initial conception of teacher efficacy, Bandura conceptualized self-efficacy as consisting of two related dimensions.

Structure of Self-Efficacy

Bandura theorized that self-efficacy beliefs were constructed from two types of expectations. First, efficacy expectations consist of a judgment of how well a person can utilize the skills he or she possesses in a given circumstance (Bandura, 1997). However, according to Bandura, these self-perceptions are not necessarily an accurate description of competence, as "people's level of motivation, affective states and actions are based more on what they believe than on what is objectively true" (p. 2).

The second aspect to self-efficacy beliefs is outcome expectancies, defined by Bandura as "a person's estimate that a given behavior will lead to certain outcomes" (Bandura, 1977 p. 8). Outcome expectancies include physical and social rewards, as well as punishments,

criticisms, and self-evaluations. Whatever the form, Tschannen-Moran et al. (1998) posited that these expectations would provide motivation or deterrence for a specified behavior.

Sources of Efficacy Information

Four sources of information contribute to the construction of self-efficacy beliefs. Mastery experiences are authentic experiences that provide one with data to make an evaluation of one's competence. This is the most powerful source of information in self-efficacy beliefs, as the experience can provide diagnostic information of one's competence (Bandura, 1997). When an individual has experienced success in specific circumstances, he or she will likely have positive self-efficacy pertaining to the given situation. However, if the success was achieved without much difficulty, it might lead the individual to expect success to come easily. In other words, a certain degree of difficulty helps develop a resilient sense of self-efficacy, which will motivate the individual to persevere in the face of obstacles. Bandura (1997) argued that, while a certain degree of difficulty is beneficial, repeated failures would lead to a decreased sense of self-efficacy. In addition, he proposed that the temporality of the failure also plays a role in determining the degree of one's self-efficacy. For example, failure that occurs at the initiation of a behavior often leads to decreased self-efficacy beliefs. However, the perception of one's ability to execute an action successfully in a given circumstance extends beyond a simple assessment of past performance, as it also takes into account other factors that may weigh into the success of the experience (Bandura, 1997). For example, competitors may feel efficacious about their performance in a race despite not achieving their personal-best time. External factors, such as temperature and weather, may have exerted negative influence on the overall success of the performance despite the individual assessing that his or her perseverance, pacing and running ability were in top form.

The second source of efficacy information is learning through vicarious experiences. Modeling is a powerful form of vicarious learning. It refers to cognitive, affective, and behavioral changes that occur as a result of observing a model, which could be real or symbolic. Regardless of its type, a model provides a reference for behaviors, verbalizations, and nonverbal expressions (Pajares & Schunk, 2001). Learning through observation requires the individual to rely on inferences of social comparison (Bandura, 1977). If the observed model is perceived as depicting similar behavioral and social traits to those the individual possesses, the experience will have a more significant impact. Conversely, a dissimilar model may not provide much impact for any learning. Whatever the comparison between the model and the observer, the reliance on this inference makes the vicarious experiences more vulnerable to change than the more stable mastery experiences.

Social persuasion is another source of efficacy information and involves verbal support or feedback for a given situation. It implies that individuals may be influenced by comments made by others on capabilities they exhibit in a certain area. Again, because this type of information is inauthentic, it bears less of an impact than a mastery experience. Additionally, Bandura (1997) hypothesized that this aspect might be more influential on the outcome expectancy, rather than one's personal efficacy belief.

The final source of information that influences one's efficacy beliefs is affective beliefs. According to Pintrich and Schunk (1996), how one is feeling during a given experience can influence the assessment of one's competence. High degrees of stress and anxiety have been found to have an adverse effect on performance. As a result, individuals often equate feelings of stress and anxiety with poor performance (Bandura, 1977).

17

Self-efficacy contributed a significant amount of structure to the construct of teacher efficacy, which thus adopted Bandura's two-factor structure consisting of personal teaching efficacy and a second factor. The nature of the second factor has been debated, and has been likened by some authors to external locus of control, while others described it as outcome expectancies. Bandura's description of the sources of efficacy information has also informed teacher efficacy. Since mastery experiences are believed to exert the most powerful influence on efficacy beliefs, student teaching experience is thought to be a critical factor in the development of teacher efficacy beliefs.

Distinction between Locus of Control and Self-efficacy Theory

Since two theoretical positions inform the teacher efficacy construct, it is important to identify the differences between these two theoretical strands. Bandura stipulated that beliefs about whether one has the ability to produce certain actions (self-efficacy) are not the same as a belief that certain actions will affect outcomes (locus of control) (Bandura, 1997). According to Tschannen-Moran et al. (1998), while perceived self-efficacy is a strong predictor of a particular behavior, locus of control is not. In other words, teachers may believe that certain courses of action could be taken, indicating an internal locus of control, which will result in certain outcomes. This does not, however, imply that they are confident in their ability to implement the required actions. For example, while teachers may be aware that instructional actions can be taken to improve student reading achievement, they may not have the confidence in their ability to carry out those actions. The belief that a teacher, rather than the specifics of the students' environment and personal abilities, has an influence over an outcome reflects locus of control. Alternatively, a teachers' belief in his or her capability to carry out certain courses of action that will result in certain outcomes reflects efficacy beliefs. Because these theories are similar, the

18

wording of items measuring each of the constructs is critical. Unfortunately, as some researchers do not seem to understand, or have at least failed to acknowledge, the difference between the two theories, the resulting instruments created to measure teacher efficacy are unclear (Gibson & Dembo, 1984; Tschannen-Moran et al., 1998). This distinction is relevant to this study, as the utilized model of efficacy includes an evaluation of present capabilities that would only be seen in efficacy and not in locus of control theory.

<center>*Accuracy of Efficacy Beliefs*</center>

While higher efficacy beliefs are widely assumed to exhibit a positive effect, overly positive teacher efficacy beliefs may have negative implications as well. Literature suggests that it is in human nature to be overly positive in evaluations of self. The emphasized role of the cognitive processes and cyclical nature of the integrated Self-efficacy Model (Tschannen-Moran et al., 1998) further illuminates why efficacy judgments may not be commensurate with performance. While a critical feature of the self-efficacy construct is a judgment based on beliefs, rather than reality, the wide-reaching implications teaching efficacy seems to have for a number of student and teacher outcomes necessitates better understanding of the accuracy of these beliefs. The following section will review the nature of efficacy beliefs and an argument for the importance of understanding their accuracy.

Self-efficacy judgments are impacted by the constraints of limited attention, information-processing capacity, and memory, all of which are active in other decisions (Stone, 1994). Additionally, evidence suggests that, when self-efficacy judgments are made without prior firsthand experience, particularly in complex decision-making tasks, they lead to overly confident efficacy judgments (Cervone & Wood, 1995). Overconfidence "occurs when decision

<center>19</center>

makers' beliefs about the quality of their performance exceeds their actual performance" (Stone, 1994, p. 454).

The pertinent literature identifies three main categories of bias in overconfidence. The first is based on research findings suggesting that most people hold a positive view of self. Silverman (1964) reported that most people demonstrate weaker recall for failure than for success. Furthermore, people will often perceive improvement in their performance despite no change in actual performance (Conway & Ross, 1984). According to Taylor and Brown (1988), second type of bias resulting in overconfidence is an illusion of control. The authors reported that, when one's outcome expectancies match the outcome that occurs, the individual often overestimates the degree to which he or she played a role in the outcome. A third type of bias that influences one to adopt overly positive views of self and his or her ability is unrealistic optimism. When making a future-oriented judgment about performance, children and adults alike overestimate their actual performance (Taylor & Brown, 1988). This is problematic for many efficacy measures, as they include future-oriented items in order to align with Bandura's notion that efficacy is a future-oriented belief.

Given that self-efficacy judgments are likely to be more positive than the actual performance would suggest, it is essential to consider the impact of inflated self-efficacy judgments. Bandura (1997) conceded that self-efficacy judgments are based on belief, rather than reality, and argued for the value of overly positive efficacy judgments. Nonetheless, he maintained that inflated self-efficacy judgments are helpful, as they fight self-doubt, while encouraging resilience, persistence, and effort. In other words, if one had a negative self-efficacy judgment, it would undermine the motivation to persist in the task. Woolfolk-Hoy (2000) theorized that, when pre-service teachers underestimated the demands of teaching, they

eventually accepted the chasm between their personal standards and actual performance. As a result, the interns start engaging in self-protective strategies, such as purposely lowering their standards, to diminish the difference between the requirements of excellent teaching and their own perceived competence (Woolfolk-Hoy, 2000). Once pre-service teachers have lowered the standards for their teaching practice, this may persist into their beginning teaching years and may adversely affect the progression of achievement in readers.

Other authors suggest that doubts are also valuable. Whetley (2002) argued that teachers need to experience disequilibrium in order to change their teaching practice. Brodkey (1993) challenged this view, asking, "If teachers have [great] confidence in their teaching, why should they change?" (p. 70). Prompted by this lack of consensus regarding the value of recognizing one's shortcomings, Lange and Burroughs-Lange (1994) conducted a case study in order to examine what experiences provoked changes in knowledge and practice of experienced teachers. The authors utilized open-ended interviews that focused on memorable events in the teachers' professional lives. The results of the analysis indicated that, "changes in their knowledge and practice were motivated affectively and cognitively by the desire to move from a state of professional uncertainty towards feeling more comfortable about what they knew and did" (p. 628). The authors used their findings to develop a four-part model in which teachers moved in a nonlinear fashion to ultimately resolve their comfort with teaching practices. While the value of these results cannot be disputed, they have limited generalizability due to the case study nature of the research design as well as the use of memories as data sources, which can be unreliable or inaccurate. Nonetheless, the study findings encourage investigation of unrealistic efficacy

evaluations.

Personal Factors

Behavioral Factors

Environmental Factors
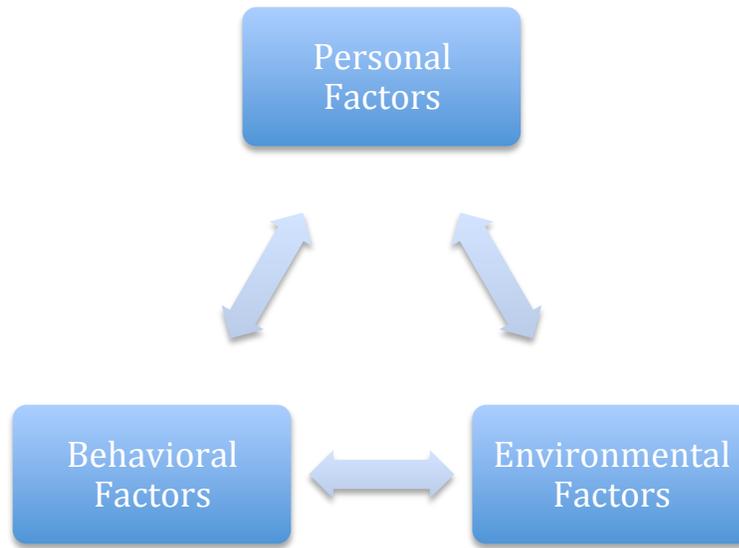
Figure 1: Social Cognitive Framework

Bandura's notion of efficacy beliefs was built on the social cognitive framework (Figure 1). This framework stipulates that human action is influenced by the interplay of personal, behavioral, and environmental factors. Although personal factors consist of both cognitive and affective elements, most efficacy studies address only beliefs without addressing the cognitive facets that play a role in influencing human action. This is inadequate, as having efficacy beliefs that are inaccurate in relation to actual knowledge or ability may have implications for actions. No studies conducted thus far have addressed the relationship between teacher efficacy beliefs and their accuracy.

Dimensions of Teacher Efficacy

In response to the promise of the construct's powerful relationship with student achievement, researchers continue to explore teaching efficacy. Two factors, reflecting the two items from the initial RAND study, dominated the initial studies of the construct. In the following section, the development of teacher efficacy measures and corresponding outcomes of their application will be reviewed.

Though the RAND items were based on Rotter's one-dimensional conceptualization of locus of control, later interpretations conceptualized these two items as independent dimensions, in accordance with Bandura's notion of self-efficacy, which is a multidimensional construct. Personal teaching efficacy, representing the agent-means aspect of the construct, was defined as teachers' "evaluation of their abilities to bring about student change" (Gibson & Dembo, 1984, p. 570). General teaching efficacy was thought to correspond to Bandura's outcome expectancies, as well as external locus of control.

The use of two items in RAND to form a summary score of teacher efficacy had resulted in powerful relationships with student achievement. However, with only two items, reliability was limited. To address this shortcoming, researchers subsequently attempted to develop longer, more reliable assessments of the teacher efficacy construct. Gibson and Dembo (1984) developed a dynamic measure of teacher efficacy, in order to allay some of the concerns regarding reliability of the RAND study's two-item assessment. The authors retained a two-factor structure in an effort to address personal teaching efficacy and general teaching efficacy, which were thought to align to Bandura's efficacy expectations and outcome expectancies. The resulting measure was titled the *Teacher Efficacy Scale* (TES). There are potential concerns, however, with how this measure was constructed. The factor structure was established using a scree test to identify where the eigenvalues drop off. Because the researcher makes this determination, subjective judgment can influence the outcomes. Henson (2002) argued that, though this method is commonly used, there are many options to employ for factor retention, which may not lead to the same number of factors. This factor structure continued to be questioned due to the low amount of variance explained by the two factors. The Personal Teaching Efficacy and the Teaching Efficacy factor accounted for 18.2% and 10.6% of the total

variance, respectively, resulting in only 28.8% of the variance explained (Gibson & Dembo, 1984). This is considered minimal at best and indicative of weak factorial validity.

Due to excitement about potential relationships between teacher efficacy and other yet-to-be-discovered student and teacher variables, the measure began to be widely used before the additional research that the authors advocated for could be conducted. As Ross (1994) stated, Gibson and Dembo's (1984) *Teacher Efficacy Scale* was adopted as the standard instrument for measuring the construct despite emerging concerns over its theoretical orientation and psychometric properties (Tschannen-Moran et al., 1998).

However, as subsequent studies were conducted, their findings prompted a debate over the true nature of the two-factor structure. Guskey and Passaro (1994) asserted that the two dimensions reflected an internal and external component of influence, rather than efficacy expectations and outcome expectancies. In this interpretation, the internal component refers to teachers' "perceptions of personal influence, power and impact in teaching and learning situations," whereas the external component refers to teachers' "perceptions of the influence, power and impact of elements that lie outside the classroom . . ." (p. 639). To differentiate their interpretation from Rotter's internal and external locus of control, Guskey and Passaro (1994) argued that these components do not lie on a continuum as Rotter's theory contends. Rather, these components are distinct from one another and assert their own influence. Underscoring the confusion over the foundational conceptual strands of teacher efficacy, using Gibson and Dembo's *Teacher Efficacy Scale*, Guskey and Passaro (1994) found that PTE and GTE correlated more strongly with internal and external control orientations, rather than the dimensions of self-efficacy theory.

Dissatisfied with the muddled conception of teacher efficacy, Tschannen-Moran et al. (1998) attempted to create an integrated model of teacher efficacy, informed both by locus of control and self-efficacy. The authors contended that teacher efficacy beliefs stem from a joint evaluation of a task analysis of the teaching situation and an assessment of a teacher's own capabilities. This model emphasized the role that knowledge plays in the construction and re-evaluations of teaching efficacy beliefs and retained the four sources of efficacy information found in Bandura's social cognitive theory. In addition, as illustrated in Figure 2, it added a cyclical feedback loop that enabled cognitive processing to inform efficacy beliefs.
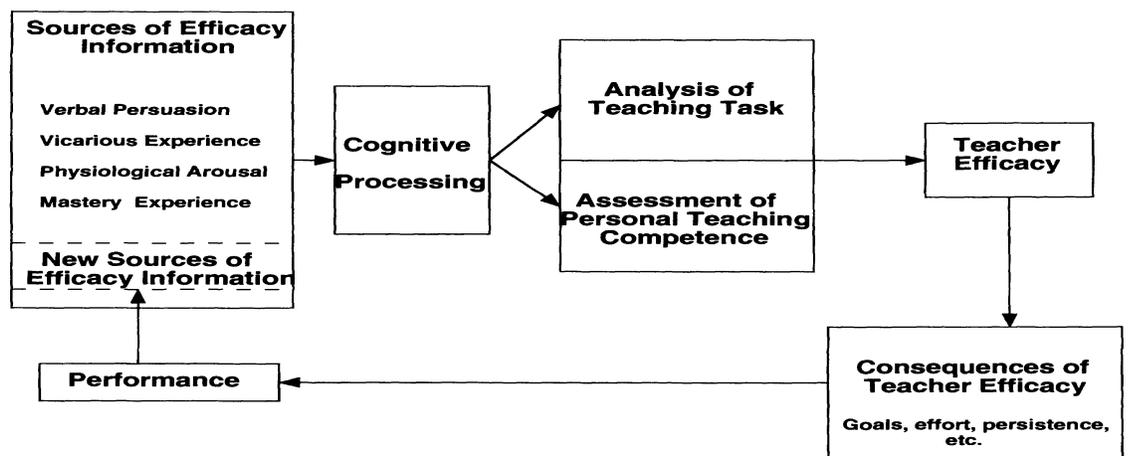
Figure 2: Integrated Model of Teacher Efficacy   Tschannen-Moran et al., 1998, p. 228

While the task analysis element of the model is related to GTE, it differs from the original conception of GTE due to accounting for factors that will both encourage and inhibit the teaching success. GTE, on the other hand, is only concerned with relevant external constraints and does not consider potentially useful resources (Henson, 2002). The model is consistent with social cognitive theory, as it involves cognitive, behavioral, and environmental factors. In fact, the task analysis aspect of the model expands the role of environmental influence over efficacy judgments. However, task analysis is a difficult skill that evolves with experience. Tschannen-

Moran et al. (1998) argued that novice teachers would rely more on task analysis, while more experienced teachers could "rely more heavily on memories and interpretations of similar past teaching experiences" (p. 231). This clearly indicates that further research is needed in order to expand on the role of task analysis in teacher efficacy beliefs.

Tschannen-Moran and Woolfolk-Hoy (2001) developed a measure aligned with their integrated model, the *Teacher Sense of Efficacy Scale.* After initially reporting three factors—student engagement, instructional practices, and classroom management, the authors proposed a revised, single-factor structure (Roberts & Henson, 2001). Its long form with 24 items accounted for 58.47% of the variance, while the short form, retaining only 12 items, accounted for 69.10% of the variance. As a result, the measure has demonstrated to be an effective advancement in the measure of teacher efficacy.

Because of the context-specific nature of teaching efficacy, Tschannen-Moran et al. (1998) argued that a cognitive element plays a role in the processes, as teachers analyze the demands of the teaching task and simultaneously evaluate their own abilities to perform within this context (Tschannen-Moran et al., 1998). In this integrated model of teacher efficacy, the conceptualization of personal teaching efficacy orients the perception of abilities to the present, rather than the future, as in Bandura's model. Tschannen-Moran et al. (1998) argued that future-oriented evaluations could only occur after a present evaluation of current competence is made (Tschannen-Moran et al. 1998). The orientation to the present also increases the likelihood of accuracy of these beliefs (Taylor & Brown, 1988).

Henson, Bennett, Sienty, and Chambers (2002) found some support for this model. Because the integrated model argues that novice teachers will rely on an explicit analysis of the teaching task more than their more experienced peers will, Henson et al. (2002) sought to

delineate if task analysis would predict efficacy evaluations in novice teachers. While the authors were not able to find support for this premise, they found evidence that task analysis may be potentially valuable for future assessments of teacher efficacy. Furthermore, the authors were able to demonstrate a relationship between personal teaching competence and instructional efficacy judgments (Henson et al., 2000).

As the construct evolved, researchers adapted their interpretations of the teacher efficacy dimensions. Beginning from the one-dimensional locus of control theory, teacher efficacy progressed to be conceptualized as a two-factor construct, though debate continued on what these two factors represented. The latest one-factor iteration of teacher efficacy has integrated locus of control and self-efficacy theory to arrive at a more psychometrically sound model with a clear theoretical foundation.

Teacher Efficacy Correlates

Throughout the evolution of the construct, a variety of constructs have been associated with teacher efficacy. Teaching efficacy has been related to instructional practices, teacher retention, as well as student achievement and beliefs. Despite the powerful relationships it seemed to demonstrate, much of the literature ignored other variables that may have had a critical role in the outcomes that were purported in the research. In the following section, the correlates of teacher efficacy will be reviewed, including those concerning teachers, such as teacher retention (Glickman & Tamashiro, 1982; Murphy, 2013), early onset of feelings of burnout (Fives, Hamman, & Olivaren, 2007), innovation in teaching (Guskey, 1984), and persistence with difficult students (Gibson & Dembo, 1984). In addition, student outcomes, such as improvements in academic achievement (Armor et al., 1976; Moore & Essleman, 1992), and academic beliefs (Midgely, Feldfaufer, & Eccles, 1989) will also be discussed.

Teacher Outcomes

Given the cost associated with teacher training and high turnover rates, determining factors of teacher retention is of interest to many. Glickman and Tamashiro (1982) compared teachers who were currently in their fifth consecutive year of teaching with first-year teachers and those who had left the profession prior to the fifth year of teaching. The analysis results indicated that first- and fifth-year teachers demonstrated significantly higher teaching efficacy compared to their peers who had left the profession. Thus, the authors assumed that the lower efficacy beliefs of teachers who had left the field likely played a role in their decision to leave the field. However, Glickman and Tamashiro (1982) failed to address other personal factors that may have influenced this decision. Additional information would have been needed to ascertain the role that low efficacy beliefs played in the decision to leave the teaching profession. An additional weakness of the design lies in the instrumentation used. The authors created the data collection instrument used in their study based on the RAND items, assuming that these measured efficacy, rather than locus of control. A third item was added to the instrument, which the authors described as being based on the RAND items. Unfortunately, as no additional information on the content of the items was provided, given the one-dimensional nature of locus of control, it calls to question what the third item assessed.

These findings were recently contradicted. Murphy (2013) investigated the role of teacher efficacy in organizational commitment for special education teachers. The study findings indicated that efficacy beliefs were not associated with one's commitment to remain at an organization. While these findings are informative, additional research is needed, perhaps utilizing more recent evolutions of teaching efficacy measures.

Fives et al. (2007) investigated if burnout indicators are exhibited early in one's teaching career beginning with student teaching. Viewing teacher burnout as a lengthy evolving process, authors theorized that efficacy and burnout are likely related. They further postulated that symptoms of burnout, such as emotional exhaustion, depersonalization of students, and a diminished sense of personal accomplishment, might be demonstrated during student teaching, while the pre-service teacher is beginning to acquire both adaptive and maladaptive coping skills for the profession. The results of their analyses indicated that, while pre-service teachers do exhibit symptoms of burnout during student teaching, their efficacy beliefs could ameliorate these feelings. Further analysis revealed that pre-service teachers' efficacy beliefs were positively correlated with the amount of guidance they received from their cooperating teacher. Moreover, the authors found an association between the level of efficacy beliefs and factors associated with teacher burnout. More specifically, pre-service teachers with higher efficacy beliefs were more likely to have higher sense of personal accomplishment, while being less likely to depersonalize their students. The relationships exhibited here suggest that increased efficacy beliefs buffer against early onset of teacher burnout symptoms. While the results of this study are intriguing, the paucity of literature supporting the notion that burnout symptoms are exhibited early in teacher's career and continue to develop warrant further investigation. Furthermore, the researchers measured efficacy beliefs at two time points, midway and following student teaching. The timing of this data collection warrants follow-up analysis, as the development of efficacy beliefs in the pre-service population, as well as among the novice in-service teachers, has not been definitively established. Given the dearth of research in this field, it is unknown if beliefs tend to continually improve as teachers acquire mastery experiences, or if the development of these beliefs waxes and wanes as the teacher receives both positive and

29

negative feedback through these experiences. Additional studies are needed to clarify the nature of these beliefs.

Guskey (1984), in an investigation of relationships between teacher efficacy and attitudes toward implementing new instructional practices, found that highly efficacious teachers identified mastery learning, the focus of a professional development program, as more important than their less efficacious peers perceived it to be. Additionally, highly efficacious teachers also perceived mastery learning to be more in line with their current teaching practices and less difficult to implement than their less efficacious counterparts (Guskey, 1984). Since no measure of instructional practices was used in the study, it is impossible to establish whether the teachers' responses are accurate portrayals of their beliefs and instructional practices, or are influenced by social desirability bias. Additionally, the participating teachers may have had more knowledge and interest in the focus of the professional development program. Here, once again, a measure of teacher's pedagogical knowledge plays a critical role in the effort to fully understand the variables. This may have been particularly relevant in this study, since participation in the professional development program, and thus the study, was tied to advancing the teachers' pay scale. However, the results are in accordance with Bandura's (1997) beliefs that higher teacher efficacy would influence teachers to create more ambitious goals and be willing to try new teaching practices. Further investigation of this topic should include an evaluation of present teaching practices.

In a multi-modal analysis, Gibson and Dembo (1984) measured teacher efficacy using the *Teaching Efficacy Scale*, in addition to assessing teachers' use of instructional time, and exchanges between teacher and student. The measure was subsequently used to gather information on the teaching behavior of teachers exhibiting both high and low efficacy. Eight

teachers were dichotomized into high and low efficacy groups, which were compared on their use of instructional time as well as persistence with resistant students. The results indicated that lower efficacy teachers spent more of their time in small group instruction than those with higher efficacy beliefs. Furthermore, the researchers found a significant difference in how persistent teachers reacted to student failure or resistance. Teachers reporting low levels of efficacy were more likely to give students an answer, or move on to ask another student to call out the answer, rather than scaffolding the student to answer successfully. While teachers' verbal ability was assessed, their pedagogical content knowledge was not. Highly efficacious teachers may have been more persistent; however, it is unclear whether their instructional strategy was appropriate for the situation. Since teacher efficacy beliefs consist of a judgment of one's capabilities, it is important to examine the one's knowledge. While including an assessment of instruction strengthened the design of this study, the small sample limits the potential for generalization of its findings. Furthermore, since neither teachers' orientation to reading instruction nor literacy pedagogical content knowledge were assessed, the effects of confounding variables could not be accounted for.

To date, no study has attempted to measure teachers' efficacy beliefs and teachers' pedagogical content knowledge. Since both cognition and affective elements constitute the personal factors that influence human action, ascertaining the relationship these variables have with each other seems critical to understanding any outcomes that are demonstrated from either variable. It is evident that efficacy beliefs exert influence over teachers' career decisions (Glickman & Tamashiro, 1982) and pedagogical decisions (Guskey, 1984; Gibson & Dembo, 1984). Thus, having a more complete understanding of the relationship of efficacy with other

cognitive factors, such as pedagogical content knowledge, will enable a more dynamic understanding of an already powerful construct.

Student Outcomes

As promising as the influence of teacher efficacy was for further academic study and practice, many researchers were even more excited to see its influence over student outcomes. As improvement in student achievement is one of the best indicators of teaching success, the following section will review studies investigating the effects of teacher efficacy on their students' performance. As with the extant studies that focused on teacher outcomes, no studies in this area have accounted for actual teacher pedagogical knowledge when evaluating any gains in student achievement.

The initial RAND items demonstrated a relationship between teaching efficacy and student achievement in minority students. This outcome was replicated using Gibson and Dembo's (1984) *Teacher Efficacy Scale.* Moore and Essleman (1992) found support for the relationship between teacher efficacy and student achievement reported by the authors of the RAND study (Armor et al., 1976). The authors analyzed reading and math performance and found that, while the latter was related to teacher efficacy, the former demonstrated non-significant differences, which could potentially be due to the limitations of the instrumentation (Moore & Essleman, 1992). Because the instrument initially utilized by Gibson and Dembo was employed, the same validity and psychometric weaknesses are evident in this study as well. Although the *Teacher Efficacy Scale* is a measure of general teacher efficacy, one of the items specifically identifies mathematics as a context. This may have led the study participants to have math concepts primed for the answers to the survey, which resulted in the absence of relationship with reading. Finally, no attempt was made to account for teachers' pedagogical knowledge.

This study underscores the importance of identifying a specific context for the efficacy beliefs, as well as controlling for the impact of teachers' pedagogical content knowledge.

Researchers were also able to identify relationships between teacher efficacy and student beliefs. Midgely et al. (1989) constructed a quasi-experimental study analyzing student motivation and teachers' efficacy levels during a transition period between elementary and junior high school. Following the participating students across two years, before and after the transition, researchers assessed students' expectations for success in math, as well as their perceptions of performance and the difficulty of math. Teachers' efficacy beliefs were assessed using an original measure that included items from the original RAND study (Armor et al., 1976), as well as other measures. The results indicated that students in classrooms taught by teachers exhibiting a higher sense of efficacy believed that math was less difficult than students whose teachers had lower efficacy beliefs. This relationship extended to students' expectations for success and perception of performance (Midgely et al., 1989). When analyzing the data across the transition period, researchers found that students who were instructed by highly efficacious teachers during both years believed that math became progressively less difficult as each year progressed more often than students who were assigned to less efficacious teachers. Additionally, teacher efficacy beliefs were found to exert a stronger influence on low achieving students than on their high achieving peers. However, the study findings should be interpreted with caution, as the researchers did not investigate knowledge and teaching practices of the teachers. Understanding how highly efficacious teachers differed from those that demonstrated low efficacy would have enabled the researchers to better understand the role that efficacy played in the differences in the students' beliefs. While teachers with high efficacy may have exerted more effort, due to the weak psychometric elements of the measure, it is difficult to

isolate the impact of teaching efficacy. Despite the limitations, the study revealed that the

potential influence that teacher efficacy beliefs can exert over student beliefs on academic

performance holds a promising relationship that should be further explored.

Clearly, teacher efficacy has been shown to relate to a number of other important

variables, including student and teacher behaviors and beliefs, as well as motivation. With

improved instrumentation, as well as study designs that would have more completely addressed

the personal facets that influence an individual's actions, the possibility of confirming these

relationships, as well as discovering new connections to teacher efficacy, is promising.

Specificity of Teacher Efficacy

As the recognition of the relevance of teacher efficacy grew, the impetus to narrow the

scope of efficacy beliefs to a particular context became more important. The following section

will review the importance of specificity of teacher efficacy. Additionally, a review of the

contexts in which this has already been explored in the literature will be provided.

Bandura (1997) contended that perceptions of self-efficacy differed across different

contexts. As a result, he emphasized the creation of instrumentation that was context-specific,

though the level of specificity had not yet been determined. However, educational theorists

agree that teaching efficacy is both context- and subject-specific (Tschannen-Moran et al.,

1998). Bandura (1997) advocated against the use of single-item measures because of the

recognized reliability issues and the innate inability to capture the complex dimensions of

teacher efficacy. Acknowledging that finding the optimal level of specificity is difficult, he

recommended assessing a wide variety of tasks that the teacher engaged in. Measures of teacher

efficacy started with general measures of teaching efficacy (Gibson & Dembo, 1984) and

evolved to assess specific subjects, such as science (Enochs & Riggs, 1990). Rubeck and Enochs

(1991) have taken this initiative even further to assess teacher efficacy within the context of chemistry, asserting that it would be vastly different from efficacy required for biology. While this is likely true, the danger of increasing specificity is the lack of generalizability and predictive power of the instrumentation (Tschannen-Moran et al., 1998). Pajares (1997) warned that "domain specificity should not be construed as extreme situational specificity, and there is no need to reduce efficacy assessments to atomistic proportions" (p. 13). Bandura (2001) similarly cautioned, "Scales of perceived self-efficacy must be tailored to the particular domains of functioning that are the object of interest" (p. 1). In line with these notable difficulties, researchers struggled to succeed in developing a measure that targeted specific contexts.

One example of extending Gibson and Dembo's (1984) *Teacher Efficacy Scale* was the *Science Teaching Efficacy Belief Scale* (STEBI) (Riggs & Enochs, 1990). The scale was created for in-service teachers and adhered to the two-scale model suggested by Bandura's theoretical conception of self-efficacy and Gibson and Dembo's instrument. This scale was soon adapted for the pre-service teaching population and titled the *Science Teaching Efficacy Belief Instrument (B)*. A variety of evidence was reported in support of its content, construct, and convergent validity. Additional validity evidence was demonstrated when teachers who scored highly on the Personal Science Teaching Efficacy Belief scale spent more time teaching science (Riggs & Jesunathadas, 1993). Riggs (1995) posited that teachers that scored low on this scale were likely to choose not to teach science and were rated poorly by observers (Riggs, 1995).

Roberts and Henson (2000) created another science subject-specific efficacy measurement titled the *Self-Efficacy Teaching and Knowledge Instrument for Science Teachers* (SETAKIST). The authors used the *Teacher Efficacy Scale* as the foundation while rewording items to be specific to science teaching. Another important departure from previous measures

was the development of a knowledge efficacy construct that evaluated a teacher's perceived competence for science pedagogical content knowledge. An example of a knowledge efficacy construct was, "I know the steps necessary to teach science concepts effectively" (Roberts & Henson, 2000). The authors hypothesized that teaching efficacy and knowledge efficacy would be related. However, they cautioned that further construct validity should be assessed. While the idea was intriguing, no research has been conducted on further explicating the construct.

Special education teachers Coladarci and Breton (1997) sought to adapt Gibson and Dembo's (1984) *Teacher Efficacy Scale* for resource room teachers. The adaptation, however, involved primarily changing the terms "teacher" to "resource room teacher". Additionally, the authors made the decision to substitute two items on the Gibson and Dembo scale with the original RAND items, stating that the substituted items were deemed equivalent, without offering further explanation. The validity of the scale was established by comparing the factor structure to the original *Teacher Efficacy Scale* (Gibson & Dembo, 1984). However, since the factors for this scale have been argued to be weak, any measurements against it would yield weak validity evidence at best. The results of the principal component factor analysis revealed that 28% of total item variance was explained by these two factors, which was comparable to the total variance found in the original scale. The authors reported that personal teaching efficacy was clearly demonstrated, but that general teaching efficacy needed to be further clarified.

Thus far, studies on context specific teacher efficacy beliefs have focused on mathematics, science, and resource room teachers. These measures advanced the construct, as specificity is the key facet to teacher efficacy beliefs. While the scope of the context continues to be debated, many see the importance of having measures targeting different content domains that make up the curriculum. Additionally, the literature has offered abundant examples of

measures with weak validity evidence (Coladarci & Breton, 1997; Gibson & Dembo, 1984).

Thus, future measures should attempt to demonstrate more substantive validity evidence to

clarify the construct.

Literacy Teaching Efficacy

Initial interest in context-specific efficacy beliefs began in mathematics and science

domains but was also extended to resource room teachers in special education classrooms. In the

science domain, several attempts to create and refine instrumentation were made. However, one

critical aspect of education was absent from this line of research. Only recently, researchers

started to develop measures been to address Literacy Self-Efficacy (Szabo & Mokhtari, 2004;

Tschannen-Moran & Johnson, 2011).

Szabo and Mokhtari (2004) developed the first instrument targeting literacy efficacy

beliefs titled the *Reading Teaching Efficacy Instrument* (RTEI). Though the reliabilities found

for the two subscales were adequate, the measure was based on Gibson and Dembo's scale and

thus retained some of the same psychometric weakness the original scale demonstrated. The

statements included in the instrument were generated by making adaptations from the STEBI

(Enoch & Riggs, 1988). Initial content validity was established using an expert panel. The

authors reported the reliability for the outcome expectancy scale to be $\alpha =.70$. In line with other

measures based on this scale, a scree plot test was used to establish that the measure consisted of

two factors. One factor related to a teacher's evaluation of his or her teaching efficacy and the

second evaluated the external conditions that are beyond the control of the teacher, such as

socioeconomics. While the authors labeled the second factor "outcome expectancy", in line with

Bandura's conception of self-efficacy, Tschannen-Moran and Johnson (2011) argued that it more

closely represented Rotter's (1966) Locus of Control theory and was yet another example of

confusion between the two theoretical foundations of the self-efficacy construct. Convergent validity evidence was established by comparing the results to a general teaching efficacy belief instrument. The authors described their results as "favorable" without reporting any specifics (Szabo & Mokhtari, 2004, p. 63). Regardless of the reported results, the shaky foundation of the psychometric properties on which the instrument was based necessitates further research.

Using the integrated model of teacher efficacy as a theoretical basis, Tschannen-Moran and Johnson (2011) sought to create a new instrument, *the Teacher Self-Efficacy for Literacy Instruction* (TSELI). Standards for the English Language Arts (Ellery et al., 2010) and the IRA's Standards for Reading Professionals informed the development of the original 33 items specific to a diverse variety of literacy instruction. The instrument assessed ability to use word study, decoding and comprehension strategies, modeling effective strategies, integrating instruction across language arts, grouping practices, use of a wide variety of genres, meeting the needs of both proficient and struggling readers, and the ability to motivate students to value reading (Tschannen-Moran & Johnson, 2011). The authors sought to establish content validity using a panel of experts from the field of reading and literacy instruction. The scale was later pilot-tested with a group of graduate students to determine wording clarity. The items require a response on a nine-point Likert scale, with anchors for the response scale ranging from 1 = not at all, through 3 = very little; 6 = some influence; and 7 = quite a bit; to 9 = a great deal. Exploratory factor analysis was used to eliminate items that did not adhere to a coherent factor structure, as well as to test the construct validity of the scale. Eleven items were removed due to low communalities and factor coefficients below .50. Multiple strategies were employed to determine the factor structure, including eigenvalues over 1.0, scree analysis, factor structure clarity, and interpretability of factors. While two factors emerged from the analysis, explaining

62% of the variance in TSELI, as they were strongly correlated ($r = .81$, $p < .01$), a Varimax rotation was employed. Ten items had coefficients above .4 on both factors, which necessitated a second order factor analysis that yielded a single factor. All 22 items loaded on this factor as well as held strong factor coefficients. Construct validity was established, as the factor explained 55% of the variance. The scale's reliability was assessed using Cronbach's alpha and the resulting alpha coefficient of .96 was obtained. Confirmatory factor analysis was subsequently used to establish concurrent validity against the *Teacher's Sense of Efficacy Scale*. However, the construct is distinct from a general sense of teacher efficacy as measured by the *Teacher's Sense of Efficacy Scale* (TSES) (Tschannen-Moran, 1998). This measure was chosen for use in the current study as the instrument to assess teacher literacy efficacy, as it draws from the integrated model of teacher efficacy and minimizes the theoretical confusion that earlier instruments exhibited.

Owing to its recent creation, the measure has not been widely used; however, preliminary results indicate support for the measure. Tschannen-Moran and Johnson (2011) used the TSELI in addition to measuring contextual variables that may exert influence over efficacy beliefs. Additionally, the teachers' scores from the TSES (Tschannen-Moran, 1998) were examined in relation to scores on the TSELI. The results indicated that elementary teachers in suburban schools felt more efficacious in literacy than middle school teachers and teachers who taught in rural geographic locations. Female teachers also experienced higher literacy teacher efficacy than their male counterparts. The experience of a children's literature course, as well as the teachers' participation in a book club, also resulted in elevated literacy teacher efficacy. Researchers also reported that having greater experience was unrelated to teachers' efficacy beliefs.

Despite being a relatively recent development in the study of teacher efficacy, context-specific measures and their results are encouraging. Given how critical literacy is to the students' academic success, continued exploration of literacy teacher efficacy is well founded.

Development of Teacher Efficacy Beliefs

Bandura (1997) theorized that self-efficacy judgments are established early and can be resistant to change. This premise has been confirmed in studies of self-efficacy beliefs (Tschannen-Moran, 2011). Consequently, it is important to investigate the role of self-efficacy beliefs in pre-service teachers. The following section will review how teacher efficacy beliefs develop in pre-service teachers.

Early evaluations of teaching efficacy are important as they exert a strong influence over the teachers' decision to sustain effort in the field (Bandura, 1986). Several studies have indicated that pre-service teachers reported higher teaching efficacy than did teachers in the field (Benz et al., 1992). In fact, Benz et al. concluded that pre-service teachers held an "unrealistically high sense of efficacy" (p. 284). This may be the result of creating the efficacy evaluations without having any authentic experiences. Bandura (1997) stipulated that mastery experiences, which would provide the authentic experience, provide the most influential source of information for efficacy experiences. However, prior to their student teaching experience, pre-service teachers are largely making their efficacy evaluations based on alternative, less influential sources of efficacy information, such as vicarious learning in the form of observations and modeling, as well as verbal persuasion of peers and faculty. Woolfolk-Hoy (2000) explained that pre-service teachers often underestimate the difficulty of teaching. This may account for the "reality shock" that first-year teachers reportedly experience (Veenman, 1984, p. 143).

Several researchers have examined the development of teacher efficacy in pre-service teachers. Tuchman and Isaacs (2011) compared the effects of formal and informal experiences on the development of teacher efficacy and found that both were correlated with positive influences on teacher efficacy. The researchers found that formal experiences, such as tutoring and student teaching experiences, had the strongest correlation with efficacy in instructional strategies. On the other hand, informal experiences, such as babysitting or serving as camp counselors and youth advisers, demonstrated a strong relationship with student engagement (Tuchman & Isaacs, 2011). An important limitation of the study is the sample, which was restricted to educators in Jewish day schools. These teachers may not hold the same motivations, pedagogy knowledge, and beliefs as other teachers working in a nonreligious setting.

Bernadowski, Perry, and Del Greco (2013) specifically examined service learning field experiences and their relation to teacher efficacy beliefs in pre-service teachers. The authors found that service learning experiences that were related to the course content, as opposed to those that were not, were associated with higher efficacy beliefs in pre-service teachers. However, this study took a unique avenue in measuring efficacy beliefs, analyzing the underlying sources of information that contribute to efficacy beliefs, such as mastery experiences and physiological and emotional states during service learning experiences. The findings, however, cannot be generalized to other studies that employed measures of teacher efficacy as a whole construct.

Hoy and Woolfolk (1990) studied three groups of undergraduate students, namely student teachers, education students, and psychology students. The participants completed a modified version of Gibson and Dembo's (1984) *Teacher Efficacy Scale* before and after the semester. The findings revealed that general teaching efficacy declined for students who engaged in their

41

student teaching placement. Specifically, personal teaching efficacy subscale scores significantly increased during the student teaching placement. The authors reported that general teaching efficacy beliefs declined, though the specifics of the analyses are not detailed. Similar results were found in Li and Zhang's (2000) study measuring changes in general teaching efficacy before and after formal clinical education experiences. Their results indicated that teachers felt more efficacious in personal teaching efficacy following only six half-day clinical experiences. This finding suggests that the number of clinical experience hours can play an influential role in determining teacher efficacy. Cole (1995) compared students assigned to a 32-hour clinical placement to those assigned to a 6-hour clinical placement and found that efficacy scores only improved in the expanded clinical experience group, confirming the above premise.

Plourde (2002) looked specifically at science teaching efficacy beliefs of pre-service teachers before and after the student teaching experience. Using the STEBI (Enochs & Riggs, 1988), pre-service teachers were assessed before and after their student teaching placement. While no significant differences emerged on the Personal Science Teaching Efficacy scale, scores on the Science Teaching Outcome Expectancy scale significantly decreased. Plourde attributed this decrease to the potentially weak science pedagogical content knowledge the teachers possessed, as well as inadequate access to resources. Plourde found that pre-service teachers' general teaching efficacy decreased as they assigned greater importance to external factors to their teaching.

Recent investigations into pre-service LTEB throughout teacher preparation programs contradict the findings of previous research suggesting declines in efficacy (Plourde, 2002, Veenman, 1984). Kent, Giles, and Hibbert (2013) analyzed pre-service teacher efficacy at various points throughout pre-service teacher preparation. They reported that LTEB increased

steadily from the initial coursework in teacher preparation through student teaching. The authors specifically mention the care with which their teachers were assigned to their respective student teaching placements. As all participating pre-service teachers reported their perception of student teaching to be a positive one, it is likely that this mediated the development of their efficacy beliefs. Kent et al.'s (2013) results support Bandura's theory that mastery experiences have the most influence in developing efficacy beliefs. Nonetheless, additional research is needed in order to further investigate the direction of this influence based on the perception of the overall experience.

Pre-service teachers' efficacy beliefs have been described as "unrealistically high" (Benz et al., 1992), although this is impossible to confirm due to absence of normative data for the construct. However, pre-service teachers do appear to exhibit higher teacher efficacy beliefs than in-service teachers do (Benz et al., 1992, Woolfolk-Hoy, 2000). The majority of studies indicated, as Bandura (1997) postulated, that efficacy beliefs increase with mastery experiences (Cole, 1995; Hoy & Spero, 2005; Kent et al., 2013; Li & Zhang, 2000). However, at least one study indicated a decline in outcome expectancy beliefs following a mastery experience (Plourde, 2002). Additional literature suggests that the type and length of mastery experience plays a role in its correlation with efficacy beliefs. The empirical evidence suggests that formal mastery experiences that have a connection to course content are correlated with the highest efficacy beliefs. Sensibly, longer mastery experiences appear to have stronger correlations with higher efficacy beliefs. Given that teacher efficacy beliefs appear to develop early and remain stable, more work is needed to clarify the development of teacher efficacy beliefs and the types of experiences.

Teacher efficacy has evolved from a confused beginning to a more defined construct with explicit theoretical foundations. Its powerful relationships with a number of teacher and student variables has cemented its presence in education literature. Pre-service teachers' propensity to demonstrate higher teaching efficacy scores, despite lacking the experience to warrant these elevated beliefs, is a concern, given that these beliefs appear to establish early and remain stable. Understanding its relationship to other relevant variables, such as pedagogical content knowledge, will help elucidate the nature of teacher efficacy beliefs and offer additional information on how these constructs influence instructional decisions and perhaps, ultimately, student literacy achievement.

Teacher Literacy Knowledge

Effective teaching requires knowledge, skill, and a belief in one's abilities. According to Bandura (1993), teacher efficacy "is a generative capability in which cognitive, social, motivational and behavioral skills must be organized and effectively orchestrated to serve numerous purposes" (p. 118). However, the existing literature on teaching efficacy largely disregards the role that teacher knowledge plays in teaching efficacy beliefs. Teaching efficacy judgments evaluate the teachers' capabilities, including their knowledge of teaching. Consequently, the integrated model of teacher efficacy is predicated on teachers' knowledge of the teaching task. The following section will explore forms of teacher literacy knowledge, including literacy content knowledge, as well as an overview of pedagogical content knowledge, and specifically literacy pedagogical content knowledge (LPCK).

Literacy Content Knowledge

Historically, research on teaching methods focused on the psychology of reading, as opposed to specific content knowledge (Phelps & Schilling, 2004). However, the poor literacy

rates and recent legislative emphasis on teacher accountability have highlighted the gap in literature for this area. Several studies have demonstrated that students who are still reading poorly at the beginning of the third grade often never become competent readers (Blachman, 2000; Lyon, 1998; Snow et al., 1998). However, early systematic instruction in the early grades can reduce the number of students reading below grade level, even those that may be later diagnosed as having learning disabilities (Bos, Mather, Friedman, Narr, & Babur, 1999). Better understanding of student achievement in reading has underscored the need for effective teaching. The body of evidence supporting a direct relationship between teachers' knowledge and skills of essential components of effective early literacy instruction and student literacy outcomes has grown (Darling-Hammond, 2000; McCutchen & Berninger, 1999). It is widely agreed that, in order to be effective in reading instruction, teachers need to have an extensive knowledge base, as well as a large repertoire of instructional strategies (Brady & Moats, 1997; Hoffman & Roller, 2001; International Reading Association, 2003; National Reading Panel, 2000; National Research Council, 1998).

Research has identified five components necessary for effective early literacy instruction (NICHD, 2000). These components include phonemic awareness, phonics, fluency, vocabulary, and comprehension. Several studies have indicated that teachers who are knowledgeable about these components are able to implement effective instruction, which can prevent reading failure in their students (Moats, 1994; Snow et al., 1998; Taylor, Pearson, Clark, & Walpole, 1999). On the other hand, teachers that are unfamiliar with these concepts may provide incorrect or inappropriate feedback when students make errors, as well as misinterpret literacy assessments (Moats, 2000).

Many researchers and practitioners agree that the following components are inherent to effective early literacy instruction knowledge: direct teaching of decoding; comprehension and literature appreciation; phonemic awareness instruction; systematic and explicit instruction in English orthography; dynamic vocabulary instruction that addresses the relationship among words, word structure, origin, and meaning; and comprehension strategy instruction that includes predicting outcomes, summarizing, clarification, questioning, and visualization (Birsh et al., 2011; Moats, 1999; NRP, 2000; Sartain & Stanton, 1978; Snow et al., 1998). Several research studies that examined content knowledge for literacy contributed to the subsequent work the applied forms of this knowledge, termed literacy pedagogical content knowledge (LPCK). These studies tended to examine the language and content knowledge required to teach early decoding (Bos, Mather, Dickson, & Moats, 1994; Spear-Swerling et al., 2005). Findings that some of these studies yielded indicate that most teachers, experienced or not, are weak in their knowledge of word structure (Brady & Moats, 1997; Lyon & Moats, 1997; Moats, 1994; National Reading Panel, 2000; Snow et al., 1998; Troyer & Yopp, 1990; Mather et al., 2001). The following section will thus review the extant studies examining literacy content knowledge for word structure.

Moats (1994) created an assessment that would later serve as a foundation for many other measures of not only literacy content knowledge, but also more applied types of knowledge, such as LPCK. The measure had a narrow focus and was limited to word structure, including phonology, morphology, phonics, and orthography. The survey was created to identify the concepts that should be targeted in the upcoming course. The study design was extremely weak and only descriptive level analyses were performed. Consequently, its findings cannot be generalized to other populations. Overall, Moats reported that the teachers that took part in the

study performed well below the 50th percentile on most items. He also discussed specific weaknesses in phonics, phonological awareness, and morphology. Moats (1994) surmised from the results that many literate teachers might have acquired foundational skills sufficient enough to learn to read, but were not adequately knowledgeable to teach children how to read. As a result, Moats emphasized the need for teacher preparation programs to address these skills explicitly. Critically, Moats did not make a connection between the teachers' literacy content knowledge and either student literacy growth or achievement, and she failed to conduct any observations of teaching as a part of this investigation. While it appears reasonable that teachers possess this knowledge, it is critical that a connection be established in research to warrant priority in the limited space that teacher preparation programs have. Because the author was considered an expert in the field, and due to the dearth of assessments targeting this construct, many researchers chose to use this measure, or some modified version of it, in their studies (Bos, Mather, & Babur, 2001; Mather et al., 2001; Piasta et al., 2009). In this initial study, no reliability or validity data were reported. Despite lacking validity data of its own, this measure was used to validate later measures. This paper provided the cornerstone for many future studies involving literacy content knowledge.

One of the most extensive studies on literacy knowledge, in part based on Moat's (1994) measure, focused on the literacy knowledge of pre-service teachers. Salinger et al. (2011) created an instrument consisting of 53 items which took teachers nearly an hour to complete. The measure made marked improvements in assessing a wider scope of reading, including all five areas that were outlined as critical to early literacy instruction in the NRP's report (NICHD, 2000). While modest reliability levels were reported for the overall measure, subscale reliabilities were unacceptably low (Salinger et al., 2011). Another advancement from the

Moat's measure was establishing validity evidence. Convergent validity was established by comparing performance to self-reported scores on SAT or ACT, as well as overall and education major GPA scores. However, it should be noted this information was collected through self-reported data, whereby the participants may have inflated or incorrectly remembered their scores on these measures, resulting in skewed analyses. A further limitation of the measure was the length of administration, which made replication difficult and unlikely.

This study attempted to examine pre-service teachers' content knowledge of several facets of literacy and their perceptions of their preparation programs. Using a large, nationally representative sample, the authors assessed pre-service teachers' knowledge of alphabetics (consisting of phonics and phonemic awareness), fluency, and meaning (consisting of vocabulary and comprehension). The results mirrored those reported for previous studies (McCutchen & Harry, 2002; Moats, 1994; Moats & Foorman, 2003; Piasta et al., 2009; Spear-Swerling et al., 2005; Washburn et al., 2011). Overall, pre-service teachers answered 57% of the knowledge items correctly. The instrument also assessed pre-service teachers' perceptions of the inclusion of this material in their teacher preparation programs. Pre-service teachers demonstrated the highest degree of competence in fluency (achieving 61% accuracy), followed by meaning (58% accuracy), and lastly alphabetics (53% accuracy) (Salinger et al., 2010). The poor performance of pre-service teachers on the alphabetics factors is notable, given that they indicated this factor as the most emphasized in both coursework and field experience (Salinger et al., 2010).

Bos et al. (2001) reported similar results, following their study that was based on a more complex design and a larger sample. The authors measured teacher knowledge for both pre-service and in-service teaching populations and compared pre-service teacher knowledge to that of their in-service counterparts. The study findings indicated that in-service teachers achieved a

mean score of 68%, while pre-service teachers scored a mean of 50%. The changes to study design and the attempt to account for reliability and validity evidence improved the study's outcomes. Several additional studies reported similar results in both the pre-service and in-service teaching populations (Spear-Swerling et al., 2005; McCutchen & Harry, 2002; Piasta et al., 2009; Washburn et al., 2011).

The majority of studies examining language and literacy content knowledge with regard to word structure indicated that both in-service and pre-service teacher knowledge was generally described as inadequate (McCutchen & Harry, 2002; Moats 1994; Moats & Foreman, 2003; Piasta et al., 2009; Spear-Swerling et al., 2005; Washburn et al., 2011). Pre-service teacher knowledge was generally reported as lower than that demonstrated by the in-service teacher population (Bos et al., 2001; Spear-Swerling et al., 2005). Consequently, concern arose in how to improve teacher knowledge, as the more difficult question of the impact of these low accuracy scores on student outcomes emerged. Responding to the various studies indicating that teachers needed instruction in word analysis skills, researchers started to investigate the effects of efforts to improve teacher literacy content knowledge. On the whole, it appears that literacy content knowledge is malleable and sensitive to efforts aimed at improving it. The following sections will review studies that focused on the changes of literacy content knowledge as a result of an instructional or professional development attempt.

Spear-Swerling (2009) analyzed the impact of coursework and tutoring experience on literacy knowledge and literacy self-efficacy. The study sample included pre-service teachers, as well as in-service teachers enrolled in a master's program. The participants' knowledge was assessed before and after participation in the literacy course and the initiation of tutoring. Literacy content knowledge was assessed using the original measure targeting word

structure tasks, along with morphological knowledge and general knowledge of reading and spelling development. Student reading achievement was also assessed before the tutoring began and following its completion.

The study results indicated that the participating teachers' knowledge significantly improved following the completion of the literacy courses and leading reading tutoring sessions. The students who took part in the tutoring sessions also demonstrated significant improvements, though teachers' knowledge did not predict student achievement. However, the authors stipulated that this outcome could have been due to a number of external factors, as well as the lack of random assignment of some teacher-student pairs. While these results appear promising, a number of methodological and instrumentation issues weakened the impact of the study. First, absence of any validity evidence for any of the teacher measures questions what exactly the tests were measuring. Given that, at the time of the study, a number of other literacy content measures were available, conducting a convergent validity analysis would have strengthened the impact of the study. Additionally, the manner and location of the testing administration for the teachers was not detailed. If the assessments were given during their course with the teacher present, social desirability bias may have exerted a strong influence on the responses given.

Al-Otaiba et al. (2012) conducted a randomized control study, whereby the participating pre-service teachers were assigned to one of two tutoring conditions. One type of tutoring included specific code-focused instructional activities. Otherwise, the tutoring conditions were very similar. The pre-service teachers' knowledge was assessed before and after the tutoring experience using literacy content measure specific to word structure (Mather et al., 2001). The results indicated that both groups significantly improved their knowledge of language concepts. Neither condition yielded significant improvements in student achievement, though the authors

cautioned that this finding could be due to the relatively small sample size. The researchers should be applauded for their attempts to construct a solid research design. However, as no measure of treatment fidelity was administered, it is unknown what the content of the tutoring sessions actually included. Given that this was a preliminary study with sound research design, this information would be critical to help replicate its findings. Furthermore, the knowledge measure, as indicated above, is limited in scope and does not incorporate situated knowledge. Additionally, validity evidence for this instrument is lacking. However, the results of these studies are indicative of the influences that mastery experiences can have on the development of literacy content knowledge. Understanding that literacy content knowledge is malleable and can be enhanced as a result of direct instruction or tutoring infinitives has implications for teacher preparation programs, as well as professional development initiatives for in-service teachers. If literacy content knowledge measures are sensitive enough to detect change due to an intervention, costly and time-consuming efforts to target literacy content knowledge can be substantiated. This information could also help in curriculum planning by indicating if pre-service teachers were demonstrating mastery of content.

The message from these studies seems to be that both pre-service and in-service teachers exhibit low levels of literacy content knowledge, especially of concepts relevant to word structure (Bos et al., 200). Pre-service teachers appear to score lower than their in-service counterparts (Bos et al., 2001). However, literacy content knowledge appears to improve when explicit programming in coursework and field experiences target literacy (Al-Otaiba et al., 2002; Spear-Swerling, 2009). Thus, more information is needed to better understand what the nature of this knowledge is and how much knowledge is necessary to affect change in student literacy. The following section will investigate literacy content knowledge and literacy teaching efficacy.

Literacy Content Knowledge and Efficacy

Researchers have attempted to measure teachers' perceptions of their ability in relation to their actual ability levels. Generally, in this body of literature, the perception of ability was termed "preparedness" or "competence". Preparedness measures typically require the teachers to rate how capable they felt in a given task. However, most studies of this nature attempted to capture teachers' "preparedness" using single items, as was done with teacher efficacy (Bos et al., 2001; Cunningham et al., 2004). Personal teaching efficacy, as defined by Bandura (1986), is "a judgment of one's capacity to accomplish a certain level of performance" (p. 391). On the other hand, preparedness, at least partially, constitutes one's capacity (Housego, 1990). The majority of the results reported in the literature indicate an incongruous relationship between preparedness and literacy knowledge. Since preparedness is at least one component of teacher efficacy, the results suggest that literacy teaching efficacy beliefs may not be aligned with literacy content knowledge. The following section will discuss the literature on investigating literacy knowledge and preparedness to teach reading.

Bos et al. (2001) compared the perceptions and knowledge of early literacy instruction of general educators using a sample of both pre-service and in-service teachers. The results comparing pre-service to in-service teachers indicated that, while the latter significantly outperformed the former on the knowledge survey, neither group scored well on the measure. Assessments of word analysis of in-service and pre-service teachers demonstrated mean scores of 68% and 50%, respectively. The teachers rated their preparedness to teach in three different items: preparedness to teach children; preparedness to teach struggling readers; and preparedness to teach using phonological awareness. The results of this first study comparing these variables indicated that teachers who demonstrated higher levels of literacy

knowledge felt more prepared to teach across all three areas. The authors also assessed the teachers' perceptions of their explicit and implicit code instruction. Here, researchers found that in-service teachers who favored explicit code instruction felt more prepared to teach children, to instruct struggling readers, and to use both phonemic awareness and phonics. Perhaps pre-service teachers were unable to draw from experiences in teaching either explicit or implicit code instruction to make a difference in their evaluation of their preparedness. The results suggesting higher degrees of preparedness for those who favored explicit jhhcode instruction are misleading, given that the researchers asked the teachers to rate preparedness for elements of explicit code instruction, but not implicit code instruction.

Cunningham et al. (2004) conducted a study that was the first to introduce the concept of calibrating preparedness or competency beliefs with actual knowledge. Teachers' literacy knowledge was assessed in three ways: awareness of children's literature; phonological awareness knowledge; and phonics knowledge. Perceived competence for each domain was measured by a single item asking, "How would you describe your current skill level, based on past success, in your knowledge of . . ." followed by task definitions for each of the domains. The respondents were asked to provide their answer by indicating the response on the four-point Likert scale that best matched their level, ranging from "no experience" to "expert". The analysis results supported those found in earlier studies, showing that teachers have very limited knowledge of content viewed as critical for successful reading instruction despite perceiving themselves as proficient in teaching these skills. It was even more concerning that less knowledgeable teachers perceived themselves to be more proficient than their more knowledgeable and experienced peers, indicating that these teachers were not aware of what they did not know. While the inclusion of efficacy judgments of teacher knowledge was novel and

innovative, the study results are limited by reliability concerns pertaining to the perception of knowledge measures. Additionally, the content knowledge tasks lacked validity evidence. However, the indication that in-service teachers had miscalculated their preparedness to teach was concerning, as it could result in teachers being unreceptive to improving their literacy instructional skills.

Several subsequent studies addressed the relationship of preparedness to teach reading and literacy knowledge. Spear-Swerling et al. (2005) measured the level of literacy knowledge of in-service teachers enrolled in a graduate program in relation to their feelings of preparedness and experience. The study participants were asked to rate how confident they felt in their general knowledge on reading and reading development, word structure, and morphology. The instrument consisted of three items including statements concerning the three aspects of word-level knowledge targeted in the study. Literacy knowledge was assessed using a measure created by the researchers to target five specific aspects of language. The reported results contradicted those of Cunningham et al. (2004). More specifically, teachers with higher efficacy beliefs performed higher on assessments of literacy knowledge, just as lower efficacy teachers were weaker on knowledge assessments. As all study participants were participating in a graduate program, it is likely that they have developed more accurate evaluations due to the effect of the school environment. Being exposed to a more diverse population of teachers, as well as teaching practices, may have allowed these teachers to calibrate their knowledge more accurately. Despite demonstrating that efficacy evaluations were congruent with the actual knowledge levels, all participating teachers performed well below the ceiling on the knowledge assessments. This outcome reflects the overall research findings that teachers do not possess aspects of knowledge that are considered critical for effective teaching.

Washburn et al. (2010) looked at a more comprehensive model of domains of early reading instruction in their investigation of pre-service teachers' knowledge and their perceptions about their ability to teach these concepts. The sample included pre-service teachers in the final stages of their certification in general education. Literacy content knowledge was assessed using an adaptation of other measures, such as the *Informal Survey of Language Concepts* (Moats, 1994) and The *Teacher Knowledge Scale: Structure of Language* (Bos et al., 2001). However, the authors expanded the scope to include elements of morphology and comprehension. Additionally, in a measure of literacy teaching efficacy, pre-service teachers evaluated their perceived ability to teach reading to typically developing readers, reading to struggling readers, phonemic awareness, phonics, and vocabulary. The majority of pre-service teachers indicated that they felt "moderately" prepared to teach reading to typically developing students as well as struggling readers, in addition to phonemic awareness and phonics. They felt most competent in teaching vocabulary. When the authors compared the pre-service teachers' perceptions of competence and their actual skills and ability, they found that, in all areas except phonics, pre-service teachers perceived themselves to be more proficient than their abilities suggested. While the study would have been significantly bolstered by the inclusion of a measure of teaching practice, the results are indicative of a mismatch between preparedness to teach reading and literacy content knowledge for pre-service teachers.

The relationship of teacher efficacy beliefs and content knowledge within the context of student teaching has been examined in content areas, such as science and technology. Given the dearth of studies that addressed literacy in this field, those that assessed similar constructs in other content areas can offer some valuable information. Wenner (1993), for example, initiated a study examining science teaching efficacy beliefs and science knowledge for a sample of pre-

service teachers and found a significant negative correlation (-.27), indicating that the more efficacious teachers felt, the lower they scored on science knowledge measures. Pre-service science teachers, similar to literacy teachers, demonstrated low levels of subject-specific content knowledge, achieving about 50% accuracy on the knowledge measure used. However, a follow-up study failed to replicate this significant and negative relationship (Wenner, 1995).

The results of studies in this area are decidedly mixed. Some studies have demonstrated a positive correlation between efficacy beliefs and literacy content knowledge (Bos et al., 2001; Spear-Swerling et al., 2005), while others have indicated a negative relationship between efficacy beliefs and subject-specific teacher knowledge (Cunningham et al., 2004; Washburn et al., 2010). It is important to clarify this relationship, given that pre-service teachers may lower their standards for students, as a self-protective strategy against the disequilibrium that would arise from high efficacy beliefs and low performance, which may arise from low knowledge levels (Woolfolk-Hoy, 2000).

One critical element missing from this body literature is refined assessment measures. Most of the studies analyzing literacy efficacy beliefs relied on a single item to capture literacy efficacy beliefs or preparedness to teach reading. Furthermore, the measures of teacher knowledge are limited and do not reflect the more dynamic concepts of relevant teacher knowledge of literacy. The following section will review how teacher literacy knowledge has evolved from simple assessments of content knowledge.

Pedagogical Content Knowledge

Teachers need a variety of knowledge bases to teach their students effectively. Content knowledge and awareness of pedagogy are two critical types of knowledge that are necessary for teacher success. However, some have argued that simply acquiring knowledge of these two

facets is not enough (Shulman, 1986). Pedagogical content knowledge has been referred to as the body of information that teachers need to effectively teach in a given content area. The following section will therefore discuss the origin and structure of pedagogical content knowledge.

Shulman (1986) argued that the study of teachers' cognitive understanding of subject matter content and its relationship to instruction for students was missing in educational research. To help clarify avenues of potential research, Shulman identified three types of content knowledge relevant to teaching— subject matter, curricular, and pedagogical content knowledge. Subject matter or content knowledge refers to the structure and amount of knowledge that teachers possess. Shulman (1986) felt that this type of knowledge went beyond facts and figures, and also included the structures of the knowledge. Curricular knowledge, on the other hand, refers to the full array of programs, methodologies materials, etc., that can be utilized to teach a given subject at a given grade level. The final aspect of knowledge sparked a flurry of interest in both research and practice. Shulman defined pedagogical content knowledge (PCK) as "the most useful forms of representation . . . the most powerful analogies, illustrations, examples, explanations, and demonstrations . . ." (p. 9). Of particular importance to the construct of PCK is the synthesis of content knowledge with an awareness of the unique learning needs of one's students.

As PCK evolved, its vague definition caused confusion and was sometimes subsumed under content knowledge. However, its role in the integration and transformation of other forms of knowledge was eventually recognized. The transformative model (Figure 3) depicts PCK as the synthesis of all relevant types of knowledge needed to be an effective teacher (Gess-Newsome, 2001).
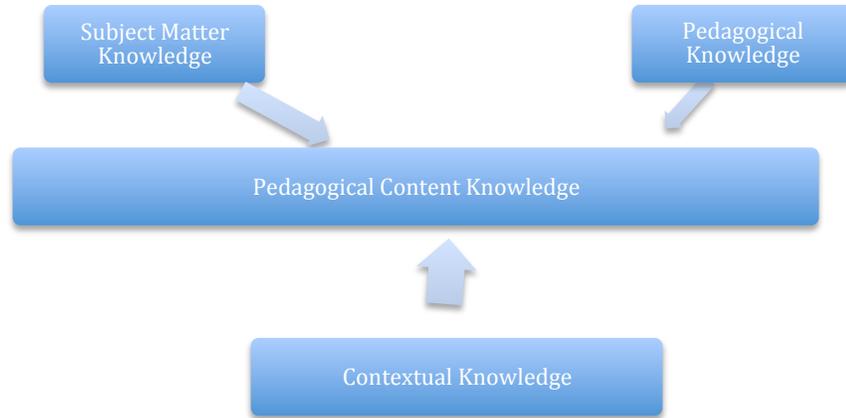
Figure 3: Transformative Model of Pedagogical Content Knowledge

(Gess-Newsome, 2001 p. 64)

While this model emphasizes the value of a synthesized knowledge base for teaching, it also recognizes that subject matter, pedagogy, and contextual knowledge bases exist. However, these knowledge sources are "latent resources" (Gess-Newsome, 2001, p. 12) and are transformed into the new more dynamic pedagogical content knowledge.

The transformative model represents the body of knowledge that teachers need in order to implement effective instruction. Without an adequate pedagogical content knowledge, teachers will be unable to engage in effective teaching. Within the socio-cognitive framework, pedagogical content knowledge contributes to the personal factors that exert influence over human action. Much of the earlier assessments of teacher knowledge and any of its correlates failed to address the system that teachers exist in. Teachers do not work within a vacuum and the complex system within which they operate needs to be considered. A more dynamic representation of literacy teacher knowledge that accounts for the fact that the purpose of knowledge is to inform others would greatly advance the field of teacher literacy knowledge.

Literacy Pedagogical Content Knowledge (LPCK)

While other subject areas have been extensively researched, LPCK has been largely ignored until recently. This is surprising, given the importance that literacy rates play in our society. Phelps and Schilling (2004) offered several explanations for the lack of attention LPCK has received. First, reading was previously not considered a discipline in the same sense as mathematics and science. Reading instruction is generally subsumed into more generative language arts, which targets reading, writing, and literature instruction. As a result, no single group of scholars identified what pre-service teachers need to know about literacy. Furthermore, concern about teacher's knowledge of reading concepts is generally overlooked, since teachers are competent readers themselves. Finally, Phelps and Schilling (2003) cited the lack of literature investigating pedagogical content knowledge in literacy. LPCK extends beyond simple assessments of declarative knowledge. In fact, it reflects the need for this knowledge to be interpreted through student work samples, applied to interpret student errors, and analyzed to inform targeted instruction. In addition, to reflect a more detailed understanding of literacy, the measures assessing teacher literacy need to expand the scope beyond word analysis. The following section will discuss studies of LPCK.

McCutchen et al. (2002) conducted a study that yielded a significant advancement in understanding teacher knowledge and its role in teachers' classroom practice, as well as student achievement. In this study, the concept of relevant teacher knowledge advanced beyond simple declarative knowledge and began to include some curricular knowledge, as well as situate the knowledge with interactions with students. The authors assessed LPCK in a multi-modal way. They used surveys to assess aspects of literacy content knowledge, while observations of literacy lessons examined the teachers' use of this knowledge within context. Teachers' philosophical

orientation to literacy instruction, as well as general knowledge of academic preparation, was

assessed. Student achievement was measured via performance on vocabulary, comprehension,

and spelling assessments, as well as narrative written-language samples. The researchers

conducted three observations throughout the school year. They developed a coding system that

included four critical categories—knowledge targeted by instructional activity, literacy activity,

textual context, and group context. The authors were surprised to learn that, even though the

teachers demonstrated high levels of general knowledge, they performed particularly poorly on

measures of linguistic content knowledge. The teachers' accuracy ranged from 30% to 35%.

Despite teachers' poor performance on the content knowledge measures, the analyses indicated a

relationship between teachers' phonological knowledge and end-of-year students' reading scores.

A marginal correlation between teachers' phonological knowledge and writing fluency was also

found. Another surprising facet of the study contradicted earlier findings in that teachers' beliefs

did not predict their instructional practice. The findings indicated that literacy knowledge

predicted instructional practices. More specifically, phonological knowledge and explicit

instruction in alphabetics predicted student end-of-year word reading for kindergarten students,

but not in first and second grade students. However, despite the significant improvements in the

design, the study yielded limited findings, due to a number of factors. First, despite reporting

relationships among a number of variables, the measures used to assess student word reading

were adapted without appropriate reliability and validity data reported. Furthermore, the

intended purpose was not followed for several of the measures used, raising the question of the

utility of the measure for that purpose. Overall, while the study revealed several strong

relationships, these are plagued by questions of psychometric strength. Additionally, the authors

admitted that their observations were brief and limited and should have been not only lengthier,

but also videotaped to enable more cross-coding. Another significant limitation of the study stems from the reporting of simple correlations. The use of more sophisticated statistical procedures, such as hierarchical linear modeling of nested data, would have strengthened the authors' results.

In a well-designed study that attended to weaknesses of its predecessors, Piasta et al. (2009) tested the hypothesis that teacher knowledge alone would not account for student achievement gains. Targeting word structure knowledge, the authors sought to examine if the interaction of teacher knowledge and time spent on decoding instruction had an impact on student achievement. This research was conducted as a part of a larger randomized control study evaluating the effectiveness of a web-based program that incorporated student achievement data to make broad recommendations for instructional activities for each child in the classroom. The researchers assessed teacher knowledge in the experimental and control condition, in addition to conducting multiple observations. Student achievement was assessed using the word identification and picture vocabulary sub-test of the Woodcock Johnson Achievement battery. The analyses results contradicted those reported by McCutchen et al. (2002), as teacher knowledge alone did not directly affect the gains in students' reading scores. Rather, the interaction of teacher knowledge and time spent on decoding instruction predicted student reading gains, even when controlling for prior achievement. This effect surpassed the effect demonstrated from treatment assignment. As a result, the students in classrooms where highly knowledgeable teachers devoted more time to explicit decoding instruction experienced higher gains on word identification tasks. Conversely, the students in classrooms where teachers performed below 25% on the knowledge assessment experienced weaker gains despite spending more time on decoding instruction (Piasta et al., 2009). This effect was still evident despite the

use of a highly scripted core curriculum. The researchers asserted that the less knowledgeable teachers were ill-equipped to provide accurate examples to students, as well as demonstrated a generally poor ability to respond and correct student errors (Piasta et al., 2009). The authors still pointed out that even the teachers who were considered "highly knowledgeable" did not demonstrate extensive knowledge of word structure. Similar to other studies, the teachers that took part in this research on average achieved 52% accuracy on the *Teacher's Knowledge Assessment*. While the study's implications are limited due to the narrow scope of teachers' literacy pedagogical content knowledge, its implications support the notion that the teacher's knowledge level can have significant effect on student achievement. It should be noted that, as the items were adopted from previous assessments and authors restricted the focus of the measure to word analysis, making generalizations about correlates to broad reading is misleading. Numerous elements are required for successful reading instruction. As the literacy community had convened on the body of essential elements for successful early reading instruction, the measures should have been broadened to reflect this consensus. The need for a measure that expands the scope beyond word analysis and incorporates items that require teachers to actively apply knowledge thus emerged.

Recognizing the limitations of earlier attempts to measure aspects of LPCK, Carlisle et al. (2011) set out to develop a new instrument that would situate knowledge within student's word samples and student responses. Snow et al. (2005) referenced this as knowledge that is "embedded in practice" (p. 11). This initiative would serve as a significant improvement in efforts to assess facets of literacy knowledge, literacy pedagogical content knowledge in particular. In addition to shifting the measurement focus to pedagogical content knowledge, Carlisle et al. (2009) also expanded the investigation to include comprehension, as well as word

analysis. As a result, the *Teacher Knowledge of Reading and Reading Practices* (TKRRP) (Phelps et al., 2009) utilized test items that situated knowledge in a teaching context and required teachers to apply knowledge from a variety of domains.

Content for the items was generated in consultation with experts in the field of early reading and addressed activities in oral language, reading, and writing that occur in teaching word reading and comprehension. The authors used two domains, word reading and comprehension, since these were previously established measurable domains of early literacy instruction (Phelps & Schilling, 2004). The word reading domain was conceptualized to cover different aspects, such as phonemic awareness and letter-sound relationships, while the comprehension domain targeted morphology, text analysis, and fluency. After extensive pilot testing, the final version of the assessment included 13 teaching scenarios with 22 items.

The authors conducted a binary factor analysis that initially aimed to assess the number of dimensions the TKRRP measured (Carlisle et al., 2011). The results indicated that a single factor was the best fit. A one-parameter item response theory model was thus employed to combine the items into a single measure of teachers' knowledge about early reading. The TKRRP had an alpha coefficient of .756 and a one-parameter IRT reliability of .762 (Carlisle et al., 2011). However, the authors were careful to point out that an analysis of the test information curve indicated that the measure was most reliable for respondents whose scores did not deviate from the mean by 1.25 SD' (Phelps et al., 2009).

Due to the weak validity evidence offered by previous assessments, the authors attempted to commit the measure to rigorous validity evaluations. Content validity was established via an expert panel and the participating teachers were observed and video recorded. Additionally, a qualitative case study comparing highly knowledgeable teachers to those exhibiting low

knowledge was conducted. The teachers in the high-knowledge group were observed to provide more elaborate and accurate descriptions of ideas and were able to make connections between classroom work and literacy ideas. Furthermore, these teachers were able to ask more demanding questions and probe student responses more thoroughly. Their use of precise language was also markedly different from their counterparts in the low-knowledge group (Phelps et al., 2009). The TKRRP is a significant advance in reliably capturing LPCK. The development of the TKRRP has enabled studies to investigate LPCK with psychometrically sound instruments that represent a variety of the facets included in LPCK. However, the instrument has not been used in any studies on pre-service teacher population.

The measure was, however, used to analyze the impact of a statewide literacy professional development initiative. The researchers controlled for previous student achievement and, based on their performance on the knowledge survey, the participating teachers were assigned to high-, middle-, and low-knowledge groups. No significant differences were found between the three groups of teachers who instructed first and second grade students on either word analysis or comprehension. Modest differences were seen in third grade teachers for word analysis, but not for comprehension. However, the study was hindered by several constraints. Despite the advancement in the measure, additional factors, such as teachers' use of instructional strategies, likely played a role in the students' literacy achievement, but were not accounted for in the research design (Piasta et al., 2009). The study was examining the effectiveness of a teacher professional development program. However, since no attempt was made to observe teacher lesson plans, no conclusions can be made on how and if teachers used this knowledge in their instructional decisions.

Summary

The studies described above depict an increasingly complex set of constructs that likely work together to affect change in student literacy achievement. Despite increasingly robust research instrumentation and study design, no clear conclusions can be drawn about the role of teacher literacy knowledge in student literacy achievement. Additional studies that have indicators of LTEB and literacy content knowledge have suggested a significant relationship. However, more work is required to develop reliable and valid measures, as well as to conclusively determine the direction of this relationship. As LPCK has recently been the subject of attention and more extensive research, reliable and valid measures have been developed. Because LPCK situates knowledge within given literacy teaching tasks, it may be more closely related to LTEB, which requires an evaluation of one's capabilities to organize and execute courses of action to accomplish a literacy task. The extensive literature review conducted as a part of this study, however, failed to identify any previous work that has employed the use of reliable and valid assessment measures to investigate the existence and nature of a relationship between literacy teaching efficacy and literacy pedagogical content knowledge in pre-service teachers. This study will seek to do just that. Given the role that the teacher preparation program plays in both literacy teaching efficacy beliefs and literacy pedagogical content knowledge, it is important to review critical aspects of teacher preparation. The next section will briefly review this body of evidence.

Teacher Preparation

Given that the period of teacher preparation is sensitive for the development of both efficacy beliefs and pedagogical content knowledge, the nature of teacher preparation programs

will be addressed in this final section of the literature review. A brief overview of the characteristics of the student teaching experience will be discussed. Additionally, information on the current status of higher education institutions' content for literacy instruction will be examined.

Content for Literacy Instruction in Teacher Preparation Programs

Coursework plays a critical role in developing the content knowledge for teachers. Accordingly, the following section will present a review of the content of literacy instruction in teacher preparation programs. A discussion of the critical facets of early literacy instruction, as well as national teaching standards, will be presented. Finally, extant studies evaluating the success of delivering literacy instruction will be discussed in detail.

The history of reading instruction has been contentious, with polarized sides arguing for either a whole language approach, which emphasizes the role of engagement in literacy and comprehension, versus an explicit systematic approach, which emphasizes learning sub-skills and contributes to fluent reading (Walsh et al., 2006). The US Congress convened a panel of experts, the National Reading Panel (NRP, 2000), to review the scholarly literature with the aim of providing a much-needed answer on what elements of instruction were necessary for successful literacy instruction. As discussed earlier, the results of this analysis continue to be debated. However, the findings of the report became the basis of subsequent legislation that has required the named five elements in federally funded programs. As mentioned earlier, while the debating sides are quite polarized, there is a consensus that students need instruction in a variety of facets of reading, including phonology, phonics, comprehension, fluency, and vocabulary. Moreover, the presentation of the requisite facets of instruction needs to be comprehensive and tailored to the developmental and ability levels of the students being targeted.

The National Council for Accreditation of Teacher Education (NCATE, 2008) releases a revised list of standards every seven years. The standards create a conceptual framework for programs, courses, teaching candidate performance, and accountability. Under NCATE, the curriculum standards for elementary education state that the candidates must

> Demonstrate a high level of competence in use of English language arts...know, understand, and use concepts from reading, language, and child development to teach reading, writing, speaking, viewing, listening, and thinking skills and to help students successfully apply their developing skills . . . . (NCATE, 2008, p. 54)

However, the specific concepts and knowledge required in the required facets of literacy instruction are not specifically stated. Owing to the generality of the curriculum content specific to literacy instruction, the International Dyslexia Association (IDA) has recently released knowledge and practice standards in an effort to improve the standards for teacher education specifically in literacy areas. Louisa Moats, who chairs the committee for the development of the standards, stated, "If teachers are better prepared, the impact of reading difficulties, including dyslexia, will be lessened, and many more students will receive the instruction and support they require to reach their potential" (IDA Website, 2012). States also provide their own guidelines to which universities must abide by.

A national study of more than 2,000 pre-service teachers, most of whom had no prior teaching experience, aimed to establish the extent traditional programs addressed the five elements identified by the NRP, based on the perceptions of the study participants. The subsequent analysis indicated that only 21% of the sample described their coursework as having a strong focus on the essential reading content (Salinger et al., 2010). However, pre-service teachers were twice as likely to report a strong focus on the five essential components in their field experiences than in their coursework. Alphabetics, representing phonemic awareness and phonics, was most frequently identified as having the highest ratings of program focus. On the

other hand, meaning, defined as comprehension and vocabulary, was identified to have the lowest ratings for program focus. A second research question addressed how well pre-service teachers performed on knowledge measures of these components. The pertinent results were similar to other findings, as the pre-service teachers answered, on average, 57% of the questions accurately (Salinger et al., 2010). Despite identifying alphabetics has having the highest emphasis of the essential literacy components, the participating pre-service teachers performed the lowest in terms of accuracy (53%), compared to 61% for fluency and 58% for meaning.

Some researchers have argued that current educational system is inadequately preparing pre-service teachers for the demands that are placed on them as they enter the workforce. A highly controversial study initiated by National Center for Teaching Quality (NCTQ) exemplifies how highly charged this issues has become. NCTQ commissioned a study to examine how pre-service teachers are being prepared to teach reading (Walsh et al., 2006). Using a random, representative sample of 72 schools of education, researchers evaluated literacy courses by reviewing their syllabi and course descriptions. The courses were rated on three factors, including "the quality of the required texts for teaching the basic components of good reading instruction, the course objective and lecture time devoted to teaching the five components" and "any kind of assignment that was given to students in which they would demonstrate this knowledge . . ." (Walsh et al., 2006, p. 17). The researchers pointed out that they found a "general disdain for any truths science has to offer" (p. 29), as well as distrust of scholarly research that comes from other related disciplines, such as cognitive psychology or linguistics. Additional results indicated that a mere 15% of the education schools included in the study sample exposed teachers to the science of reading. This low percentage was even more alarming in light of the low bar the authors intentionally set for achievement of this objective.

Furthermore, the course syllabus analysis indicated that many syllabi even dismissed the scientific research in reading. The committee deemed a mere 1% of the 227 texts acceptable. However, significant criticisms of the methodology of this study are plentiful. Primarily, the study only analyzed syllabi and descriptions without considering the quality of instruction or student support services. Though school authorities would likely have blocked efforts for structured interviews to occur, this would have increased the validity of the study. Walsh et al. (2006) reported that fewer than 1% of schools "fully cooperated" with researchers, though other reports indicate that the majority of data collected was sourced from websites and other public record requests, as many schools of education were understandably reticent to participate (Darling-Hammond, 2013).

Given that the student teaching experience exposes the pre-service teachers to a new environment, in which a different set of pedagogical principles may be prioritized, this is likely to increase their knowledge of early literacy concepts. The following section will review clinical experiences, including student teaching incorporated in teacher preparation programs.

Clinical Experiences and Student Teaching in Preparation Programs

Student teaching and other clinical experiences embedded into curricula play an important role in the preparation of teachers. Given the prominence that mastery experiences play in the development of teacher efficacy beliefs, student teaching is likely to heavily influence these beliefs. The following section will review characteristics of student teaching and its role in the development of efficacy beliefs.

Clinical practice in education can include a variety of activities, such as observations, tutoring, and student teaching. The importance of this component to pre-service teachers'

development has been growing in emphasis. In a National Research Council (NRC, 2010) report, clinical preparation was identified as one of the elements of teacher preparation that would have the most significant impact on student outcomes. NCATE, an accrediting body of education schools, has recommended that education programs adapt to make clinical practice the foundation of the programs and incorporate academic content and professional courses within that foundation (Zimpher et al., 2010). Based on this finding, NCATE released a report recommending a significant shift in the emphasis of teacher preparation programs.

Traditional preparation models often include a variety of exposure to clinical (field) experiences, which are usually hierarchical in nature. Early clinical hours occur prior to student teaching and are often requirements of methods courses, evaluated by the methods instructor (Clift & Brady, 2005). These experiences should be connected to course content (Hoffman et al., 2005). Student teaching is typically thought of as the final and culminating clinical experience and is usually part of the final semester of the preparation program (Greenberg et al., 2011).

Among these clinical experiences, student teaching is seen as the most critical facet of the teacher education process (Levine, 2006). Student teaching is equally valued by teacher educators, principals, and pre-service teachers themselves (Greenberg et al., 2010). It is essential for teacher's ability to fulfill their duties, as there is evidence that first-year teachers who have completed no or minimal clinical preparation perform at lower levels of competence (Greenberg et al., 2010). The experience typically occurs over the span of a semester and requires that student teachers synthesize and execute learned knowledge. The majority of placements require that student teachers be at a school full-time and do not have additional coursework requirements (Greenberg et al., 2010). Twenty-seven US states currently require a minimum of a ten-week placement, which is thought of as the minimum acceptable duration of teacher training program

70

of this type (Greenberg et al., 2010).

The typical cycle of student teaching usually begins with observation, which is followed by pre-teaching, participation, and eventually teaching (Johnson, 2001). During this time, the student teacher accepts increasing amounts of responsibility for planning, teaching, and evaluation of students. A recent review of literature concluded that pre-service teachers have a difficult time incorporating learned concepts in methods courses into their classroom (Clift & Brady, 2006). Implementation of concepts is influenced by beliefs, and even when pre-service teachers are placed in a field placement that is congruent with pre-service teaching, they may have a difficult time utilizing learned concepts because they disagree or feel uncomfortable with the strategies (Clift & Brady, 2006).

Weaver and Stanulis (1996) documented a student teachers' experiences of attempting to utilize learned methodology from coursework into her teaching practice. The reality of delivering what had sounded like a simple and exciting methodology within the classroom was challenging for most students. Student teachers learned to appreciate the additional constraints present in the actual classroom that are hard to describe and account for in methodology courses. This study, like many others, relied on case studies to obtain data on student teaching. While this is useful, a wider variety of research designs would yield more dynamic and causal understandings of this critical experience.

With respect to the development of teacher efficacy beliefs, each type of clinical experience contributes to varying degrees of strength (Bandura, 1997). Observations that occur in early methods courses serve as vicarious experiences for pre-service teachers. The extent to which these experiences contribute to teacher efficacy beliefs is dependent on the degree to which the pre-service teacher identifies with the teacher who is being observed. Vicarious

experiences, in which the observer closely identifies with the person modeling, will contribute more information to efficacy beliefs. Feedback from professors and peers will also provide information that will inform efficacy beliefs. Further influencing efficacy beliefs, the student teaching experience provides an opportunity to engage in mastery experiences (Bandura, 1997). As teachers gain experience, their efficacy beliefs appear to become more stable and resistant to change (Henson, 2002; Tschannen-Moran et al., 1998).

Pre-service teachers appear to perceive the content of their coursework as lacking a strong emphasis on the five facets of reading, as indicated as critical by the NRP (Salinger et al., 2010). On the other hand, field experiences are typically reported as having a strong emphasis on these facets. Student teaching is the culminating field experience of teacher preparation programs, which is highly valued by teachers and school administrators alike (Greenberg et al., 2010). The experience has been reported to influence the development of teacher efficacy beliefs (Kent, Giles, & Hibbert, 2013). Additional study is needed to examine the relationship of LPCK and LTEB during the student teaching process and any changes to these constructs during this period.

Summary

Teacher efficacy beliefs began from a confused beginning; however, ample research that followed has clarified the construct and underscored its influence in the classroom (Tschannen-Moran et al., 1998). Teacher efficacy beliefs have been suggested to serve as a mediator between knowledge and action (Raudenbush et al., 1992). The integrated model of efficacy beliefs attempts to explain how knowledge may contribute to the construction and subsequent evaluation of efficacy beliefs (Tschannen & Moran, 2001). Although both efficacy beliefs and pedagogical content knowledge are content-specific constructs, only recently have measures

been developed to facilitate their assessment. Studies that have targeted both efficacy and knowledge within the realm of literacy have for the most part targeted literacy content knowledge for alphabetics. These studies have investigated the relationship between literacy content knowledge and feelings of competence and their authors have reported that these constructs are related, though the direction of this relationship has not been conclusively determined (Cunningham et al., 2004; Spear-Swerling et al., 2005, Washburn et al., 2010). Both LPCK and LTEB may be subject to change during teacher preparation (Kent et al., 2013). Student teaching is typically the final requirement of the teacher preparation program and may provoke change in one or both of these constructs due to the change of environment and the accumulation of mastery experiences of the realities of teaching. Some evidence suggests that pre-service teachers lower their standards for teaching to buffer against the negative implications of overly optimistic efficacy beliefs (Woolfolk-Hoy, 2000). Teachers' LPCK would appear to contribute to LTEB, given that an evaluation of one's capabilities includes a review of one's knowledge. However, the extensive literature review conducted as a part of this study and summarized here has failed to reveal any extant studies that have been conducted using reliable and valid measures in order to investigate if these constructs are related. Similarly, no work has been done to establish if the nature of this relationship changes during the course of student teaching. This study will aim to fill this gap in extant knowledge and will seek to examine if a relationship exists between these constructs in pre-service teachers during their student teaching and document if any changes to the nature of this relationship occur during this period.

CHAPTER 3: METHODS

Research Questions

The purpose of this study was to examine if a relationship exists between pre-service literacy teacher efficacy beliefs (LTEB) and early literacy pedagogical content knowledge (LPCK). If a relationship is found to exist, a follow-up question will investigate whether the magnitude of this relationship changes during the course of the student teaching placement. Since student teaching is an enactive mastery experience, which holds the most influence over these beliefs (Bandura, 1997), it may yield a change in teachers' efficacy beliefs. Additionally, given that pre-service teachers report that, in their view, field placements like student teaching include more of a focus on the five essential literacy components as identified by the NRP (NICHD, 2000; Salinger et al., 2010), their LPCK may also experience a change during this period. As a result, it is important to examine if exposure to the realities of literacy instruction in early elementary classrooms provokes any changes in the beliefs or knowledge of pre-service teachers.

Primary Research Questions

(1) Is there a relationship between literacy pre-service teacher efficacy beliefs and literacy pedagogical content knowledge?

(2) If a relationship exists, does the magnitude of this relationship change over the course of student teaching?

Secondary Research Questions

(3) Do literacy efficacy beliefs significantly change during the student teaching placement?

(4) Does literacy pedagogical content knowledge significantly change during the student teaching placement?

Participants and Setting

The study participants were the students at the City University's Main Campus and were recruited from five sections of a student teaching seminar course in the spring semester of 2013. The students in these practicum courses were beginning their student teaching placement as a part of the final requirements for graduation. Permission to conduct the study was obtained from the university's Institutional Review Board on November 13th, 2012 (Appendix E). The initial respondent pool consisted of 72 early childhood education majors, who were scheduled to complete their student teaching in the spring semester of 2013. After excluding participants whose responses to the surveys were incomplete, 67 pairs of surveys were retained for analysis. While the data were collected at both the beginning and end of the student teaching placement for all 67 participants, a decision was made to restrict the sample to student teachers who were assigned to kindergarten, first and second grade classrooms because of the high emphasis of early literacy instruction in these grades.[1] The surveys of these participants were collected at two time points. The first round of data was collected between January 22nd and 30th, 2013, which constituted the first two weeks of student teaching. The second and final round of data collection occurred in the last three weeks of the student teaching placement (April 17th-May 2nd, 2013).

Measures

Student Teacher Information Survey

The participants were asked to complete several questions providing personal and professional information, including age, gender, amount of professional training experience,

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[1] Parallel analyses were performed on the full sample and similar results were found. As the pattern of results was the same for both the full and the restricted sample, the discussion pertaining to the additional analysis will highlight the results of the restricted sample, even though the full sample yielded similar findings.

assigned grade of their student teaching placement, geographic classification (urban, suburban, rural) of the assigned school, as well as type of school (public, charter, or private). The responses to the professional training options given in the survey were given in a binary, "yes" or "no", format. The professional training options listed specific reading program training, including "Orton-Gillingham", "Wilson Language Training", "Lindamood-Bell Learning Processes", "Reading Recovery", "Fundations", "Just Words", along with a space titled "Other" in which participants could specify other training programs they had participated in.

Literacy Pedagogical Content Knowledge

In the recent decade, increased interest in the relationship between teacher preparedness and student outcomes has resulted in studies investigating what explicit knowledge teachers must have to teach reading (National Reading Panel, 2000; Snow et al., 1998). Most of these studies have focused on specific domains of specialized literacy content knowledge. In particular, the focus has centered on word structure and phonology (Moats, 1994, 2000; Mather et al., 2001; Spear-Swerling & Brucker, 2004, 2006; Washburn et al., 2010; Bos et al., 2001; Spear-Swerling et al., 2005; Cunningham et al., 2004; McCutchen et al., 2002). However, reading is a complex and multidimensional skill. As a result, it stands to reason that teachers need dynamic, multidimensional knowledge for effective instruction of literacy. Furthermore, beyond the declarative knowledge required to teach reading, teachers need to be able to access and use this knowledge in a variety of contexts. Pedagogical content knowledge, a facet of knowledge that synthesizes content knowledge and pedagogy, embeds knowledge in practice (Snow et al., 2005).

In this study, the Teacher Knowledge of Reading and Reading Practices (TKRRP) was chosen as the measure of LPCK for several reasons (Carlisle et al., 2008). The TKRRP is a

multiple-choice assessment that measures the domain knowledge that teachers use to teach early reading. It consists of 13 questions, of which three of the questions asking than one item. Thus, there are a total of 22 items on the TKRRP.

Initially, the breadth of the measure was attractive, as it covers not only word structure and phonological awareness, but also text comprehension. Given that reading is a multidimensional skill with an ultimate focus on comprehension, it seems critical to ensure that a measure of LPCK includes items that address comprehension. The TKRRP includes items that address word structure target phonological and phonemic awareness, sound-symbol correspondence, and word frequency (Phelps & Schilling, 2004). Items addressing comprehension cover morphology, vocabulary, text genre, fluency as well as comprehension strategies (Phelps & Schilling, 2004).

Beyond these topic areas, the TKRRP was selected because of the manner in which it assesses LPCK. Rather than including items that aim to assess knowledge in a decontextualized presentation, the measure assesses situated knowledge of reading. The construct examined in this study is pedagogical content knowledge, sometimes defined as the "special amalgam of content and pedagogy that is uniquely the province of teachers; their own special understanding" (Shulman, 1987, p. 8). Since PCK is knowledge that makes content most usable for students, it seems impossible to segregate it from student work samples. In the TKRRP, the respondents are asked to evaluate work products, curricula, questioning techniques, and engage in error correction, as well as explain student performance (Phelps & Schilling, 2004).

Test developers reported that the psychometric qualities included in TKRRP were established using a sample of 1,653 teachers working kindergarten through third grade (Carlisle et al., 2008). In an ordinal factor analysis, the TKRRP was shown to be best described by two

77

factors, with only two items representing the second factor. In subsequent scaling analyses, all questions were found to form a single scale, with all items achieving adequate fit (Carlisle et al., 2008). Using a two-parameter item response theory analysis, the items were found to represent a range of difficulty from -2.423 to 1.630.

The authors reported internal consistency of $\alpha = .756$ for the TKRRP. The measure was found to be most reliable for teachers who performed 1.25 standard deviations below the mean to approximately 1.5 standard deviations above the mean. This is important, as the present study focuses on pre-service teachers, who will likely demonstrate low knowledge levels. In previous studies, pre-service teachers have been found to be significantly less knowledgeable than in-service teachers (Mather et al., 2001).

The TKRRP validity was established by analyzing the quality of teachers' lesson plans during a literacy block. After comparing the lessons of teachers exhibiting high and low knowledge against 13 criteria, the teachers' knowledge was found to be significantly associated with the quality of reading lessons ($\beta = .264$, $p < .009$) (Phelps & Schilling, 2004). Additional concurrent validity was established by correlating performance on the TKRRP with other characteristics used to describe teacher quality, including years teaching and overall professional development. There was a small but significant correlation of professional development and TKRRP ($r=.085$, $p < .01$) (Carlisle et al., 2008).

Literacy Teaching Efficacy

According to Bandura (1997), teaching efficacy is a context-specific construct. As a result, global measures of teaching efficacy are not accurate measures, since efficacy evaluations

can change based on a variety of contextual factors. While the teaching efficacy construct evolved and measures were developed to target specific content areas, literacy was largely ignored until very recently. Tschannen-Moran and Johnson (2011) created a measure utilizing the integrated teaching efficacy model. The development of the original 33 items specific to a diverse variety of literacy instruction was based on the Standards for the English Language Arts (NCTE/IRA) and the IRA's Standards for Reading Professionals. Content of the items included ability to use word study, decoding and comprehension strategies, modeling effective strategies, integrating instruction across language arts, grouping practices, use of a wide variety of genres, meeting the needs of both high ability and struggling readers, and the ability to motivate students to value reading (Tschannen-Moran & Johnson, 2011). The authors sought to establish content validity of their instrument by seeking input from a panel of experts from the field of reading and literacy instruction. The items require a response on a 9-point Likert scale, with the anchors ranging from 1 – not at all, through 3 – very little, 6 – some influence, and 7 – quite a bit, to 9 – a great deal. This measure was chosen as the assessment of literacy teaching efficacy in this study, as it reflects the most recent developments in the construct. Only one other measure of literacy teaching efficacy beliefs was located in the literature (Szabo & Mokhtari, 2004). This measure, however, adapted from a general teaching efficacy scale, retained theoretical and psychometric weaknesses evident in the original and was thus not selected for use.

Test authors utilized exploratory factor analysis to eliminate items that did not adhere to a coherent factor structure as well as to test the construct validity of the scale (Tschannen-Moran & Johnson, 2011). A total of 11 items were removed due to low communalities and factor coefficients below .50 (Tschannen-Moran & Johnson, 2011). Multiple strategies were employed to determine the factor structure, including eigenvalues exceeding 1.0, scree analysis, clarity of

factor structure, and interpretability of factors. Two factors emerged from the analysis, explaining 62% of the variance in TSELI. However, as the factors were strongly correlated (r = .81, p < .01), a Varimax rotation was employed (Tschannen-Moran & Johnson, 2011). In addition, ten items had coefficients above .4 on both factors, necessitating a second order factor analysis, which yielded a single factor. All 22 items loaded on this factor, as well as held strong factor coefficients. The scale's reliability was assessed using Cronbach's alpha and resulting in an alpha coefficient of .96. Confirmatory factor analysis was subsequently used to establish concurrent validity against the Teacher Sense Efficacy Scale. The results supported the notion that teacher self-efficacy is a multidimensional construct based on a variety of sub skills (Tschannen-Moran & Johnson, 2011). This measure was chosen as the instrument to assess teacher literacy efficacy in this study, as it draws from the integrated model of teacher efficacy and minimizes the theoretical confusion that earlier instruments exhibited.

The full scale of the measure includes 22 items that assess a teacher's beliefs in his or her ability to carry out a variety of literacy-based instructional tasks. These tasks addressed a teacher's ability to utilize literacy data for instruction, provide feedback on students' decoding, encoding and writing abilities, encouraging motivation to read, as well as selecting and leveling literature. Because the scope of the TSELI extended beyond the scope of the TKRRP, a subscale that limited the scope to match that of the TKRRP was created. The limited subscale consisted of 14 items that addressed teachers' beliefs in their ability to utilize literacy data for instruction, provide specific feedback for encoding and decoding tasks, and teachers' ability to select a text that was decodable for the present abilities for a given student.

Procedure

80

Study materials, including the TSELI, TKRRP, and student information sheet, were collected at two time points. The researcher visited the seminar classroom and administered the study materials either before or after the class began. The first round of data was collected between January 22nd and 30th, 2013, which corresponded to the first two weeks of the participants' student teaching placement. At this time, the study purpose was explained and the participants completed the consent forms. On average, the survey took about 20 minutes to complete. The participants were told that the materials would be administered once again, at the end of their student teaching placement. The second and final round of data collection occurred in the last three weeks of the student teaching placement (April 17th-May 2nd, 2013). Completion of study materials at both time points enabled participants to have the chance to win one of two $50.00 gift cards. Following the second data collection, two participants who were chosen at random were contacted via email and sent the gift cards. No additional communication was held between the researcher and the study participants.

Data Analysis

A variety of statistical analyses were performed to examine the nature of the relationship between LPCK and LTEB and any changes to each of these variables during the course of student teaching. Descriptive analyses were performed to analyze this sample of pre-service teachers completing their student teaching assignment.

Reliability analyses were conducted for both the TSELI and TKRRP. Internal consistency reliability analyses aimed to establish whether all items on the measures had suitable correlations, indicating measurement of the same construct. An alpha of .7 would be indicative of acceptable levels of reliability.

Two primary research questions were addressed in this study. The first, "Is there a relationship between literacy teaching efficacy and literacy pedagogical content knowledge", was examined using a correlational analysis of scores on the TSELI and the TKRRP at two time points—at the beginning of the student teaching experience, and following the student teaching experience. As Pearson's product moment correlation was used, a positive correlation would indicate that students who score higher on efficacy beliefs are likely to score higher on literacy PCK measures as well. No correlation would indicate that these constructs operate independently of each other.

The second primary research question, "Does the magnitude of this relationship change over the course of student teaching?" was examined by comparing the pre-student teaching correlation score of LPCK and LTEB and the post-student teaching score of LPCK and LTEB using Raghunathan, Rosenthal, and Rubin's test (Uitenbroek, 1997). A significant result would indicate a change in the relationship between these variables after the student teaching experience. On the other hand, a non-significant result would indicate no change in the relationship between these variables during this period.

Several secondary research questions were also examined in this study. The question "Did literacy efficacy beliefs change during the course of student teaching?" was examined using paired t-tests to compare pre-test literacy efficacy with post-student teaching efficacy beliefs. A positive significant result would indicate that students' efficacy beliefs increased significantly during the student teaching placement, whereas a non-significant result would indicate no change in literacy efficacy beliefs.

An additional secondary question addressed changes in LPCK beliefs during the student teaching placement. Paired t-tests were used to compare pre- and post-student teaching literacy

PCK. Thus, a positive significant result would indicate that a student's level of PCK has risen significantly during the student teaching placement, and a non-significant result would indicate no change.

CHAPTER 4: RESULTS

Introduction

The results of this study will be discussed in five sections. Section 1 will present the demographic data on the participants, while Section 2 will describe the results of the pilot analyses leading up to this study. The variables and the measures used in the study will be presented in Section 3, whereas Section 4 will consist of two sub-sections. The first will report the results of the analyses relevant to the primary research questions this study aimed to address, while the additional analyses pertaining to the secondary research questions will be discussed in the second part. The final section will present a summary of the results of this study.

Section 1: Participant Characteristics

A total of 72 subjects completed surveys at both time points. Five pairs of surveys were excluded from analyses due to a high percentage of incomplete responses. Surveys with more than 20% of items missing were excluded from the analyses. Sixty-seven pairs of surveys remained for analysis. Empirical evidence indicates that the greatest improvement in student reading skills occurs in early grades and becomes relatively slow during third grade (Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998). Teachers who have experience in these early grades are reported to be stronger in different facets of literacy pedagogical knowledge and skills (Mather et al., 2001). Given this emphasis of the acquisition of early literacy skills in kindergarten, first, and second grade, combined with the data suggesting that teachers who work with these grade levels demonstrate more facility with aspects of literacy knowledge, the aforementioned sample was further restricted to pre-service teachers assigned to kindergarten, first, and second grade. This yielded a final sample of 36 pairs of surveys, which were subjected to the analysis discussed here. Nonetheless, all analyses were still performed on both the full

sample and the restricted sample. However, as the pattern of results was similar for both, all the results discussed hereafter will pertain to the restricted sample, from which inferences for the full sample can be made.

The participants' demographic data relevant for this study is presented in the table below.

Table 4: *Participant Demographics*

Gender		N	%
Male		2	5.6%
Female		34	94.4%
	Total	36	100%
Grade Assignment		N	%
Kindergarten		7	19.4
First		16	44.4
Second		13	36.1
	Total	36	100%
Type of School		N	%
Charter		3	19.4
Public		32	44.4
Private		1	36.1
	Total	36	100%
School Location		N	%
Urban		24	66.7
Suburban		11	30.6
Rural		1	2.8
	Total	36	100%

As the table above indicates, the study participants were overwhelmingly female (94.4%), which is unsurprising given the over-representation of females in elementary teaching positions (U.S. Department of Education, 2012). In addition, the participating teachers were mostly likely to be assigned to a teaching placement in an urban public school. In addition, student teachers were most frequently assigned to first grade classrooms (44.4%), followed by second grade classrooms (36.1%), with kindergarten classrooms (19.4%) having the lowest assignment percentage. Ethnicity data was not collected for this study.

Section 2: Pilot Results

To the knowledge of this researcher, the TSELI and TKRRP had not been previously researched with a pre-service teacher population. Because of this, a pilot study was conducted to establish reliability for each of the measures for this population. Both measures were given to a sample of 14 pre-service teachers in the third year of their program, none of whom would be participating in student teaching in the spring semester of 2013. The following section will discuss the results of the pilot analysis of the TKRRP and TSELI separately.

Prior to performing the pilot study, IRB approval was obtained (see Appendix E). The TKRRP was administered to 14 pre-service teachers on November 13th, 2012. All students who were not scheduled to complete their student teaching in the spring of 2013 were invited to participate. Internal consistency reliability was established using Cronbach's alpha, whereby the initial reliability analysis indicated unacceptably weak alpha ($\alpha = .375$). Subsequent analysis of the items revealed seven items demonstrating a negative item to total correlation, indicating that they were not assessing the same construct as the other items. Additional analysis of the responses indicated a high degree of incomplete responses for several of these items. Removing these items from the analyses resulted in the alpha improving to an acceptable level ($\alpha = .75$). Nonetheless, these items were retained in the full-scale study, in order to assess the scale with a larger sample. Because this population may not have completed all of the literacy courses, as pre-service teachers who were about to begin student teaching would have, it is possible that they did not provide all the responses, as they lacked knowledge of the concepts covered in these items, which would likely not be the case in the full study sample.

The TSELI was also administered to the same group of 14 pre-service teachers on November 13th, 2012. Once again, the critical purpose was to establish the measure reliability,

given that, to the knowledge of the researcher, it had not been previously used in the pre-service

teacher population. As in its implementation with in-service teachers, the measure held very

high reliability levels with their pre-service counterparts ($\alpha = .96$)

The results of the pilot study indicated that the measures were reliable for the pre-service

teaching population, which justified their use in the full-scale study.

Section 3: Variables

This study was designed to analyze the relationship of literacy teaching efficacy beliefs

and literacy pedagogical content knowledge in pre-service teachers. These constructs were

measured by two surveys. The psychometric qualities of these surveys will be discussed below.

LPCK was measured using the TKRRP survey. The measure included 22 items that

assessed pre-service teachers' pedagogical content knowledge of phonology, orthography,

morphology, spelling, and comprehension, whereby the responses were given in multiple-choice

format. Internal consistency reliability was analyzed using Cronbach's alpha. Unlike the results

of the pilot study, none of the items demonstrated negative item to total correlations. The alpha

was found to be acceptable ($\alpha = .715$).

LTEB was measured using an adapted version of the TSELI questionnaire, which

consisted of 14 items that addressed teachers' beliefs in their ability to utilize literacy data for

instruction, provide specific feedback for encoding and decoding tasks, and teachers' ability to

select a text that was decodable for the present abilities for a given student[2]. These items align to

the scope of the TKRRP. The internal consistency reliability of the adapted version of this

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[2] The full scale of the measure includes 22 items that assess a teacher's beliefs in his or her ability to carry out a variety of literacy-based instructional tasks. Because the scope of the TSELI extended beyond the scope of the TKRRP, a subscale that limited the scope to align to the TKRRP was created. The limited subscale consisted of 14 items.

measure was determined using Cronbach's alpha. The alpha for the limited sub-scale focusing on early literacy skills was found to fall within acceptable range ($\alpha = .830$), which was comparable to that for the full scale of the measure ($\alpha = .899$).

Section 4: Results

Part 1: Major Research Questions

The following section will report on the analyses performed in order to answer each of the major research questions. Two primary research questions led this investigation, the aim of which was to examine if a relationship exists between LPCK and LTEB both at the beginning and end of student teaching and to analyze changes to the magnitude of this relationship over the course of student teaching.

The first question aimed to establish whether a relationship exists between LPCK and LTEB at the beginning of the student teaching placement. A Pearson product moment correlation was used to determine if a relationship existed between these two variables. The results of the analysis did not indicate that the two variables were related $r(34) = .136, p = .429$.[3]

The same process was undertaken to determine if a relationship existed between LPCK and LTEB following the completion of student teaching. Once again, the results of the analyses did not indicate that these variables are related, based on $r(34) = -.136, p = .429$. Additional cross panel correlations are reported in Appendix H.

To determine if the magnitude of the relationship between LPCK and LTEB changed during the course of the student teaching placement, pre-test and post-test correlations were

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[3] Parallel analyses were performed on the full sample and a similar result was found. Because the pattern of results was the same for both the full and restricted sample, discussion of additional analysis will highlight the results of the restricted sample though the results were similar for the full sample.

analyzed to determine if they differed significantly using Raghunathan, Rosenthal, and Rubin's test (Uitenbroek, 1997). The results indicated that the difference between the relationship of LPCK and LTEB at pre-test and post-test was non-significant ($Z = 1. 1118, p = .2396$).

Part 2: Additional Analyses

To investigate whether LPCK changed during the course of the student teaching experience, a paired t-test was used to compare pre-test and post-test LPCK scores. The difference in the knowledge the participants demonstrated at pre-test was not significantly different from that shown at post-test. However, pre-service teachers did marginally improve in LPCK from pre-test ($M = 12.11; SD = 3.9$) to post-test ($M=13; SD = 4.04$), $t(35) = -1.67, p = .103$.

To investigate if LTEB changed during the course of the student-teaching experience, a paired t-test was employed, whereby the LTEB scores at pre-test were compared to those achieved at LTEB at post-test. The pre-service teachers significantly increased their literacy efficacy beliefs from pre-test ($M = 88.47; SD = 18.27$) to post-test ($M = 100.88; SD = 13.90$), $t(35) = -3.72, p = .001$). Further, Cohen's effect size value ($d = .76$) suggested a moderate to high significance.

Section 5: Results Summary

The results of the analyses did not reveal a relationship between LTEB and LPCK at either pre-test or post-test. These variables appear to act independently despite demonstrating a relationship in more experienced teachers (Cunningham et al., 2005; Spear-Swerling, 2006). Accordingly, when the correlations were tested to see if there was a significant difference between the two time points, none was found.

However, pre-service teachers did demonstrate a significant improvement in their literacy efficacy beliefs during their student teaching placement. This is in accordance with self-efficacy theory, which indicates that mastery experiences have the most profound impact on efficacy beliefs (Bandura, 1994, 1997).

Despite all study participants completing their student teaching placement in kindergarten, first, and second grade classrooms, in which early literacy content is a primary focus, pre-service teachers did not significantly increase their literacy pedagogical content knowledge, as indicated by the lack of significant improvement in their LPCK scores.

However, the participants' literacy teaching efficacy beliefs significantly improved over the course of the student teaching placement despite only marginal improvement of LPCK. The performance of the pre-service teachers on the measure of LPCK was congruent with previous investigations of pre-service teacher LPCK and content knowledge. The mean score of pre-test knowledge of 55% was below City University's standards for passing performance for academic work, which is set at 70%. Though teachers marginally improved at post-test, the mean score of 61% indicated that their performance did not meet the standards for passing performance.

CHAPTER 5: DISCUSSION

Summary of the Purpose and Results

This study sought to investigate the relationship between literacy teaching efficacy

beliefs (LTEB) and literacy pedagogical content knowledge (LPCK). Raudenbush et al. (1992)

suggested that efficacy beliefs mediate between knowledge and action. The authors further

called for an examination of knowledge and efficacy, with the aim of examining the relationship

between these constructs. Both pedagogical content knowledge and efficacy beliefs should be

considered as content-specific. However, despite a significant interest in improving student

literacy achievement, measures targeting LPCK and LTEB have only recently been developed.

Thus, the main research question in this study aimed to determine whether a relationship

between these variables does exist, and how it may change during the course of the student

teaching placement. This study was designed to aid teacher educators in understanding the

relationship of pre-service teachers' LTEB and LPCK.

In this study, the relationship between LTEB and LPCK was investigated using self-

reported data collected from 36 early childhood education major students completing their

student teaching placement in kindergarten, first, and second grade classrooms during the final

semester of their undergraduate course. LPCK was measured using the TKRRP survey. The

data collection instrument included 22 items that assessed pre-service teacher's knowledge of

phonology, orthography, morphology, spelling, and comprehension, whereby the responses were

given in a multiple-choice format. Internal consistency reliability was analyzed using

Cronbach's alpha and was found to be acceptable at $\alpha = .715$.

LTEB was measured using a subscale of the TSELI questionnaire, which includes 22

items that assess teachers' beliefs in their ability to carry out a variety of literacy based

instructional tasks. These literacy instructional tasks address a teacher's ability to utilize literacy data for instruction, provide feedback on student's decoding, encoding, and writing abilities, encouraging motivation to read, as well as selecting and leveling literature. Because the scope of the TSELI extended beyond that of the TKRRP, a subscale was created by retaining only the items that addressed early literacy skills. The limited subscale consisted of 14 items that address teachers' beliefs in their ability to utilize literacy data for instruction, provide specific feedback for encoding and decoding tasks, and teacher's ability to select a text that was decodable for the present abilities for a given student. The internal consistency reliability of the measure was found to be acceptable at α = .830, and was comparable to α =.899 for the full scale. Students were also asked to report their age, gender, type of school assigned, geographic classification of the school assigned, grade assigned, and if they had participated in specific early literacy-focused professional development. No data that would enable racial identification were collected. The dataset was subsequently analyzed using Pearson correlations, tested for the significance between correlations, as well as subjected to paired-samples-t-tests.

Substantial research has investigated many facets of teaching efficacy beliefs. However this study's subject-specific focus on literacy teaching efficacy beliefs and its relationship to literacy pedagogical content knowledge in pre-service teachers is unique. Bandura (1993) postulated that efficacy beliefs are a composite of cognitive, behavioral, social, and motivational skills. When efficacy beliefs are developed, an appraisal of one's capabilities is conducted (Tschannen-Moran et al., 1998). While it is known that people tend to overestimate their actual capabilities, previous literature suggests that pre-service teachers are likely to be particularly vulnerable to overestimating their capabilities, given that they are developing efficacy judgments without having much, if any, first-hand experience (Woolfolk, 2000). This appeared to be true in

this study as well, since efficacy beliefs, which were already high at the outset of student teaching, grew to be even stronger during the student teaching placement. Interestingly, their performance on the LPCK measure, which was on average only 55% accurate at the beginning of student teaching, remained stagnant through this period.

While teachers with high efficacy evaluations are associated with a number of positive outcomes, other literature indicates that both pre-service and in-service teachers have low degrees of specific early literacy content knowledge. Recent studies of pre-service teachers have indicated significant deficits in the relevant content knowledge for literacy instruction (Cunningham et al., 2004; Mather et al., 2001; Spear-Swerling & Brucker, 2004, 2006; Spear-Swerling et al., 2005). Though many critiques are evident in this literature, most condemning is the empirical impact of teachers possessing specific literacy pedagogical content knowledge on student achievement, as this link has not yet been conclusively demonstrated in rigorous research (Lyon, 2009). LPCK, however, has been previously demonstrated to predict student literacy gains (McCutchen et al., 2000; Piasta et al., 2009). However, while previously no paper-and-pencil measure was available to assess this construct, a reliable and valid LPCK measure emerged recently. LPCK was chosen as the facet of knowledge for the focus of this study because of the preliminary indications that it influences student literacy gains. In addition, it is situating knowledge in practice, similar to literacy teaching efficacy beliefs. This study sought to investigate the relationship between these variables and determine how it changed though the extended mastery experience of student teaching. Specifically, this study addressed several research questions, the first one being:

1. Does a relationship exist between literacy teaching efficacy beliefs and literacy pedagogical content knowledge in pre-service teachers?

93

This research question explored the presence of a relationship between LTEB, an established highly powerful variable in teaching (Armor et al., 1976; Darling-Hammond, 2000; Hoy & Spero, 2005; Ross, 1994; Szabo & Mokhtari, 2004; Woolfolk & Hoy, 1990), and LPCK. This study investigated if a relationship was evident at both the outset and conclusion of the student teaching placement. The results of these analyses will be discussed collectively.

To answer if these variables are related, a Pearson product-moment correlation was calculated between the sum scores of the TKRRP and the adapted subscale of the TSELI. The analysis of the participants' responses indicated no relationship between LTEB and LPCK in this sample of pre-service teachers either before or after the student teaching placement.

This finding was surprising, given the role knowledge appears to play in the integrated model of efficacy beliefs used in this study. This model relies on an evaluation of one's abilities in the construction and subsequent re-evaluation of efficacy beliefs. The model cycles through various stages, including sources of efficacy information, analysis of the teaching tasks, and an assessment of personal teaching competence (Tschannen-Moran et al., 1998), to which the consequences of existing efficacy beliefs contribute.

Additionally, while previous studies examining content knowledge and efficacy beliefs had reported a significant relationship between these constructs, the direction of this relationship was mixed. Some indicated a positive relationship (Spear-Swerling et al., 2005), indicating that teachers with higher content knowledge would exhibit higher efficacy beliefs. Other studies reported a significant negative relationship between content knowledge and efficacy beliefs (Cunningham et al., 2004).

However, the present study examining LPCK and LTEB did not yield any relationship. It is possible that this particular facet of knowledge does not contribute to efficacy beliefs. Perhaps

because content knowledge is a more direct form of knowledge, it informs efficacy beliefs, as opposed to pedagogical content knowledge. Perhaps, in the translation process of LPCK, this knowledge becomes less salient to efficacy beliefs. Additional study will need to occur to examine if similar results would be found with a wider variety of subjects. In order to arrive at a definitive answer, research in a wider variety of subjects should be conducted.

It is possible that no relationship was demonstrated in this study because of the choice of the study participants. Perhaps pre-service teachers are too naïve to understand and fully appreciate their own possession, or lack, of relevant knowledge. Pre-service teachers may not be aware what they do not know and are unable to exercise sophisticated task analyses that would exert influence on their efficacy beliefs. Perhaps examining these constructs in experienced teachers may yield alternative results.

Another explanation for these results may be in the study's use of an extensive assessment of pre-service teachers' efficacy beliefs, rather than the more simplistic assessment of a teacher's perceived competence that has been utilized in previous studies, where content knowledge was the focus. Previous studies in which a relationship was found between competence and content knowledge typically employed a single-item measure, asking generally "How competent do you feel to teach reading?" (Cunningham et al., 2004; Moats, 1994; Spear-Swerling, 2009; Spear-Swerling & Brucker, 2004, 2006; Spear-Swerling et al., 2005). The reliabilities of these measures are therefore questionable. Similarly, measures of teachers' literacy content knowledge used in the extant studies had low or no reported reliabilities. These measures were, furthermore, often narrowly restricted to phonological and orthographic knowledge. One of the expressed goals of this study was to examine the presence of a relationship between these constructs using instrumentation that covered more dynamic

conceptions of LPCK while holding adequate reliability and validity. The results of this study indicate that increased comprehensive applied knowledge does not predict that one will believe oneself to have higher efficacy.

The results of these analyses indicate that a section of the pre-service teacher population exhibits a discrepancy between LTEB and LPCK. While the discriminant quantity of knowledge required to effectively teach literacy has not yet been established, discrepant levels of efficacy and knowledge may be associated with instructional teaching decisions. Woolfolk-Hoy (2000) suggested that pre-service teachers whose actual performance does not meet their expectations might lower their future expectations to bridge the discrepancy between their performance and efficacy beliefs.

The impact of teachers lowering their performance standards is at present unknown. Another potential consequence of the incongruent LTEB and LPCK may be in the teachers' participation in future professional development programming targeting literacy initiatives. Because teachers may believe that their knowledge and practices comprise effective instruction, they may feel that there is no need or reason to change. Additionally, even teachers who may participate in professional development because they are required to do so may be resistant and opt not to utilize any of the content delivered during these efforts. Alternatively, those teachers who exhibit low efficacy beliefs and high degrees of knowledge may dedicate time and effort to improving their knowledge, which would be better utilized by focusing on improving other aspects of instruction. Additionally, this discrepancy might provoke undue stress and anxiety on the teacher. This study was a preliminary investigation into LTEB and LPCK and much more research needs to be conducted to clarify if discrepant beliefs predict any instructional decisions or any student literacy achievement. Furthermore, a more comprehensive study of literacy

efficacy beliefs, LPCK, as well as observation of instruction and measures of student literacy gain or achievement, would be informative of the roles of these constructs and any associations they have with other paradigms that occur in the classroom system.

The second primary research question guiding this study asked:

> 2. Would the magnitude of the relationship between literacy efficacy beliefs and literacy pedagogical content knowledge change during the course of the student teaching placement?

This research question examined if the degree of the relationship between LTEB and LPCK changed during the course of the student teaching placement. After comparing the Pearson correlations obtained before student teaching and following its completion, no significant difference in the relationship was found. Given that no relationship between LTEB and LPCK existed at either time point, it is not surprising that no significant difference was found in the relationship between LPCK and LTEB from pre-test to post-test.

The results of this analysis may indicate that the student teaching placement duration is not sufficiently long for pre-service teachers to experience the disequilibrium that additional experience may bring. Perhaps targeting novice in-service teachers who have gathered more experience and knowledge would have yielded different results. Another explanation for the results of this study might be that the design of student teaching, which limits the true responsibilities of teaching, shields a pre-service teacher from the true realities of leading a classroom. Yet another possibility is that the cooperating teacher working with the student teacher in the placement did not possess deep LPCK, which would preclude pre-service teachers, who may not know what they do not know, from recognizing the limitations to their own LPCK. Additional research is needed to clarify why this may be the case.

Additional analyses examined changes to LTEB and LPCK during the course of the student teaching placement. The research questions and the pertinent analyses and results will be discussed separately below.

3. Do literacy efficacy beliefs change over the course of the student teaching placement?

The results of this analysis yielded a significant improvement from before student teaching to after student teaching. The results support Bandura's belief that enactive mastery experiences most heavily influence efficacy beliefs (Bandura, 1997). Previous literature for general teaching efficacy beliefs reports a variety of changes to efficacy beliefs over the course of one's teaching career. Early studies that employed the two-prong efficacy model reported a sharp decline in outcome expectancy beliefs with some increase to the personal teaching beliefs (Plourde, 2002). This is in line with literature that reports novice teachers experiencing a "reality shock" (Veenman, 1984, p. 143) as they navigate more complex classroom realities than initially anticipated. Other studies report an increase in efficacy beliefs as teachers amass experience that strengthens their beliefs (Cole, 1995; Kent, et al., 2013; Le & Zhang, 2000). One possible explanation for the rise in efficacy beliefs during this period may be due to the structure of the student teaching experience. When pre-service teachers engage in student teaching, they have the opportunity to gain both enactive mastery experience as well as vicarious experiences demonstrated by their cooperating teacher. In addition, the relationship of the cooperating teacher in the classroom ideally provides constructive criticism and feedback after student-teachers implement lesson plans. Further feedback is provided by university supervisors during scheduled observations. Feedback plays a role in the evolution of future efficacy beliefs. Additionally, student-teachers participate in a seminar class which fosters reflection and evaluation of student-teachers' performance and beliefs. This increased reflection also likely

98

contributes to increased efficacy beliefs. Recent studies of literacy teaching efficacy beliefs of pre-service teachers found that pre-service teachers' literacy efficacy beliefs in this study increased as they participated in a reading clinic, where an explicit link to literacy was clearly made (Al-Otaiba et al., 2002; Spear-Swerling, 2009). Teachers in the present study also significantly improved literacy teaching efficacy beliefs though they did not participate in a mastery experience where the explicit target was singularly literacy based. The similar results prompt further investigation into whether the type of mastery experience exerts a specific influence over literacy efficacy beliefs. The results of this study suggest that even general mastery experiences such as student teaching in which the pre-service teachers assume a diverse set of responsibilities for the whole of the classroom, will promote improved efficacy beliefs.

4. Does literacy pedagogical content knowledge change over the course of the student teaching placement?

Despite a significant improvement in literacy efficacy beliefs, the analyses of the data specific to LPCK during the student teaching experience for this sample did not indicate a significant change. The sample for this study was intentionally restricted to pre-service teachers assigned to kindergarten, first, and second grade classrooms, due to the specific focus of these grade levels on the development of early literacy skills. While no measure of pre-service teacher's perception of time spent on literacy tasks was collected, one would expect that pre-service teachers assigned to these classrooms would have observed, participated, and/or lead several lessons, whereby these activities would have constituted a significant amount of time during their placement. Additionally, no measure of the quality of the student teaching placement was employed in this study. An abundance of literature reports on the multitude of factors that can make the student teaching experience a positive, valuable one. These may include the relationship between the student teacher and the cooperating teacher, the skills of the

99

cooperating teacher, as well as contextual factors of the school and classroom (Maloch, Fine & Flint, 2003). Several authors have reported that LPCK increased when pre-service teachers and in-service teachers participated in literacy-focused professional development, coursework, or mastery experiences (Al-Otaiba & Lake, 2007, Spear-Swerling, 2009; Spear-Swerling & Brucker, 2004). However, most of these studies investigated LPCK in coursework and field experiences that focused on literacy. In this study, the student teaching placement did not have a specific focus on literacy, but rather a general assignment to encompass all the duties that an early childhood educator performs. As opposed to efficacy beliefs, where it appears that general experience prompts improvement in literacy efficacy beliefs, perhaps more of a specific and explicit focus on literacy needs to occur to enable pre-service teachers to improve their LPCK. Further research investigating this potential link is warranted, as preliminary studies indicate LPCK is related to student literacy gains (McCutchen et al., 2000; Piasta et al., 2009).

Pre-service teachers in this sample performed similarly to other teachers in previous studies with respect to their poor performance on measures of LPCK. At pre-test, these pre-service teachers scored an average of 55% and a slight but non-significant improvement was seen at post-test, with an average of 60%. Both scores, however, failed to indicate a mastery of relevant material, as perceived by academic standards at the University, which are set at 70% accuracy in test responses. Analyses of course syllabi for literacy-related courses for this population of pre-service teachers documented that these topics were addressed in courses taken prior to student teaching. The results of this study indicate that it cannot be assumed that pre-service teachers will be able to effectively utilize the information covered in previous coursework and make it relevant to the student population they are assigned to without proper support.

Limitations of the Study

Several factors limit the interpretation of the results yielded by this study. Most crucially, the data collection did not extend to any information on the student teaching placement. A number of factors exert influence over the success or failure of the student teaching placement, including the relationship with the cooperating teacher, school environment, and ability levels of the students in the placement, as well as the compatibility of communication styles between the student teacher and the cooperating teacher. For example, the quality of the cooperating teacher can exert influence over the pre-service teacher's acquisition of LPCK (Roehrig et al., 2008). Highly qualified cooperating teachers will impart more knowledge and skills that would their less qualified colleagues (Roehrig et al., 2008).

Additionally, despite the expectation that student teachers would have observed, participated, or implemented lessons for literacy, no information was gathered to validate this assumption. Given the placement of pre-service teachers in kindergarten through second grade classrooms, it would be reasonable to expect that early literacy instruction was a priority. However, no data were collected and thus it is not known how much time or what types of activities the pre-service teachers were exposed to during this placement. As student teachers, they may have been relegated to do other tasks while literacy lessons occurred. In this study, LPCK is defined as a specific knowledge of English phonological, orthographic, and morphological systems, as well as vocabulary, comprehension processes and strategies, and fluency development. This researcher does not believe this is the only facet of knowledge one needs to be a successful literacy teacher, but is rather only a part of a very complex network of constructs, namely classroom management, student rapport, assessment knowledge, and the ability to analyze teaching tasks.

The present study employed the use of a convenience sample. Thus, it is acknowledged that the general population of pre-service teachers would possibly have had student teaching placement in a wider variety of schools. The majority of schools to which the study participants were assigned were urban, public schools, which might have played role in the study findings, given that district socio-economic status and size have been found to exert a negative influence on student outcomes (Folwer & Walberg, 1991). While many researchers use convenience samples, this approach limits the generalization of the findings of any study. This limitation exists for this study as well.

<center>Implications for Theory and Practice</center>

The most powerful implication of this study is its contribution to the literature on the absence of relationship between LTEB and LPCK. The study findings indicate that LPCK and LTEB were not related in this sample of pre-service teachers, either before or following student teaching. As these results contradict previous research of in-service teachers and recent investigations of pre-service teachers, they indicate that more work on this topic is required. However, as there is presently no consensus on the link between the two measures, no assumptions should be made regarding a teacher's LPCK based on LTEB scores. Previous investigations of teacher literacy content knowledge indicated a significant relationship with LTEB (Cunningham et al., 2002; Spear-Swerling et al., 2005). This study, which employed measurement tools with adequate technical properties, did not reveal any relationship between LPCK and LTEB. The results indicated that LPCK and LTEB operate and develop independently and, while the latter appears to increase over the course of student teaching, the former remains the same. These results appear to support the adage, "You don't know what you don't know". Pre-service teachers felt highly efficacious with respect to their teaching literacy,

<center>102</center>

whilst demonstrating accuracy levels that are widely considered to be unacceptable (less than 60%) for most educational settings.

Pre-service student teachers that took part in the present study did not improve their LPCK during the student teaching placement. If the student teaching experience is a mastery experience separate from instruction in literacy concepts, it should not be relied upon as a means to crystallize previous instruction or develop knowledge that may be critical for effective literacy instruction. Alternatively, field experiences that coincide with explicit coursework or training in literacy result in gains in LPCK (Leader-Rankin & Rankin-Erikson, 2013). Accordingly, the lack of gains in LPCK demonstrated during this field experience appears to support providing coursework or training that targets specific literacy skills that coincide with student teaching or other types of mastery experiences. Though the pre-service teachers included in the study had completed coursework that addressed the elements targeted on the TKRRP, this knowledge did not seem to come to the forefront during the assessment conducted either before or after student teaching. Pre-service teachers at this university completed a minimum of four literacy courses that, according to syllabi analysis, appeared to cover these concepts. However, exposure to these concepts alone did not appear to make a lasting impression on the skills of this sample of teachers. Thus, completing additional field experiences in which literacy content is targeted and expected to be demonstrated during a concurrent field experience may result in lasting gains in LPCK.

Implications for Future Research

A universally accepted definition of teacher quality is still lacking, as the debate regarding its determinants continues. Despite extensive resource investment in literacy professional development, the necessity of teachers gaining a specific degree of literacy

pedagogical content knowledge is not yet conclusive. Previous research designs (McCutchen et al., 2002; Piasta et al., 2009) have demonstrated how critical conducting observations of instruction are to examining facets of the classroom system. However, as the results of these studies have been mixed, broadening the teacher constructs being measured may help inform the relationship between teacher knowledge and student literacy efficacy. As a part of this effort, careful definition of student measures should also be considered. Rather than end-of-year student literacy achievement, gains in student literacy skills may be a better indicator of the link between the efficacy knowledge and student literacy abilities. Understanding the dynamics of this relationship may help provide clarity in what pre-service teachers need to know to deliver successful literacy instruction.

Additional lines of research should be pursued to further examine the development of literacy efficacy beliefs in pre-service and novice in-service teachers. This study was limited to the duration of the student teaching experience. However, it may be that literacy efficacy beliefs experience change when the teachers enter the classroom, and are required to assume the full responsibilities of the classroom and face all the difficulties that arise within this role. Furthermore, if changes to literacy efficacy beliefs do occur, relationships to literacy instruction should be examined through either live or videotaped observation.

Determining the level of LPCK that is optimal for pre-service teachers to hold upon graduation would be helpful in examining the level of focus teacher preparation programs need to apply on these concepts. Designing a study that assesses teacher literacy knowledge and identifies quartiles of instruction, whereby the relationship of teachers' level of knowledge with precisely defined measures of student literacy gain is examined would help illuminate this. The sample would need to be large and representative of the country. Moreover, it would be critical

to conduct observations of teachers' instruction to determine if teachers' knowledge relates to instructional practices.

The sample for this study was intentionally limited to pre-service teachers assigned to early elementary classrooms, where the general expectation would be that literacy instruction would take a prominent role in the curriculum. The results of this study indicated that LTEB improved by the end of student teaching, though no data on the amount of hours spent on literacy instruction during clinical experience was collected. Since it is advised that efficacy belief measures be context-specific, it would be interesting to investigate if the length of time spent in the corresponding context would exert influence on context-specific efficacy beliefs. This approach would help determine if context-specific efficacy beliefs increase as a result of global mastery experiences, or if mastery experiences that dealt explicitly with literacy instruction were needed to improve literacy teaching efficacy beliefs. Global mastery experiences may elevate teachers' sense of efficacy across all contexts, while literacy-explicit mastery experiences may provoke a sense of disequilibrium, which may invoke efficacy beliefs to remain stagnant or possibly decline.

Conclusions

The nation's current student literacy rates are widely seen as unacceptable (NCEE, 1983; NICHD, 2001; NCES, 2013). Recent research has established that teacher quality is the most influential in-school factor that affects students' academic performance. Armed with this knowledge, legislative action has increased the pressure on teachers to improve student literacy rates. Interest in identifying teacher variables that can predict student literacy achievement has increased dramatically. Efficacy beliefs have also been found to have many relationships with both student and teacher variables. However, it is important that efficacy beliefs be defined

within a given content, as teachers may feel efficacious for one content area, but not for another. This study suggests that LPCK does not contribute to LTEB for pre-service teachers, and no changes were evident as a result of pre-service teachers completing their student teaching assignment. The results indicate that these constructs are not related and operate independently at both the beginning and end of student teaching. Additional analyses also examined independent changes in LPCK and LTEB during this period. While efficacy beliefs significantly improved over the course of student teaching, pre-service teachers' LPCK did not change. Additional research is needed to determine if a certain threshold for LPCK is required to predict LTEB. Further investigation into the population of pre-service teachers who possess high degrees of efficacy beliefs and low levels of knowledge is also highly recommended. Research should address if this discrepancy predicts any instructional decisions or participation in professional development. The results of this study contribute to literature in both literacy teaching efficacy beliefs and literacy pedagogical content knowledge.

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APPENDIX A: TKRRP

1. Mr. Burnett noticed that some of his second graders are having difficulty reading common irregular words. To address this problem, Mr. Burnett created sets of words for students to practice. Which set is most suitable for this purpose? **(Circle One)**

    a. when, until, which, after

    b. sweet, sugar, milk, banana

    c. because, does, again, their

    d. light, house, my, they

2. In her kindergarten class, Ms. Frank uses several different tasks to help her students identify sounds in words. Which directions indicate the use of a blending task? **(Circle One)**

    a. "Put the sounds together to say the word /t/ /a/ /p/'.

    b. "Tell me the first sound of 'tap'".

    c. "Say 'tap'. Now say it again but don't say /t/".

    d. "Say each sound in 'tap'".

3. Mr. Rink asked an aide to present each of the follow words orally to a group of children and to have the children tell the aide how many phonemes (speech sounds) are in each word. Help create an answer key that Mr. Rink's aide could use by marking the number of phonemes contained in each word.

	1	2	3	4	5
Freight	☐	☐	☐	☐	☐
Ship	☐	☐	☐	☐	☐
Nation	☐	☐	☐	☐	☐

4. A parent asks you what to do to help Juan, her second-grade son, become a more fluent reader. Which of the follow recommendations is most likely to help Juan develop reading fluency? **(Circle One)**

    a. have Juan read each book several times.

    b. have him listen to books on tape

    c. have him read on his own for 20 minutes every evening

    d. read books to him every day

5. A new third-grade teacher is having trouble picking books that are at the right reading level for his students. He asks you how he can help a student figure out whether the book is too hard. You suggest that he tell the student: **(Circle One)**

    a. to pick books on topics he/she knows something about

    b. to avoid books with small print and few pictures or illustrations

    c. no to pick books with more than five hard words on a page

    d. not to select books written by unfamiliar authors

6. During reading, analysis of word structure would be a useful strategy for understanding which of the following words **(Circle One)**

    a. discriminate

    b. inalterable

    c. perspective

    d. institution

7. Mr. Danks, a kindergarten teacher, has students learn to recite nursery rhymes (such as Little Miss Muffet) and to sing songs (such as Twinkle, Twinkle Little Star). In what way are these activities most likely to support children's early reading development? Through fostering their _____ **(Circle One)**

    a. understanding of story structure

    b. enjoyment of literature

    c. development of vocabulary

d. development of phonological awareness

8. The following are common words that children are usually taught to read in grades one through three. Some are phonetically <u>regular</u> (i.e., they conform to frequently-taught phonic rules in English), whereas others are phonetically <u>irregular</u> (i.e., they are exceptions to phonic rules). **(Please mark (x) whether each of the following words is phonetically regular or irregular.)**

	Regular	Irregular
snowy	☐	☐
was	☐	☐
chunk	☐	☐
done	☐	☐
give	☐	☐
peach	☐	☐

9. Mr. Lewis' class has been learning spelling rules for adding "ing" to base words. He is looking for groups of words that illustrate the various rules to give his students a complex challenge. Which of the follow groups of words would best support this purpose? **(Circle One)**

a. hopping, running, sending, getting

b. hoping, buying, caring, baking

c. seeing, letting, liking, carrying

d. All of the word sets are useful for this purpose

10. Mr. Hamilton, a first-grade teacher, notices that Rafael spends much of his free time writing. He notes that Rafael misspells many words but that his misspellings suggest knowledge of some letter sound relations. For instance, he spelled *zipper* as *zipr* and *elephant* as *elifint.* To promote Rafael's spelling development, which would be the best step for Mr. Hamilton to take? **(Circle one)**

a. Engage Rafael in activities that promote phonological awareness

b. Teach him standard spelling patterns before he spends more time writing

c. Teach him standard spelling patterns within the context of his compositions

d. Encourage him to continue to write a lot.

11. Ms. Rico dictated the follow story to her class:

I have a black and white dog.
Her name is Skipper.
One day she went to my school.
She liked playing with the kids.

She looked at her students' papers. Jesse's paper looked like this:

I have a blk and wit bog.
Hra name is skpr.
Wone bay she wat to mui skul.
She likt playg wethe the kibs.

Which of the following words in Jesse's writing provide evidence that Jesse can identify the correct number of speech sounds in words? **(Mark "Yes" or "NO" for each word)**

	Yes	NO
"blk" for black	☐	☐
"wit" for white	☐	☐
"skpr" for skipper	☐	☐

12. Ms. Stanley, a kindergarten teacher, is preparing activities to teach phonological awareness in a developmentally appropriate sequence. Which of the following should she teach first? **(Circle One)**

    a. Matching word sounds and letters

    b. Identifying words that rhyme

    c. Identifying vowels that say their own name

    d. Counting the number of speech sounds in words

13. A first grade teacher is preparing a read-aloud lesson for her class. She is thinking about selecting four or five words from the story to discuss with the students. Which category of words below, if selected by the teacher, will <u>most affect</u> whether students will understand the story? **(Circle One)**

    a. names of characters

    b. the words that are hardest to pronounce

c.   words that students will encounter in other texts

d.   specialized words in the story

APPENDIX B: ADAPTED SUB-SCALE OF TSELI

	Please mark a single score for **EVERY** question.	Not at all		Very little		Some Influence		Quite a bit		A great deal
1	To what extent can you use a student's oral reading mistakes as an opportunity to teach effective reading strategies?	1	2	3	4	5	6	7	8	9
2	To what extent can you use a variety of informal and formal reading assessment strategies?	1	2	3	4	5	6	7	8	9
3	To what extent can you adjust reading strategies based on ongoing informal assessments of your students?	1	2	3	4	5	6	7	8	9
4	To what extent can you provide specific, targeted feedback to students' during oral reading?	1	2	3	4	5	6	7	8	9
6	How much can you do to meet the needs of struggling readers?	1	2	3	4	5	6	7	8	9
7	To what extent can you help your students monitor their own use of reading strategies?	1	2	3	4	5	6	7	8	9
9	To what extent can you get students to read fluently during oral reading?	1	2	3	4	5	6	7	8	9
10	To what extent can you model effective reading strategies?	1	2	3	4	5	6	7	8	9
11	To what extent can you implement effective reading strategies in your classroom?	1	2	3	4	5	6	7	8	9
12	To what extent can you help your students figure out unknown words when they are reading?	1	2	3	4	5	6	7	8	9
13	To what extent can you implement word	1	2	3	4	5	6	7	8	9

		1	2	3	4	5	6	7	8	9
	study strategies to teach spelling									
14	To what extent can you use students' writing to teach grammar and spelling strategies?	1	2	3	4	5	6	7	8	9
16	To what extent can you use flexible grouping to meet individual student needs for reading instruction?	1	2	3	4	5	6	7	8	9
21	How much can you do to adjust your reading materials to the proper level for individual students?	1	2	3	4	5	6	7	8	9

Please mark a single score for each question.

		Not at all		Very little		Some Influence		Quite a bit		A great deal
1	To what extent can you use a student's oral reading mistakes as an opportunity to teach effective reading strategies?	1	2	3	4	5	6	7	8	9
2	To what extent can you use a variety of informal and formal reading assessment strategies?	1	2	3	4	5	6	7	8	9
3	To what extent can you adjust reading strategies based on ongoing informal assessments of your students?	1	2	3	4	5	6	7	8	9
4	To what extent can you provide specific, targeted feedback to students' during oral reading?	1	2	3	4	5	6	7	8	9
5	To what extent can you adjust writing strategies based on ongoing informal assessments of your students?	1	2	3	4	5	6	7	8	9
6	How much can you do to meet the needs of struggling readers?	1	2	3	4	5	6	7	8	9
7	To what extent can you help your students monitor their own use of reading strategies?	1	2	3	4	5	6	7	8	9
8	To what extent can you provide your students with opportunities to apply their prior knowledge to reading tasks?	1	2	3	4	5	6	7	8	9
9	To what extent can you get students to read fluently during oral reading?	1	2	3	4	5	6	7	8	9
10	To what extent can you model effective reading strategies?	1	2	3	4	5	6	7	8	9
11	To what extent can you implement effective reading strategies in your classroom?	1	2	3	4	5	6	7	8	9
12	To what extent can you help your students figure out unknown words when they are reading?	1	2	3	4	5	6	7	8	9
13	To what extent can you implement word study strategies to teach spelling	1	2	3	4	5	6	7	8	9
14	To what extent can you use students' writing to teach grammar and spelling strategies?	1	2	3	4	5	6	7	8	9
15	To what extent can you model effective writing strategies?	1	2	3	4	5	6	7	8	9
16	To what extent can you use flexible grouping to meet individual student needs for reading instruction?	1	2	3	4	5	6	7	8	9

17	To what extent can you integrate the components of language arts?	1	2	3	4	5	6	7	8	9
18	To what extent can you get children to talk with each other in class about books they are reading?	1	2	3	4	5	6	7	8	9
19	To what extent can you recommend a variety of quality children's literature to your students?	1	2	3	4	5	6	7	8	9
20	To what extent can you provide children with writing opportunities in response to reading?	1	2	3	4	5	6	7	8	9
21	How much can you do to adjust your reading materials to the proper level for individual students?	1	2	3	4	5	6	7	8	9
22	How much can you motivate students who show low interest in reading?	1	2	3	4	5	6	7	8	9

APPENDIX D: PRE-SERVICE TEACHER INFORMATION SURVEY

Please answer the following questions.

1. Age: _____

2. Gender: _____ Male _____ Female

3. Please mark any of the following programs you have had training in

___ Orton Gillingham

___ Wilson Language Program

___ Fundations

___ Slingerland

___ Lindamood-Bell

___ Other: _____

4. What grade level are you be assigned to for your student teaching placement?
   a. K
   b. 1
   c. 2
   d. 3
   e. 4

5. Select what best describes the school you are being placed in for your student teaching placement?
   f. Urban
   g. Suburban
   h. Rural

6. Select what best describes the school you are being placed in for your student teaching placement?
   i. Charter
   j. Public
   k. Private

APPENDIX E: IRB APPROVAL FOR RESEARCH

TEMPLE UNIVERSITY®

Office for Human Subjects Protections
Institutional Review Board
Medical Intervention Committees A1 & A2
Social and Behavioral Committee B
Unanticipated Problems Committee

Student Faculty Conference Center
3340 N Broad Street - Suite 304
Philadelphia, Pennsylvania 19140
Phone: (215) 707-3390
Fax: (215) 707-9100
e-mail: irb@temple.edu

Certification of Approval for a Project Involving Human Subjects

Protocol Number:	21002
PI:	THURMAN, S.KENNETH
Review Type:	EXEMPT
Approved On:	13-Nov-2012
Approved From:	
Approved To:	
Committee:	B BEHAVIORAL AND SOCIAL SCIENCES
School/College:	EDUCATION (1900)
Department:	EDUCATION PSYCH, ORG & LEADERSHIP (19040)
Project Title:	Pre-Service Teacher Efficacy Beliefs and Literacy Pedagogical Content Knowledge

The IRB approved the protocol **21002**.

If the study was approved under expedited or full board review, the approval period can be found above. Otherwise, the study was deemed exempt and does not have an IRB approval period.

Before an approval period ends, you must submit a "Continuing Review Progress Report" to request continuing approval. Please submit the form **at least 60 days before the approval end date** to ensure that the renewal is reviewed and approved and the study can continue.

Finally, in conducting this research, you are required to follow the Policies and Procedures, the Investigator Manual, and other requirements found on the Temple University IRB website: http://www.temple.edu/research/regaffairs/irb/index.html

Please contact the IRB at (215) 707-3390 if you have any questions.

APPENDIX F: INFORMED CONSENT FORM

Title of the research study: Pre-Service Teacher Efficacy Beliefs and Literacy Pedagogical
Content Knowledge
Name and Department of investigator: Ken Thurman
                                        Department of Psychological, Organizational and
                                        Leadership Studies in Education

This study involves research. The purpose of the research is to examine the relationship between literacy teacher efficacy beliefs and literacy pedagogical content knowledge of pre-service teachers. Additionally, the study will examine the impact the student teaching experience has on this relationship.

What you should know about a research study:
- Someone will explain this research study to you.
- You volunteer to be in a research study.
- Whether you take part is up to you.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide, it will not be held against you.
- Feel free to ask all the questions you want before and after you decide.

The estimated duration of your study participation is 15-20 minutes.

The study procedures consist of completing two surveys at two points in time. The first will occur immediately following this class period. If you are unable to complete the survey immediately following this class period, you will be asked to schedule a time that is convenient to you. The second will occur immediately following a class period once the student teaching placement has ended. If you are unable to complete the survey at that time, you will be asked to schedule a time that is convenient to you.

There are no reasonably foreseeable risks or discomforts as a result of participating in this study.

The benefit you will obtain from the research is knowing that you have contributed to the understanding of this topic.

The alternative to participating is not to participate.

Please contact the research team with questions, concerns, or complaints about the research and any research-related injuries by calling 215-500-5552 or e-mailing tuc28780@temple.edu.

This research has been reviewed and approved by the Temple University Institutional Review Board. Please contact them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following: questions, concerns, or complaints about the research; questions about your rights; to obtain information; or to offer input.

Your signature documents your permission to take part in this research.

Signature of subject	Date

Printed name of subject

Signature of person obtaining consent	Date

Printed name of person obtaining consent

Confidentiality: Efforts will be made to limit the disclosure of your personal information, including research study records, to people who have a need to review this information. However, the study team cannot promise complete secrecy. For example, although the study team has put in safeguards to protect your information, there is always a potential risk of loss of confidentiality. There are several organizations that may inspect and copy your information to make sure that the study team is following the rules and regulations regarding research and the protection of human subjects. These organizations include the IRB, Temple University, its affiliates and agents, Temple University Health System, Inc., its affiliates and agents, and the Office for Human Research Protections.

Identifying information will be kept in a locked file in Ritter Hall. Only the Principle Investigator and investigation team will have access to this file. All study materials will be identified by an assigned participant identification number.

APPENDIX G: IRB APPROVAL FOR PILOT STUDY

TEMPLE UNIVERSITY®

Office for Human Subjects Protections
Institutional Review Board
Medical Intervention Committees A1 & A2
Social and Behavioral Committee B
Unanticipated Problems Committee

Student Faculty Conference Center
3340 N Broad Street - Suite 304
Philadelphia, Pennsylvania 19140
Phone: (215) 707-3390
Fax: (215) 707-9100
e-mail: irb@temple.edu

Certification of Approval for a Project Involving Human Subjects

Protocol Number:	**20947**
PI:	**THURMAN, S.KENNETH**
Review Type:	EXEMPT
Approved On:	01-Nov-2012
Approved From:	
Approved To:	
Committee:	B BEHAVIORAL AND SOCIAL SCIENCES
School/College:	EDUCATION (1900)
Department:	EDUCATION:PSYCHOGICAL STUDIES (19040)
Project Title:	Pre-Service Teacher Efficacy Beliefs and Literacy Pedagogical Content Knowledge

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The IRB approved the protocol **20947**.

If the study was approved under expedited or full board review, the approval period can be found above. Otherwise, the study was deemed exempt and does not have an IRB approval period.

Before an approval period ends, you must submit a "Continuing Review Progress Report" to request continuing approval. Please submit the form **at least 60 days before the approval end date** to ensure that the renewal is reviewed and approved and the study can continue.

Finally, in conducting this research, you are required to follow the Policies and Procedures, the Investigator Manual, and other requirements found on the Temple University IRB website: http://www.temple.edu/research/regaffairs/irb/index.html

Please contact the IRB at (215) 707-3390 if you have any questions.

APPENDIX H: CROSS PANEL CORRELATIONS

	Pre PCK	Post PCK	Pre Efficacy	Post Efficacy
Pre PCK	1			
Post PCK	.394*	1		
Pre Efficacy	. 136	. 113	1	
Post Efficacy	.321	-136	.249	1

Correlation is significant at the 0.05 level (2 tailed)