DATA LITERACY OF READING EDUCATORS: TEACHER PERCEPTION AND

KNOWLEDGE OF THE USE OF READING DATA TO INFLUENCE

INSTRUCTION

A Dissertation

by

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ABSTRACT

This dissertation is developed around two studies created with the goal of describing and quantifying current educators' knowledge and perceptions of reading assessment and subsequent data-based instructional decision making. Unique to the field, a critical component of this study is an emphasis on educators' development of *data literacy* as a knowledge base necessary to the successful education of students in today's classrooms.

Study 1 documents the development and validation of a new survey instrument, the *Perceptions, Knowledge, and Interpretation of Reading Assessment* (PKIRA) survey, to assess the perceptions and knowledge of current educators of reading/language arts in grades PK – 12. The final version of the PKIRA consists of five sections and/or subscales; 1) demographics, participants general experience and perceived instructional preparedness section; 2) teacher perception of reading assessment and instruction subscale; 3) teacher reading assessment knowledge and data literacy subscale; 4) teacher knowledge of language structure subscale; and 5) the teacher ability to use data to drive instruction open ended response section. The reliability and validity of this new instrument were analyzed using exploratory factor analysis, item response theory and inter-item correlations. Results indicate the PKIRA is a reliable and valid instrument to measure the knowledge and perceptions of inservice reading teachers.

The purpose of Study 2 was to collect data on the knowledge and perceptions from a unique group of inservice reading educators to further validate the PKIRA and

determine which aspects of teacher training or experience were associated with reading

content knowledge, reading assessment knowledge and data literacy knowledge.

Cronbach's alpha, confirmatory factor analysis, item response theory, and ANOVA were

used to analyze the data collected. Results provide further support for instrument

validation. Results also indicate participants' certification and master's degree status

have no statistically significant differences on their mean knowledge score. However,

differences in mean knowledge score were found to be associated with teachers' total

years teaching and more strongly with, their total years teaching reading.

The value of these studies lies in the creation and validation of a reliable new

survey instrument that can be used to support the growth and development of data

literacy in current educators nationwide. As the PKIRA can provide extensive data on

teacher knowledge and perceptions of reading and reading assessment, those who

prepare or supervise educators could use the tool to better differentiate and align their

instruction to the ever changing needs of the classroom teachers of today.

DEDICATION

For Boede and Matthew.

Thank you for your time, patience, and love throughout this whole process.

For my mom, Elaine Rayburn.

Thank you for teaching me kindness and persistence.

And finally, for my daddy, Ralph Rayburn.

You better be smiling down from Heaven right now.

We did it.

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FRAMEWORK AND PERSPECTIVES

Introduction

Reading is the method by which all other knowledge is attained. Unfortunately,

children who do not achieve early success in reading are most likely to never master the

skills and knowledge necessary to prosper not only in school, but also in life (Moats,

1999). Additionally, the demands of growing and facilitating capable readers can be an

arduous and grueling mission for teachers. Assessment, when implemented

productively, can help define and direct teacher and student efforts for the most efficient

learning. Therefore the task of assessing all aspects of reading has become a critical

component to the daily responsibility of educators. However, to ensure that assessment

is indeed promoting student learning one has to examine the purpose of these

assessments and the ability of teachers to employ their knowledge to make practical use

of these evaluations. Therefore the overarching purpose of this work is to add to the

knowledge base about teachers' interpretation of student assessment data for reading,

and to better understand teachers' strengths and weaknesses in using that data to

effectively instruct students.

Assessment Supports Student Achievement

With the current state of education emphasizing high stakes assessment for

students and higher quality preparation for educators (Afflerbach, 2010; American

Recovery and Reinvestment Act, 2009; Blank, 2013; Jacobs, Gregory, Hoppey, Yendol-Hoppey, 2012; Means, Chen, DeBarger, & Padilla, 2011; Salinger et al., 2010), teachers' effective interpretation of student data for instructional decision making has become a critical factor to connect this increased use of assessment to actual student achievement. In his speech made at the fourth annual Institute of Education Sciences (IES) Conference in 2009, the recent U.S. secretary of education, Arne Duncan, declared his belief in the power of data to drive decisions by telling us where we are and what we need, as well as who is most at-risk (Duncan, 2009b). As it relates to the content of literacy, the process of administering and interpreting classroom reading assessments is at the soul of effective reading instruction and student achievement. Within schools it provides educators with a clear picture of student mastery and need, as well as presenting the gaps in learning that teachers must fill in order for their students to achieve success. The cycle of administering, evaluating, and interpreting assessments allows educators to differentiate instruction based on student competencies and deficits. As Snow, Burns, and Griffin stated in 1998, "the major prevention strategy for [at-risk readers] is excellent instruction" (p. 172). The teacher can make all the difference in a student's learning or failure. Furthermore, Moats (2014) and Connor et al. (2009) support the instructional priorities of teachers to be guided by students' difficulties and progress, and identify a powerful strategy for improving students' literacy as the individualization of instruction. Thus, the reinforcement of excellent instruction is developed through a teacher's ability to interpret and evaluate valid and reliable reading assessments to identify students' mastery of learned concepts, as well as make informed and purposeful

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decisions about the classroom instruction and intervention necessary to promote student success.

Definitions of Key Terms

A common and explicit definition of many key terms is necessary for understanding and clarity throughout this study. The following terms are defined within the constructs of this research to ensure coherency during the discussion.

- *Reading assessment*: a tool used to determine student learning (Pellegrino, Chudowsky, & Glaser, 2001), which provides feedback to students and teachers for instructional purposes. While reading assessment can be used for a variety of objectives, in this study reading assessment will specifically be utilized as a collection instrument which teachers evaluate in order to plan effective instruction. Reading assessment can take many forms such as informal tests, portfolios, interviews, observations, student work samples, and student personal judgments about the quality of their work (Blair, Rupley, & Nichols, 2007). The following terms and examples, defined by Michael McKenna and Katherine Dougherty-Stahl (2009), specify the types of reading assessment that may be included within this definition.
  - *Formal Assessment*: an assessment with prescribed directions, and little to no teacher discretion (e.g., state and national standardized tests).
  - *Informal Assessment*: an assessment in which the teacher's discretion plays a major role in the interpretation of results (e.g., essays, informal reading inventories).

- *Screeners*: a brief and general assessment that provides a broad estimate of a student's overall level of knowledge or achievement. Group achievement tests such as the Stanford Achievement Test or Iowa Test of Basic Skills can be used as screening assessments. These assessments are typically administered individually and used to identify target areas where more assessments are necessary.

- *Diagnostic Assessment*: an assessment that provides detailed information for the planning of instruction (e.g., asking students to name all the alphabet letters and their corresponding sounds; asking students to read a list of high frequency vocabulary words). These assessments will maintain much of the focus of this study as they provide the most specific and comprehensive information of individual students and their areas of need.

- *Administration*: the act or process of giving something to someone (Oxford University Press, 2015). This study will utilize the definition of assessment administration as the act of asking a student or students questions from a particular reading assessment. The process of accurately administering an assessment is central to the collection of appropriate and reliable data, which is thus evaluated and interpreted for instructional use. The assessment administrators most important to the current study are the classroom teachers.

- *Best practices* (in instruction): researched based instructional strategies or practices that have shown, with convergent evidence, to improve student achievement (Allington, 2006). These practices have proven to be reliable and

valid, and have demonstrated improved student learning. Effective teachers ensure they are using research validated instructional practices in order to support student growth (Moats, 1999). In the context of this study, best practices will be evaluated and categorized as utilized by classroom teachers to alter or improve instruction.

- *Data Literacy*: an educator's ability to ask and answer questions about the collection, analysis, evaluation, and interpretation of data (Hamilton et al., 2009). Data literacy is a learned skill and has been found to be more of a *learned through practice* instructional technique, as opposed to being learned through formal education coursework (Jacobs et al., 2012). Data literacy can and should include the knowledge and skills of teachers that reinforces effective use of data for instruction by examining a *variety* of data sources, and thus developing strategies for student improvement based on said data (Mandinach & Gummer, 2013b). For the purpose of this study, classroom teachers' data literacy will be evaluated, specifically as they work with data from reading assessments.

- *Data Driven Instruction*: the systematic collection, analysis, evaluation, and interpretation of a variety of data (e.g., demographic, observational, achievement) to inform educational practice (Hamilton et al., 2009; Mandinach, 2012). This process has become increasingly important within the past decade because of an increased focus on student accountability and standardized testing (Pella, 2012). For this study, teachers' data literacy will guide and support the implementation of data driven instruction within their classrooms.

- *Evaluation*: the action of determining the value of something (Oxford University Press, 2015). Teachers manifest the act of evaluation by analyzing and categorizing student data from reading assessments in order to find patterns, or develop hypotheses, that in turn support instructional decisions centered within specific areas of individual mastery or need (Johnston, 2010). This study will analyze how teachers first categorize and group their students' data, to look for trends in various dimensions of reading, prior to interpreting it into classroom instruction. An example of evaluation would be the teacher noticing that a student has not mastered blending and segmenting of phonemes, based on failure to perform on those tasks during a phonemic awareness assessment. The initial noticing, or evaluation, of the student's area of need would in turn guide the interpretation of the data for instructional adjustment and practice.

- *Interpretation*: a teacher's ability to think critically about the relationship between instructional practices and student learning (Brunner, et al., 2005). During this interpretive process of the data driven instruction cycle it is critical for teachers to use what they determine to be trends in the students' data during the evaluation process, to then determine specific instructional strategies that will promote the growth of particular groups, as well as individual students. In this study, classroom teachers' interpretation of student reading assessment data into classroom best practices will be assessed. An example of interpretation would be the how and what a teacher determines to be appropriate instructional practices to promote growth and mastery of a student in his or her areas of deficiency. To

build on the previous example given for the student who is struggling with blending and segmenting phonemes, a teacher could interpret this data by choosing to do oral blending and segmenting tasks using Elkonin boxes (National Institute of Child Health and Human Development [NICHD], 2000). This research based practice to support the ability to hear and identify individual phonemes, would promote the student's ability to blend and segment those phonemes, and thus improve the student's phonemic awareness.

- *Content Knowledge*: the body of knowledge and information that teachers are expected to teach and students are expected to learn in a given subject area ("Content Knowledge," 2016). Throughout this research content knowledge will specifically refer to reading content knowledge as it applies to teachers of reading/language arts.

- *Pedagogical Content Knowledge*: the blending of teacher content knowledge and teacher pedagogy into an understanding of how particular topics or issues are organized and adapted for diverse learners, and then presented for instruction (Shulman, 1987). Although the development of this type of knowledge can be a challenging process, the ability to combine content knowledge with effective teaching methods (Leader-Janssen & Rankin-Erickson, 2013) is a significant aspect of this study's research.

Theoretical Framework and Perspectives

Multiple frameworks and perspectives were studied and reviewed as part of this research, although no single framework has explicitly captured an educator's knowledge of reading assessment and interaction with data to drive instruction. The following are some of the foundational theories that supported the development of this study. I will begin by describing a model of the cycle of data driven instruction. Next, I will discuss how teacher preparation and preservice, as well as the implementation of value-added educational reform, have played a role in the development of educators' data literacy. I conclude this chapter by revealing the purpose and research questions for this study.

The Cycle of Data Driven Instruction

The administration and frequency of assessments is not enough to improve a student's reading capability (Blair, Rupley, & Nichols, 2007). Logically, the act of simply giving a test does not increase one's understanding of assessment. Therefore, the evaluation and interpretation of results holds the value, and is a skill that must be acquired through the education and practice of the teacher. The understanding and interpretation of data to effectively influence instructional decisions, recently defined by select researchers as *data literacy* (Athanases, Bennett, & Wahleithner, 2013; Hamilton, Halverson, Jackson, Mandinach, Supovitz, & Wayman, 2009), is a crucial component to teacher education. This process requires unique knowledge, which is enacted at each stage. An educator must possess or acquire; a) the appropriate knowledge of best practices for the development of reading; and b) the ability to understand a student's

areas of mastery and need based on data, in order to make informed decisions about further instruction.

Effectively using data to guide instructional decision begins with the process of evaluation. This process allows teachers to gain a deeper insight into the learning needs of students (Hamilton et al., 2009). Teachers must know how to look at data through an evaluative lens that supports the categorization and analysis of student assessment results, which in turn guide instructional decisions. The tremendous assessment requirements of the NCLB-inspired accountability systems demand teachers become fluent in, or frequently demonstrate their understanding of, this skill (Means, Chen, DeBarger, & Padilla, 2011). Having a better understanding of teachers' knowledge of the evaluation of assessments was a critical component to the research in this study.

The insight gained on educators' abilities to interpret data and the knowledge teachers have on the appropriate selection of instructional strategies to support learning in their students, may be the important learning gained from this study. Every week teachers make hundreds, if not thousands, of decisions about the variety and delivery of instruction their students receive (Means, Chen, DeBarger, & Padilla, 2011). The ability to interpret data gives foundation and merit to those instructional decisions.

The frameworks for assessment and diagnosis, established by Cooper, Chard, and Kiger (2006), and Hamilton et al. (2009), provided a foundation for the cycle developed for this research. For this study, the cycle of data-driven instruction can be better understood in Figure 1.
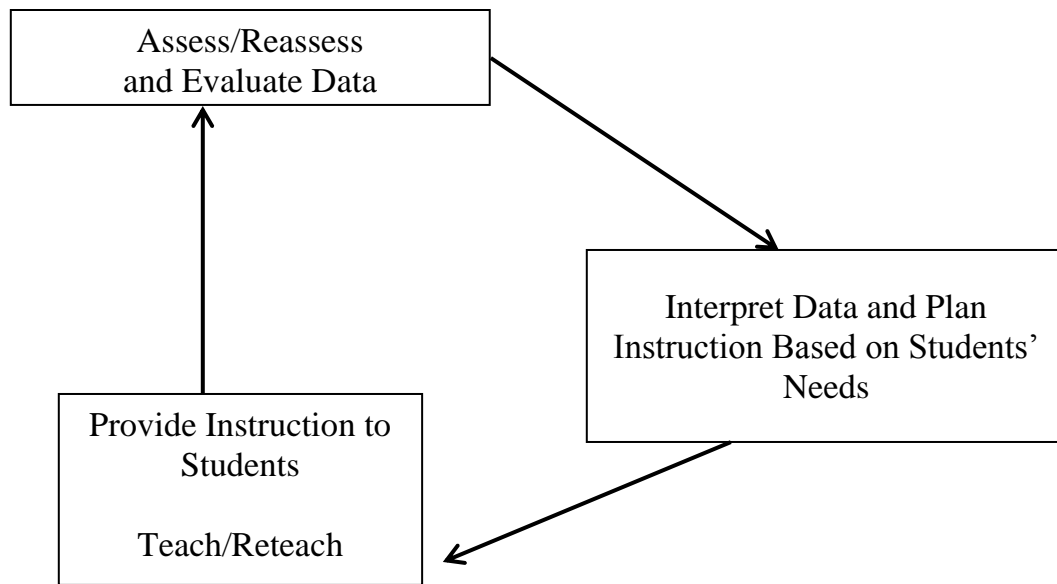
Figure 1. Cycle of data driven instruction.

This cycle of developing instruction based on students' needs, revealed by assessment data and the interpretation of data to drive that instruction, establishes the foundation for continuous reading improvement (Mokhtari, Rosemary, & Edwards, 2007).

The Role of Teacher Preparation

With enduring importance being placed on students' observable growth throughout their schooling, more effort is being required of teachers to ensure student development is being tracked from kindergarten through twelfth grade. In defense of teacher knowledge Linda Darling-Hammond (2008), a pioneer in teacher education and preparation, stated, "teachers need to be able to analyze and reflect on their practice, to assess the effects of their teaching, and to refine and improve their instruction" (p. 93).

Unfortunately, the body of research on the process of assessing, collecting, and deciphering data remains minimal. Even as state and local governments place a higher emphasis on data-driven instruction (National Governors Association & Council of Chief State School Officers, 2010; No Child Left Behind Act, 2001; Texas Education Agency, 2007-2015), little has been documented on the preparation of teachers in the acquisition of data literacy (Brookhart, 2011; Popham, 2009).

Preservice Teacher Education

The education of preservice teachers is an imperative component to the development of a teacher workforce with an acquisition and understanding of data literacy (Athanases, Bennett, & Wahleithner, 2013). Models for teacher education that include cycles of inquiry and investigation of student learning have been recognized both by researchers and practitioners for transforming the practices of educators (Lieberman & Miller, 2008; Lieberman & Wood, 2003; Darling-Hammond, 1989; Darling-Hammond, 2002). The establishment of coursework focused on the attainment and comprehension of these cycles not only supports a data-driven school system, called for by our own secretary of education, but also gives new teachers the tools to provide appropriately differentiated instruction to all learners regardless of uncontrolled school factors like student schema or socioeconomic status. In 2012, the Council of Chief State School Officers released a report in which data literacy was determined to be an essential skill in teacher preparation. Similar research reported the same year, communicated that teacher preparation programs must educate future teachers to use data from an assortment of assessments, including not only number producing tests, but

student attendance, school demographics, and student engagement, to support the development and adjustment of instruction (Greenberg & Walsh, 2012). However, currently there is limited survey evidence on the prevalence of college coursework offered that specializes in the development of data literacy (Mandinach & Gummer, 2013b; Mann & Simon, 2010).

Value-Added Reform

Beyond the classroom, a current focus on value-added education, in which a "value" is given to a teacher based on his or her ability to "add" to a student's learning (Amrein-Beardsley & Collins, 2012), should spur an increase in professional development on assessment data. Teachers must learn to view results of assessments as more than just a pass or fail grade for their students. They must comprehend the purpose of assessment as being a guide for instruction and learn to continuously evaluate student data, interpret that data for instructional use, and determine appropriate instructional practices to support future learning. Student growth is becoming the most highly regarded factor used in the evaluation of teacher and school quality. This shift in research from a focus on the link between teacher characteristics and student outcomes, to a framework solely developed to identify overall teacher contributions to learning (Hanushek & Rivkin, 2010) is critical in the context of policy that is impacting teachers' orientation towards assessment.

Student Assessment, Teacher Knowledge, and Data Literacy

It has been well documented that teachers' knowledge is a primary factor in their effectiveness as educators (Bos et al., 2001; Moats, 1994; Moats & Foorman, 2003;

Salinger et al., 2010). Cantrell-Binks, Washburn, Joshi, and Hougen (2012) identified a key awareness in support of this study, the Peter Effect (Applegate & Applegate, 2004), in their research on the preparation of reading teachers. The Peter Effect supports this research with the proposal that teachers cannot be expected to teach knowledge that they, themselves, do not possess.

Although preservice teacher education and value-added reform are not a central focus of this study, both factors provide a context which highlights the growing concern concentrated around student assessment, teacher knowledge, and data literacy, paramount to this research. The limited research addressing a combination of these three factors thus guides this examination into not only the foundations of teacher knowledge necessary to promote student learning, but also the practical classroom provisions necessary to grow proficient readers, specifically as it relates to the administration, evaluation, and interpretation of reading assessments to drive instruction for students in prekindergarten through twelfth grades.

Purpose

The purpose of this study was to develop and validate a reliable instrument to collect information on teachers' perceptions, content knowledge, understanding of reading assessments, and ability to interpret the data from these assessments to influence instruction. This research contained two studies. Study 1 addressed the development of a valid and reliable instrument, and thus lead to the pilot studying of a survey to measure teachers' perceptions, content knowledge, and understanding of reading assessments in prekindergarten through twelfth grades. Study 2 encompassed the collection and

analyses of data about teachers' perceptions, content knowledge, and understanding of reading assessments for classroom instructional practices.

Regarding the organization of chapters, in Chapter II, I present a review of the literature foundations for this study of survey development and reading assessment knowledge. In Chapter III, I present the methods and results of Study 1, in which I developed and internally validated the constructs of my survey within a widespread sample of educators from 13 states within the US. In Chapter IV, I present the methods and results of Study 2, in which I collected data using the revised survey, within a geographically homogeneous sample of teachers, and externally validated the survey by considering patterns between teachers' training and experience and performance on the survey. Finally, Chapter V serves as a general discussion for both studies in this research.

Research Questions

Table 1 provides an outline of the two studies within the context of this research, as well as the research questions and statistical analyses utilized within each study.

Table 1

Overview of Studies, Research Questions, and Analyses

Study and Title	Research Questions	Statistical Analyses

Study 1 – The Development of a Survey for the Observation of Teacher Perceptions, Content Knowledge, and Understanding of Reading Assessments	1. How valid are data from a newly developed instrument to collect information on teachers' perceptions, content knowledge, and understanding of reading assessments?
	
	2. How reliable are data from a newly developed instrument to collect information on teachers' perceptions, content knowledge, and understanding of reading assessments?
		• Exploratory Factor Analysis
		• Cronbach's α
		  • α if deleted items
		• Item Response Theory
		  • Item difficulty, p value
		  • Discrimination index, D value

Study 2 – The Analysis of Data about Teacher Perceptions, Content Knowledge, and Understanding of Reading Assessments	1. What are inservice teachers' perceptions of reading and reading assessment?
	
	2. What are inservice teachers' levels of knowledge for interpreting students' reading assessment data for instructional planning and adjustment in the classroom?
	
	3. What are inservice teachers' levels of knowledge of evaluating students' data from reading assessments to determine areas of strength and need?
	
	4. Which aspects of training or experience best predict teachers' higher knowledge of reading assessment?
		• Confirmatory Factor Analysis
		• Cronbach's α
		  • α if deleted items
		• Item Response Theory
		  • Item difficulty, p value
		  • Discrimination index, D value
		• ANOVA

Research has shown that inservice teachers spend somewhere between a minimum of 30 to 50 percent of their instructional time on the administration, evaluation, or interpretation of assessments (Plake, 1993; Stiggins, 1991). Ultimately, the goal of this study was to provide information, which in turn could influence the education of current teachers in the utilization of data from reading assessments to better drive instruction in today's classroom.

CHAPTER II

LITERATURE REVIEW

Introduction

In the following review I first describe some momentous national reforms in education that promoted the expansion of reading instruction and assessment. Next, I illustrate how teachers' reading and pedagogical content knowledge, as well as a push from professional educational organizations, have necessitated the growth of data literacy for educators. Finally, I document the prior research utilized in the development of my survey and explain why each of these previous studies was chosen as a contributing factor to my research.

Recent National Reading Reforms

The spring of 2000 brought about significant change to the field of reading. Under direction from Congress, the National Reading Panel (NRP; NICHD, 2000) identified five components essential to effective reading instruction. Phonemic awareness, phonics, fluency, vocabulary, and comprehension were clearly defined as the pillars upon which reading instruction is to be founded. The explicit identification of these five components gave teachers specific skills to target through effective instruction in order to develop successful readers. Also, with the presentation of these components, came the need to develop and utilize precise assessments that focused on a particular component to determine a student's level of mastery. The No Child Left Behind (NCLB) act of 2001 implemented a mandate for states to test students annually in

reading, in third through eighth grades. As a support to this legislation, the Reading First Initiatives which were part of the reauthorized Elementary and Secondary Education Act (U.S. Department of Education, 2002), focused on providing support to states and districts in the application of scientifically based reading research, through proven instructional and assessment tools, in the early grades, kindergarten through third. This program's focus was to ensure all students could not only learn to read, but could learn to read *well* by the end of third grade. Along with the requirements for these new legislations, Adequate Yearly Progress (AYP) was an assigned evaluation tool to be implemented, determined, and utilized by each state as a standard of proficiency for their students to attain to ensure adequate growth every year. Although today, much of the legislation for NCLB and Reading First has been revised or simply terminated, AYP continues to be the measurement tool through which schools are evaluated year-to-year, and future educational funding is determined. Through this process, reading assessment gained much political and monetary significance that continues to hold substantial importance today.

Standards-based reform, accountability, and high-stakes assessment (Thurlow & Thompson, 1999; NCLB, 2001) are now a critical part of the accountability structure of our educational system. An assessment system that provides reliable and dependable results that can be utilized to develop instructionally relevant and efficient educational change is essential in today's classrooms (Carnine, 2000; Elmore, 1996; Linn, 2000). Ensuring students are learning by determining their areas of strength and weakness is fundamental. The pressure is on to make certain that instruction provided to students is

not only effective, but is also sufficient for student mastery (Good, Simmons, & Kame'enui, 2001). The Reading First grants (NRP, 2000) attempted to improve instruction through scientifically based reading practices and strategies for working with struggling readers, as well as placing emphasis on the diagnosis and prevention of early reading difficulties (Gamse, Bloom, Kemple, & Jacob, 2008). However, Reading First did not provide explicit training on the evaluation and interpretation of reading assessments for instructional differentiation. It is within this cycle of assessment that data is analyze and valued as the vital information it provides is formative to the adjustment and variation of instruction. However, just as we cannot expect students to be held accountable for things they have not yet learned, we cannot expect teachers to have mastered skills that they may not have been taught.

The Common Core State Standards initiative (CCSS, 2009) maintained the NCLB assessment legislation and AYP requirements by developing common educational standards for English Language Arts and mathematics. By adopting the Common Core State Standards (CCSS) states would receive greater consideration on their application for funding for a Race to the Top (RTT) grant. These RTT grants were awarded to states that implemented reform in four areas. Two of significance to this study are, 1) enhancing standards and assessments, and 2) improving the collection and use of data (Skinner & Feder, 2014). With the implementation of the CCSS, the U.S Department of Education began funding the development of common assessment to measure student learning of these standards. Two consortia of states have received grants in order to design and develop these assessments. Fundamental components to

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the development of these national assessments is they include, 1) frequent and formative diagnostic measures to provide immediate feedback on how well students are progressing throughout the school year (Conley, 2011), and 2) summative assessments to show student mastery at the end of the school year (Center for K-12 Assessment & Performance Management at ETS, 2012). The diagnostic assessments, occurring throughout the year, show how both past and current national reform efforts continue to promote the use of assessment and data literacy to drive instruction. These CCSS cycles of assessment are also concurrent with the value added legislation mentioned earlier, as these assessments give substantial and specific data for teachers, administrators, and policy makers to review as a tool for determining an educators "value added" to the learning of his or her students. By adopting the CCSS, states will maintain support of the continued use of data in the driving of instruction.

With the growth of nationally mandated assessments, as well as programs centered around data knowledge, came an expansion of assessments available for U.S. teachers. The breadth and depth of these assessment options is extensive, to say the least. The Southwest Educational Development Laboratory (2015) developed a reading assessment database to identify all available assessments for prekindergarten through third grade educators. There are currently 98 assessment options identified by SEDL, ranging in cost from a free download to over six hundred dollars (SEDL, 2015). Yet, this substantial explosion of assessment tools and instruments has not been matched by an increase in teacher assessment education.

The need for a more comprehensive understanding of the components of the cycle of assessment continues to grow. This focus is not limited to merely school-aged children. The National Association for the Education of Young Children (NAEYC) released a report in 2004 addressing the definition, process, and whys of assessing children ages three to five, in order to produce data to support instructional decisions (McAfee, Leong, & Bodrova, 2004).

Through this historical perspective, we are reminded that we must continue to critically evaluate reading assessments for reliability and validity as testing instruments and tools (Afflerbach, 2010) in order to best determine student areas of success and deficit. As assessments and data driven instruction continue to develop and evolve, one thing remains true, assessment of student knowledge will endure and maintain its significant role in education for many years to come.

Teacher Knowledge and the Call for Data Literacy

School districts, policy makers, administrators, and teachers are in a state of constant exploration for preeminent strategies to support reading growth in our students. Some researchers have focused on the relationship between teacher knowledge and student achievement (Carlisle, Correnti, Phelps, & Zeng, 2009; Carlisle, Kelcey, Rowan, Phelps, 2011; Kelcey, 2011; McCutchen, Abbott, et al., 2002; Piasta, Connor, Fishman, & Morrison, 2009). It would seem that a teacher's instructional comprehension, or understanding of the art of teaching, would have a strong connection to the degree of learning attained by students. As teachers grow in knowledge of content, pedagogy, and practice, so too would growth be evident in their students. However, a key awareness

made evident by this research is there is great difficulty in determining the specific content and pedagogical knowledge that teachers require to be successful educators, and to what extent this knowledge can be linked to students' mastery (Kelcey, 2011).

Some research spotlights teacher knowledge as it relates to specific content, but fails to consider how this knowledge affects student growth within the domain of the classroom (Cunningham, Perry, Stanovich, & Stanovich, 2004; Moats & Foorman, 2003; Phelps & Schilling, 2004; Spear-Swerling & Brucker, 2003). Still other research has revealed that there is a limited number of teachers who are prepared to used data effectively and demonstrate data literacy within their classrooms (Mandinach 2012; Means, Padilla, & Gallagher, 2010; Wayman & Stringfield, 2006). The lack of teacher knowledge, specifically related to data literacy in a reading classroom, presents a potential collapse in instruction and the necessitation for this research.

Pedagogical Content Knowledge

An influential and even paramount (Rowan, et al., 2001) report on teacher knowledge came from Lee Shulman in 1987 to establish seven categories responsible for promoting understanding and comprehension among students. A key component of Shulman's work, that is a foundation for this study, is a teacher's pedagogical content knowledge. Pedagogical content knowledge supports the identification of the specific content knowledge required for teaching (Shulman, 1987). This particular knowledge embodies the union of content and pedagogy into "an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners" (Shulman, 1987, p. 8). Teachers must be able to not

only merge their beliefs about teaching with content, but they must do this while supporting the curiosity and capability of each child within a diverse population of learners. His opinion that the art of teaching is often trivialized, even by teachers themselves, provided the motivation to clearly define his vision of teacher knowledge and the substantial requirements on teachers and teaching. Classrooms are no longer a place where a teacher stands in front of the class and lectures. Teachers are expected to master an exorbitant amount of knowledge, as well as implement a multitude of instructional practices, in order to enable students to learn. As the curriculum grows more rigorous and the standards more frequently assessed, no longer can teachers simply be the providers of information and students the recipients of knowledge. Accordingly, Shulman (1987) tasks those who educate teachers to support them in the development of sound reasoning and self-reflection, as well as the ability to skillfully perform the act of educating. A teacher must be adaptive and implement his or her content knowledge in a "pedagogically powerful" (Shulman, 1987, p. 15) manner that sustains adaptability based on the various abilities and backgrounds of the students.

Professional Organizations and Assessment Literacy

A specified knowledge skill set for teachers, including knowledge of data literacy to produce data driven instruction (although not yet defined with this terminology), has existed many years. As far back as 1990, the American Federation of Teachers (AFT), the National Council on Measurement in Education (NCME), and the National Education Association (NEA), published seven standards for what they then termed

teacher's educational assessment competence. Of these seven standards, three (AFT,

NCME, & NEA, 1990) support this research focus as they called for teachers to:

- be skilled in the development of methods of assessment that are appropriate for
  instructional decisions

- be skilled in the administration, scoring, and interpretation of assessment results
  of teacher made and other published assessment methods

- be skilled in the use of assessment results for making decisions about individual
  students, planning instruction, and teaching

Therefore, even 27 years ago, important professional organizations for educators saw the

need for teachers to acquire data literacy, and ensure their instruction was based on the

needs of their students.

More recent and specific standards for reading practices, titled *Knowledge and

Practice Standards for Teachers of Reading*, were released by the International Dyslexia

Association (IDA) in 2010. A particular section of this report concentrated on the

importance of the administration and interpretation of assessment for instructional

planning. This section emphasized the need for teachers who can "accurately interpret

subtest scores from diagnostic surveys to describe a student's patterns of strengths and

weaknesses and instructional needs" (p. 9).

Also in 2010, two more educational organizations reported their beliefs on the

development of teachers' ability to analyze and understand data, as well as the

importance of this skill in the development of educators. The National Council of

Accreditation of Teacher Education (NCATE, 2010) presented recommendations for the

clinical practice of teaching to include a strong emphasis on data use for classroom instruction (Blue Ribbon Panel on Clinical Preparation and Partnerships for Improved Student Learning, 2010). In line with the NCATE, the International Reading Association, renamed the International Literacy Association (ILA) in 2015, revised their book of *Standards for Reading Professionals* (2010), to include not only a standard for foundational knowledge and knowledge of curriculum and instruction, but also an assessment and evaluation standard which describes how reading teachers should be able to use a variety of assessment tools and practices to develop and evaluate effective reading instruction (ILA, 2010). These recommendations continue to support the current campaign for data driven instruction in the classroom, as well as develop a call for action to preservice and current educators as to the importance of this type of knowledge to produce well-educated students.

Recent Focus on Data Literacy

Although the push for assessment and data literacy is extensive, the research available addressing specific teacher skills that necessitate the ability to utilize assessment for reading instruction is, to say the least, limited. Educators not only need a firm foundation in the requirements for teaching reading, but must also possess the flexibility, knowledge, and adaptation necessary to adjust instruction based on student need – the what, why, and how of assessing students is critical. Carlisle, Correnti, Phelps, & Zeng (2009) found that very little research has developed and validated various measures of the early reading knowledge of teachers. Accordingly, the argument for the importance of data literacy is definitive.

Data literacy is hardly a new concept, even though it has just recently begun to receive the spotlight. The importance of adopting instruction that is based on data and focused on goal attainment is, and has been, critical for continuous reading and writing improvement (Mokhtari, Rosemary, & Edwards, 2007) for years. In 2013 Mandinach and Gummer, through the assimilation of research, identified the knowledge, skills, processes, and components necessary to support educators' development of data literacy (Mandinach & Gummer, 2013a). The elements significant to this research are as follows:

- differentiate instruction for the needs of all learners
- devise hypotheses about the needs of learners and various instructional strategies
- use all types of students data (formative, summative, benchmark, common, anecdotal, and class work) to make instructional decisions
- use the data accordingly, to modify instructional practices

Only through the differentiation of instruction, implementation of varied but explicit instructional strategies, and the effective use of data from multiple sources to modify instruction, can data literacy be achieved and thus support student success. The authors continued their argument by addressing various obstacles in the achievement of data literacy for all those involved in education, highlighting two fundamental barriers; 1) the lack of research on how teachers acquire data literacy, and 2) the failure of schools of education to teach data literacy to preservice educators. These barriers have been

addressed previously in this research and although they are not the primary focus of this study, they support the argument that data literacy is an essential part of education today.

To clarify, an educator's knowledge of the administration, evaluation, and interpretation of data, and the concept of data literacy are complementary, but not completely congruent. The cycle of data driven instruction envelops the concept of data literacy, however it also includes the act of actually administering the assessment. By definition, these two ideas are distinct. Throughout the remainder of this study data literacy will be used as it was defined previously, whereas the entire cycle of data driven instruction will maintain its focus on all aspects of assessment, from administration to data interpretation for instructional decisions.

Prior Research Contributing to Survey Development

To create a new survey instrument it was essential to build upon the work of others. The selection of prior research studies to use in the development of this study's survey was a recursive process. Survey and knowledge assessment research with a similar focus or topic of interest as my research, was located and reviewed. However with limited surveys available in this specific area much of the survey development was derived from teacher preparation texts for reading assessment and my practical school experience as a reading specialist. A formative inspiration in the development of this survey came from Rowan et al. (2001) as an advisement that in the survey of teacher knowledge, measuring general cognitive ability is not enough, and instead one must examine the role of "job-relevant knowledge" (p. 3) in predicting teachers' effective teaching ability.

Thus, this survey was developed to not only collect teachers' content knowledge of reading assessment, but also teachers' perception of their ability to use reading assessments, and their ability to review student data and determine instructional practices to support student growth. To support the reliability and validity of this new instrument certain items were taken in whole or part from some pre-established prior survey research. A summary of the prior research used to support the instrument development in this study can be found in Table 2. Then I describe the manner in which each of the prior research studies contributed to the development of survey items or other aspects of this study.

Table 2

Prior Survey Research Consulted for Instrument Development

Study	Survey(s) & Assessment(s)	Purpose	Participants & Sample size (n)	Reliability	Results Applicable to this Research
L. C. Moats, 1994 (also utilized by D. McCutchen, R. D. Abbott, et al., 2002)	*Informal Survey of Linguistic Knowledge*	Determined the knowledge educators had of language elements and how these elements are represented in writing	o Reading teachers, special education teachers, speech pathologists, teaching assistants, and graduate students o n = 89	o Cronbach's α =.84 for kindergarten teachers o Cronbach's α =.79 for first grade teachers *(determined in McCutchen, Abbott, et al., 2002)*	Experienced teachers lack understanding of written and spoken language, and thus would be unable to teach beginning or struggling readers through explicit instruction of these concepts.
C. Bos, N. Mather, S. Dickson, B. Podhajski, and D. Chard, 2001	*Teacher Perceptions about Early Reading and Spelling* and *The Teacher Knowledge Assessment: Structure of Language*	Examined the perceptions and knowledge of preservice and inservice educators about early reading instruction	o Preservice and inservice educators o n = 538	<u>Initial Field Test Survey</u> o Cronbach's α =.74 <u>Final Survey</u> o Cronbach's α =.70 (Explicit Code Instruction) o Cronbach's α =.50 (Implicit Code Instruction) o Cronbach's α =.60 (Knowledge Assessment)	Both preservice and inservice teachers perceive themselves as somewhat prepared to teach reading to children, however both groups were unable to correctly answer nearly half of the knowledge of language structure survey questions.

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Table 2 Continued

Study	Survey(s) & Assessment(s)	Purpose	Participants & Sample size (n)	Reliability	Results Applicable to this Research
L. C. Moats and B. R. Foorman, 2003	*Teacher Knowledge Survey, Forms #1 - #3*	Explored type and level of questions that would discriminate more from less capable teachers, and would have a predictive relationship with student reading achievement	o Kindergarten – fourth grade teachers o n = 194	(descriptive statistics only)	Inservice teachers had knowledge deficits in phonemic awareness tasks, comprehension relationships, fluency instruction and finally how to interpret a student's oral reading record.
L. Spear-Swerling and P. O. Brucker, 2003	*The Test of Word-Structure Knowledge*	Examined preservice and inservice teachers' knowledge about word structure and improvements in their knowledge as a result of instruction	o Preservice and inservice teachers from a special education certification program o n = 90	<u>3 Word Structure Tasks</u> *1. Graphophonemic Segmentation of Words (GSW)* • $\alpha = .775$ *2. Syllable Type (ST)* • $\alpha = .768$ *3. Irregular Words (IW)* • $\alpha = .630$	Preservice and inservice teachers' knowledge about word structure can develop with instruction, and prior preparation did not influence participants' responsiveness to instruction.
J. F. Carlisle, R. Correnti, G. Phelps, and J. Zeng, 2009	*Language and Reading Concepts* (test of reading knowledge)	Examined inservice teachers' knowledge about early reading and its contribution to the improvement of students' scores on word analysis and reading comprehension assessments	o First – third grade teachers o n = 977	o Item Response Theory (IRT) = .88	There were no significant findings at any of the three grade levels. There was little association between levels of teacher knowledge and student achievement in first and second grades, and only a modest relationship in third grade reading comprehension.

Table 2 Continued

Study	Survey(s) & Assessment(s)	Purpose	Participants & Sample size (n)	Reliability	Results Applicable to this Research
Salinger et al., 2010	*Pre-Service Teacher Preparation Program and Knowledge Survey*	Examined the extent to which the content of teacher education programs focus on the essential components of early reading instruction and the extent to which graduating preservice teachers (post-field work) are knowledgeable about the essential components of early reading instruction	o Preservice teachers from 99 institutions of higher education o n = 2,237	o Cronbach's α =.78	Teacher preparation programs focused more heavily on phonemic awareness, phonics, and fluency, whereas focus on all five essential components of reading was stronger in the field work of preservice teachers ready to graduate.
Binks-Cantrell, Joshi, and Washburn, 2012	*Survey of Basic Language Constructs*	Examined teacher content knowledge and designed an instrument to evaluate teacher knowledge of basic language constructs	o Teacher educators and preservice teachers o n = 286	o Cronbach's α =.90	Through utilization of item difficulty and discrimination analyses, Exploratory Factor Analysis, and reliability analysis, the validation of an instrument can be assessed. Through analyses the survey for this study showed evidence of strong construct validity, however the predictive validity of the instrument was not demonstrated.

Moats, 1994. This influential study was chosen as it relates to the current study in its expressed concern that many students' reading problems stem from very specific issues with phonological or morphological word features (Moats, 1993) which need to be addressed through explicit instructional practices. Moats' survey revealed that many teachers are not prepared for this type of instructional obligation, which thus supports the need for this research to better understand teacher knowledge and its effect on classroom instruction and student achievement.

Bos, Mather, Dickson, Podhajski, and Chard, 2001. Originally, for the purposes of this study, only items from the *Teacher Perceptions about Early Reading and Spelling* portion of this survey were used. However, upon further revision of my survey, the *Teacher Knowledge of Language Structure* section of this survey was used in its entirety because of its strong reliability, as well as the phonological and phonetic nature of its items. This study's focus the examination of preservice and inservice teachers' perceptions of their knowledge and ability to teach early literacy, as well as their actual knowledge of reading instruction, made it a valuable tool for my study.

Moats and Foorman, 2003. A three-phase teacher knowledge survey, developed by Moats and Foorman (2003), was also applicable to the development of the current study's survey. Although Moats and Foorman's original survey provided data utilized for only descriptive purposes, the content and development process of this survey was another vital support for my study's research. The survey was chosen not only because of its content, but also because it included student reading achievement as a component to be analyzed, and student achievement is a key underlying factor to the

need for my research. As determined by the authors, the multiple knowledge deficits of the kindergarten through fourth grade teachers surveyed could provide supporting evidence that teachers have trouble interpreting screening and diagnostic assessment data (i.e.; writings samples and oral reading records) used in determining instructional practices necessary to meet the varying needs of their students (Moats & Foorman, 2003). In further support of this study's application to my research, the authors stated they too believe that "teachers…deserve to be taught systematically the content they are responsible for teaching to children" (p. 38), which is a paramount aspect of my research.

      Spear-Swerling and Brucker, 2003. This study contributed to the development of a single item on my survey, but its attention to teacher preparation and implications for further practice made it a key component of my research. The researchers also used sound practices, as evident through their explanation of the lower reliability achieved on one of their assessed tasks (IW, $\alpha = .630$). Spear-Swerling and Brucker addressed this issue and attested it to the limited number of items for this task. Thus, the reliability of this study's assessment tasks supports its use as a model in my survey development. This study's sample size was small, similar to mine, however the results supported the premise that instruction can improve with the education of teachers. This study also concurs with the viewpoint that teacher education is a "career-long process" (p. 94), and although it may begin in a four to five year institution or certification course, it continues throughout the term of an educator's professional life.

Carlisle, Correnti, Phelps, and Zeng, 2009. This study had a large sample size and measured the impact of teacher knowledge on student achievement. However, Carlisle and colleagues did not find a direct link between teacher knowledge and student achievement, and attributed their nonsignificant findings to possible limitations of the *Language and Reading Concepts* (LRC) assessment. While the psychometric characteristics of the instrument found it to be sound, they concluded that it may not have accurately captured the knowledge that teachers utilize in teaching reading on a daily basis, and thus failed to relate to students' gains in reading. The questions on the LRC contained numerous items that addressed knowledge of the five components of reading, and thus were beneficial to my research survey as it relates to teachers' general knowledge of reading and assessment, and how this influences their instructional choices.

Salinger et al., 2010. This study was produced through the U.S. Department of Education in response to questions about the development of early reading instructional knowledge in teacher education programs, and the knowledge of the essential components of early reading instruction in graduating preservice teachers, post fieldwork experience. This highly reliable survey supported my study because it focused on the five essential components of reading, which is the most basic theoretical foundation for my research. The need for teachers to understand the five components is essential if they are to evaluate and interpret students' reading assessment data, and in turn alter their classroom instruction to support differentiated learning.

Binks-Cantrell, Joshi, and Washburn, 2012. Although this study did not

contribute to the development of particular survey items on my research instrument, it

was used as a model of overall instrumentation and methods development for teacher

knowledge. Using specific statistical analyses, this study modeled the evaluation tools

and processes necessary to support the questions of validation for a new research

instrument. The Item Response Theory (IRT) analyses in this research became a model

on which decisions about item revision or deletion were made within much of my study,

and being that it was the most recent study used it contained the most current analyses

methods.

Current Research Need

Just as current research is calling for a need for widespread data literate

educators, this study calls for a precedence to be established for teachers to utilize

student data to monitor, adjust, and improve instruction. The survey instrument created

for this study provides a tool for those responsible for the development of teacher

education to monitor, adjust, and improve instruction to focus on the needs of their

educators. Piasta, Connor, Fishman, and Morrison (2009) argued that the current state of

teacher education alone is not enough to build crucial knowledge of early reading

concepts and instruction. Professional development that is both relevant and rigorous is

necessary to construct essential knowledge in classroom teachers, and thus inspire the

growth of student achievement (Cunningham et al., 2004; McCutchen, Abbott, et al.,

2002; McCutchen, Harry, et al., 2002; Moats & Foorman, 2003; Spear-Swerling &

Brucker, 2003). The determining of what teachers need in the way of professional

development to improve their practice is the essence of this research. As teachers are challenged to use student data to monitor and adjust instruction, so should the instruction of teachers be monitored and adjusted to meet their ongoing and ever-growing needs.

CHAPTER III

STUDY 1: DEVELOPMENT OF THE PERCEPTIONS, KNOWLEDGE, AND

INTERPRETATION OF READING ASSESSMENT SURVEY

The initial intent of this study was to collect information from inservice teachers on their knowledge of reading, reading assessment, the evaluation of assessment data, and the interpretation of data for instruction for the purpose of developing and instrument – a survey regarding teacher knowledge of reading and assessment, deemed the *Perceptions, Knowledge, and Interpretation of Reading Assessment* (PKIRA). The dimensions of reading covered by the PKIRA focused on the cognitive aspects of reading and included the five essential components of reading instruction; phonemic awareness, phonics, vocabulary, fluency, and comprehension (NRP, 2000). The development process followed these steps: 1) review prior studies related to teacher knowledge of reading, reading assessment, and data literacy; 2) determine which items from previous research best supported my research interests for this study; and 3) revise or develop survey items based on the needs of this study, and the reliability and validity of prior research.

Methods

The survey development proceeded through a rigorous process resulting in four versions before formal data collection began. For each version, I document the data sources, changes made, and the rationale. The format changed significantly through each version.

PKIRA Version 1: Survey of Teacher Knowledge of Reading Assessment

The survey development proceeded through a rigorous process resulting in four versions before formal data collection began. In the following sections, I describe first the initial development of items, and next I present the process followed to receive feedback from content experts (reading professors), assessment experts (methodologists), and user (teacher) feedback. The initial development process began with 72 Likert response items, divided into five sections, with two to three constructs per section. The final survey version yielded an instrument with five sections and subscales including open ended, Likert, and multiple choice response items, with two to four constructs per section, for a total of 82 items.

The content of the PKIRA (version 1) was developed to observe five potential areas of inservice teachers' knowledge: 1) content knowledge of reading and reading assessment; 2) knowledge of the evaluation of reading assessments; 3) knowledge of the interpretation of reading assessments; 4) knowledge of formal and informal reading assessments; and 5) the ability to use data to drive instructional practice. The dimensions of the survey were initially guided by content analysis of current reading assessments being administered in public elementary schools in Texas. These assessments included the Texas Primary Reading Inventory [TPRI] (Texas Education Agency, The University of Texas System, & The University of Houston System, 2010) alphabet symbol and sound identification, Marie Clay (2006) sentence dictation, running records (Fountas & Pinnell, 2007), Developmental Reading Assessment [DRA] (Beaver,

2006), Dynamic Indicators of Basic Early Literacy Skills [DIBELS] (Good & Kaminski, 2002), and the State of Texas Assessment of Academic Readiness [STAAR].

Next, based on the initial review of the assessments, I consulted both a) previously published surveys and b) current texts for teaching reading assessment at universities. This consultation allowed for both triangulation of the actual assessment dimensions and identified critical data literacy dimensions not directly contained in the measures, such as application of assessment to instruction. The items included in the survey were both researcher developed and taken, in whole or part, from previously published measures.

Teachers' content knowledge of reading and reading assessment. The first survey construct was teachers' direct knowledge about both reading and reading assessment. To date, as I could not locate any measures specifically targeting teacher knowledge of reading assessment, I developed these items. However, because it is illogical, for example, that a teacher could have in depth knowledge about the assessment of reading fluency without direct knowledge of reading fluency, I recognized that there was overlap in knowledge dimensions. Therefore the items for this construct inquired about *both* reading content knowledge and reading assessment knowledge. See Appendix A for the items and sources utilized for the development of this section of Survey 1. Five items addressed reading knowledge, five items pertained to reading instructional practices, and five items specifically addressed reading assessment, for a total of 15 items in this section of Survey 1.

Teachers' knowledge of the evaluation of reading assessments. The second construct of interest in the development of Survey 1 was the knowledge teachers have about the evaluation of reading assessment data. This type of knowledge was considered a deeper level of knowledge than discrete knowledge of reading processes, reading instruction, and reading assessment. See Appendix A for the items and sources utilized in the development of the second section of Survey 1. Sixteen items, also developed in a Likert format, comprised this section of Survey 1. Fifteen of these items were stated as student actions, which showed signs of knowledge mastery or deficit, with one item addressing knowledge of language, for a total of two constructs in this section.

Teachers' knowledge of the interpretation of reading assessments. The third construct of investigation in this creation of Survey 1 was the knowledge teachers have of the interpretation of reading assessment data for classroom instructional purposes. Interpretation differs from evaluation in that this is the process in which teachers look at trends in student data from the evaluation process, and determine what instructional practices can be implemented to improve student learning. Teachers' ability to perform this skill is imperative in fulfillment of the ultimate purpose of assessment – to advance student learning. Appendix A lists the items and sources utilized for the development of this area of the study for Survey 1. Of the 15 items in this section, 12 addressed best practices of reading instruction for student growth, one item addressed data driven instructional decisions, and two items addressed instructional decisions based on student need, for a total of three assessed constructs.

Teachers' knowledge of formal and informal reading assessments. The fourth construct of Survey 1's research intended to determine teachers' general assessment knowledge. This construct differed from the others in that it gathered data on educators' specific knowledge of various types of assessments and forms of data. Appendix A details the item development that was originally going to be used for the gathering of general assessment knowledge of participants in this study. The 17 items in this section inquired about specific types of assessment to serve various purposes (seven items) and the use or interpretation of data from various assessments (ten items), thus assessing two constructs.

Teachers' ability to use data to make instructional decisions. The final section of the PKIRA was a qualitative performance task consisting of a scenario containing three students and their reading assessment data results (see Appendix A). Participants were asked to review the data and briefly identify each student's area of weakness and what instructional practices could be implemented to support their need.

PKIRA Version 2: Revised Survey Based on Content Panel Review

In the US, reading teacher preparation often varies based on theoretical orientation of a program area, time of teacher preparation, and on geographic location in the US, which may be influenced by state standards. As I sought to develop a tool that could be used nationally, and not specific to one state, I sought out content area experts at multiple universities. Beck and Gable (2001), and Mastaglia, Toye, and Kristjanson (2003) identified expert panel review as a process to support content validity of a newly developed researched instrument. Thus, the knowledge statements from the first version

of the survey (Survey 1) were emailed to an expert panel of professors of reading

instruction and reading assessment representing six states, for feedback. These seven

experts commented on the content, word use, and potential misunderstandings of the

statements on the survey instrument. The survey was then revised based on the feedback

of these experts, and Survey version 2 was developed. Appendix B illustrates the

revisions made to Survey version 1, while maintaining the organizational structure

within the four constructs.

PKIRA Version 3: Revised Survey Based on Academic Committee Suggestions

Based upon feedback from my dissertation committee members, who represent

both experts in literacy education and research methodology, I revised the format and

organization of the survey. Specifically, I revised my survey into Likert scale items,

multiple choice questions, and fill-in-the-blank responses in order to more precisely

measure teacher perception of their own reading assessment knowledge, as well as their

specific content knowledge of the teaching of reading. This change rendered the four

originally proposed constructs, to three similar and more specific constructs. The three

new constructs assumed to be the foundation of this research were then: 1) teacher

perception of their knowledge of reading and reading assessment; 2) teacher reading

assessment knowledge and data literacy; and 3) teacher knowledge of language

structure. The final qualitative section of Version 3 remained from Version 1 of the

survey to collect information on participants' ability to use reading assessment data to

guide instruction. In this section the survey participants were given reading data on

three students and asked to determine his or her area of need based on that data and what literacy practices would target the students' most critical area of need.

PKIRA Version 4: Revised Survey Based on Teacher Feedback

The survey then was given to 17 elementary reading teachers in a small urban school district in Texas, who would represent potential users of the survey. These teachers were asked to complete the survey and note any confusing items or questions. Based on the feedback of these 17 educators, the following revisions were made: a) nine of the sixteen demographics multiple choice items were revised for clarity and one item was added for a total of seventeen demographics items; b) from the thirty teacher perception of reading assessment and instruction subscale, six items were deleted and eight were revised for clarity, for a final total of twenty four teacher perception of reading assessment and instruction items; and c) ten of the fifteen reading assessment knowledge and data literacy multiple choice items were revised for clarity. Also, it was repeatedly noted that the twenty items in the knowledge of language structure multiple choice subscale were challenging, however these items were taken in whole from Bos et al. (2001), and thus were left without revision, for validity purposes. At that point, the survey was considered ready for formal pilot testing and was put into the Qualtrics online survey system in order to be emailed to potential participants.

Participant Recruitment

The first phase of data collection consisted of a national participant teacher sample who completed the survey through the Qualtrics online system in April and May of 2016. In accordance with university IRB, potential participants were recruited

through direct email request, snowball sampling, and word of mouth. The recruitment email that was sent, or forwarded, to potential participants invited all current or recent prekindergarten through twelfth grade reading, literacy, and/or language arts educators to participate. As an incentive for participating in this study, the possibility to win one of two $50 Amazon gift cards was offered to every participant. Additional support came from four university professors of reading, from universities located around the country, who agreed to recruit in their local areas. These four professors are located at campuses of higher education in the western central, north central, and northeastern areas of the United States. In accordance with university IRB, the entire recruitment process for this study was based on the snowball or word-of-mouth sampling techniques, thus the sample of participants was through convenience sampling.

Procedures

After the data was cleaned, the multiple choice subscales were recoded from the originally collected numbered responses to a right (1) or wrong (0) numbered response. This allowed me to analyze these subscales data using Item Response Theory, as well as conduct reliability and validity analyses.

The final section of the survey, in which participants were asked to given open ended responses to the needs and potential intervention solutions to three struggling reading students, was analyzed through a qualitative process of sorting and categorization answers. Commonality of answers was based on key vocabulary and/or similar wording. The answers were tallied for frequency and these results are reported.

Statistical Analyses

Although there were three subscales consistently revised during the development of the survey (perception of reading assessment and instruction, the knowledge of reading assessment and data literacy, and the knowledge of language structure), the PKIRA consisted of five total sections and subscales (including the demographics section and the open-ended response section), for which data will be reported. The first section consisting of demographic information and professional experience was analyzed descriptively. The second subscale of the survey consisted of 25 teacher perception of reading assessment and instruction scale items. An Exploratory Factor Analysis, performed in SPSS, was used to understand the construct structure of this newly designed instrument. Potential constructs were analyzed for inter-item reliability using Cronbach's alpha (Bland & Altman, 1997) and alpha if deleted analyses. The third and fourth subscales of the survey, teacher reading assessment knowledge and data literacy and teacher knowledge of language structure, were recoded to indicate a right or wrong answer. An Exploratory Factor Analysis, also in SPSS, was implemented for the 15 multiple choice items in the teacher reading assessment knowledge and data literacy and the 20 multiple choice items, taken in whole from Bos et al. (2001), in teacher knowledge of language structure. Potential factors/constructs were then analyzed reliability using Cronbach's alpha and alpha if deleted procedures. Finally, following the lead of Binks-Cantrell, Joshi, and Washburn (2012), analysis based on Item Response Theory was implemented with both multiple choice subscales, to further improve the scale. The final section of the survey allowed the participants to evaluate

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the data of three students, determine the academic reading profile of each, and give possible interventions to support the students' growth, through open ended response. These six open ended responses were then organized into categories, based on similar response wording or construct similarity, and reported thematically.

Results

Participant Demographics

The demographic data for the participants in Study 1 achieved the goal of a varied sample (see Table 3). Of the 190 participants that attempted the online survey, 12 stopped upon completion of the demographics section of the survey. Therefore these results were excluded from further data analyses. Of the remaining 178 participants, 131 participants completed the entire survey in full, including the open ended data analysis items at the end of the survey. Twenty six completed only through the teacher perception of reading assessment and instruction subscale (N = 178), eight stopped after the teacher reading assessment knowledge and data literacy subscale (N = 152), and thirteen stopped at the end of the knowledge of language structure subscale of the survey (N = 144). The largest possible sample was included for each subscales' analysis, because the survey sections and subscales were analyzed independent from the other.

Table 3

Study 1: Participant Demographics (n = 178)

	n	**Percentage**
Gender		
Male	7	3.9%
Female	171	96.1%
Ethnicity		
African American	9	5.1%
Asian/Pacific Islander	4	2.2%
Hispanic	16	9.0%
White	144	80.9%
Other	5	2.8%
Years Teaching		
1-3 years	32	18.0%
4-7 years	42	23.6%
8-15 years	53	29.7%
16-20 years	19	10.7%
20 or more years	32	18.0%
Years Teaching Reading/Language Arts		
1-3 years	47	26.4%
4-7 years	39	21.9%
8-15 years	50	28.1%
16-19 years	18	10.1%
20 or more years	24	13.5%
Current Grade Level Taught		
Early Childhood (PK-Kinder)	30	16.9%
Elementary (1st – 4th grade)	93	52.2%
Intermediate or Middle School (5th – 8th grade)	39	21.9%
High School (9th – 12th grade)	16	9.0%
Master's Degree		
Yes, in Reading/Language Arts	41	23.0%
Yes, in another content area	51	28.7%
In Progress	34	19.1%
No	52	29.2%
Specialized Reading Certification		
Yes	40	22.5%
No	126	70.8%
In Progress	12	6.7%

Table 3 Continued

	n	Percentage
Current State in Which You Teach		
California	5	2.8%
Georgia	1	0.6%
Illinois	7	3.9%
Iowa	5	2.8%
Louisiana	1	0.6%
Massachusetts	2	1.1%
Mississippi	1	0.6%
Nevada	21	11.8%
Oklahoma	2	1.1%
Tennessee	1	0.6%
Texas	107	60.1%
South Carolina	1	0.6%
Virginia	24	13.4%
Certification Area (participants could select multiple responses)		
Generalist (1st – 6th)	131	29.6%
Early Childhood (PK – K)	72	16.3%
Bilingual Educator	11	2.5%
English as a Second Language	63	14.3%
Special Education	30	6.8%
Reading Specialist/Master Reading Teacher	35	7.9%
Content Specific	57	12.9%
Educational Diagnostician	1	0.2%
Educational Administration	15	3.4%
Other	27	6.1%
College Reading Assessment Courses Taken		
0	19	10.7%
1	29	16.3%
2	58	32.6%
3 or more	72	40.4%
Professional Development on Reading Assessment		
Yes	138	77.5%
No	40	22.5%

The majority of the participants sampled were white (80.9%) female (96.1%), which is similar to the national statistics describing the teaching force, in which 81.9% are white and 76.3% are female (U.S Department of Education [USDE], 2012). The sample included 5.1% African American, 2.2% Asian/Pacific Islander, and 9.0% Hispanic teachers, which is similar to the national averages of 6.8%, 1.8%, and 7.8% respectively (USDE, 2012). The sample contained much variation in years of teaching but over half of the participants had been teaching for eight or more years (58.4%). The variability in the teachers' years of teaching indicates likely differences in their preparation for teaching reading as favored approaches and philosophies towards reading instruction have shifted dramatically in the past 25 years. Slightly over half of participants held master's degrees (51.7%) and many of the master's were in the field of education, but only 22.5% held Reading Specialist certifications which is typically a state certification earned in conjunction with an M.Ed. in Literacy or Reading Education. Some of the "other" certifications held by participants included librarian, dyslexia interventionist, school counselor, academic language therapist, and two certified superintendents. Many participants indicated that they had taken three or more reading assessment courses in college (40.4%) and 77.5% of the participants said they had received professional development in the area of reading assessment. Thirteen states were represented, while the majority of teachers were from the West and Southwest regions.

Participants' General Experience and Perceived Instructional Preparedness

Participants reported their general experience with the administration and data

review of reading assessments, as well as their perceived instructional preparedness (see

Table 4).

Table 4

Study 1: Participants General Reading Assessment Experience and Perceived Instructional Preparedness (n = 178)

	n	Percentage
Frequency of Instructional Decisions Made Based on Students' Data		
Every day	101	56.7%
At least once per week	66	37.1%
Other	11	6.2%
Frequency Students are Assessed		
Every day	53	29.8%
At least once per week	72	40.5%
Every 2-3 weeks (Progress monitor)	46	25.8%
Once per grading period	7	3.9%
Time Spent Assessing based on Frequency Assessed (previous question)		
1-2 hours	118	66.3%
3-5 hours	21	11.8%
6-10 hours	1	0.6%
10 or more hours	2	1.1%
Other	36	20.2%
Perceived Preparedness to Teach Children to Read		
Not Prepared		
Somewhat Prepared	4	2.2%
Adequately Prepared	27	15.2%
Well Prepared	51	28.7%
	96	53.9%
Perceived Preparedness to Support the Growth of Struggling Readers		
Not Prepared	6	3.4%
Somewhat Prepared	32	18.0%
Adequately Prepared	49	27.5%
Well Prepared	91	51.1%
Perceived Preparedness to Use Phonological Awareness and Phonics in Teaching Reading		
Not Prepared	9	5.1%
Somewhat Prepared	41	23.0%
Adequately Prepared	43	24.1%
Well Prepared	85	47.8%

Due to the phrasing of the questions, some inference is needed to understand how much time teachers spend assessing each week. Therefore, to interpret the responses from "how much time was spent assessing" I connected those responses with the responses from the previous question of "how often student are assessed." Taken in concert, results showed that 70.3% of participants indicated they assess students either *every day* or *at least once per week*. The majority (66.3%) then answered that within that time frame (*every day* or *at least once per week*), they spent one to two hours assessing students. Thus, it can be inferred that the majority of participants assess students' reading at least weekly, and the majority spent one to two hours assessing students each week. However, approximately 20% of the sample noted "other." These responses were varied but indicated that assessments were occurring at least weekly in their classrooms as well; *minutes when using total student response techniques*; *automatic online assessment*; *daily quick checks*; *minutes every day*; and *constantly*.

In total, this high frequency of assessment is consistent with the response that most participants (56.7%) indicated they made data driven instructional decisions every day. We can logically infer that they are using the assessments for decisions making.

The majority of participants reported as confident in the use of data for instruction, and felt they were *well prepared* to teach reading in general (53.9%) and also *well prepared* to teach struggling readers (51.1%). This finding is supported by the demographic data which indicated relatively high levels of teaching experience and education.

The final question inquired about perceived preparedness in phonological awareness and phonics for teaching reading specifically. Results indicated that the majority of participants (71.9%) felt *adequately* to *well prepared* to use this instructional technique.

Teacher Perception of Reading Assessment and Instruction

The second subscale of the survey consisted of 25 response items addressing teachers' perceived knowledge of reading and reading assessment. Upon the first analyses of these items the overall Cronbach's alpha was 0.793. However, the Exploratory Factor Analysis (EFA) in SPSS determined eight possible factors, however the item relationships were unclear and only two factors had an α of 0.70 or higher. Thus, a five factor analysis was forced, because five factors explained 51% of the variance for the items and five factors were assumed in the development of the items (phonemic awareness, phonics, fluency, comprehension, and total & home literacy). Upon reliability analysis of the five forced factors, only factors 1, 2, and 4 had an alpha of 0.70 or higher. Based on those results from the forced five factor EFA, items 2, 24, and 7 were deleted and the overall Cronbach's alpha increased to 0.804. Another EFA was run, with five forced factors, the factor alphas increased as predicted, and no other alpha if deleted items were disclosed.

I then ran an EFA, without forcing the factors. The program found six factors, but more importantly it determined that item 18 had a negative correlation in almost every factor. This item used the word "most" which may have caused ambiguous interpretations. When item 18 was deleted, the overall Cronbach's alpha increased to

0.825. I then performed another EFA, forcing four factors instead of five, because items 18 and 19 had been in their own factor. Factor 1 contained the same five items it had had since the first EFA, and the deletion of item 4, and had an alpha of 0.774. Factor 2 went from five to six items, because item 19 ended up there, and factor 2 had one alpha if deleted item, item 19, which would increase its alpha from 0.699 to 0.721. Factor 3, which now contained seven items, had no alpha if deleted items, and an alpha of 0.728. Factor 4 contained three items, no alpha if deleted candidates, and an alpha of 0.424. Based on these results items 19 was deleted, as it had been considered a tricky item based on the varied responses from participants. Thus, when items 4, 24, 7, 18, and 19 were deleted from the original 25 item teacher perception of reading assessment and instruction subscale of the survey, the overall Cronbach's alpha increased.

Final factor structure for the teacher perception of reading assessment and instruction subscale. Through a combination of factor analysis, Cronbach's alpha if deleted results, and theoretical rationale, I determined the final factor structure to be four factors; Factor *1*) phonemic awareness and phonics; Factor 2) instructional practices and student response; Factor 3) reading strategies and teacher actions; and Factor 4) text interactions and exposure. The table below shows how the items were grouped by factor (see Table 5).

Table 5

Study 1: Teacher Perception of Reading Assessment and Instruction Subscale Exploratory Factor Analysis, Cronbach's α, and α If Deleted Items

Item	**Factor 1** Perceived Knowledge of Phonemic Awareness and Phonics	**Factor 2** Perceived Knowledge of Instructional Practices and Student Response	**Factor 3** Perceived Knowledge of Reading Strategies and Teacher Actions	**Factor 4** Perceived Knowledge of Text Interactions and Exposure
13. Phonics instruction promotes decoding skills.	**.761**	.434	.464	.292
10. K-2 teachers should know how to teach phonics (letter/sound correspondences).	**.729**	.241	.441	.153
16. Phonics instruction is beneficial for children who are struggling to learn to read.	**.607**	.553	.208	.397
14. It is important for teachers to demonstrate to struggling readers how to segment words into phonemes when reading.	**.594**	.414	.302	.167
1. K-2 teachers should know how to teach and assess phonological awareness.	**.553**	.240	.289	.153
21. Effective instruction for word recognition and decoding emphasizes students' development of graphophonemic skills.	.374	**.720**	.393	.183

Table 5 Continued

Item	**Factor 1** Perceived Knowledge of Phonemic Awareness and Phonics	**Factor 2** Perceived Knowledge of Instructional Practices and Student Response	**Factor 3** Perceived Knowledge of Reading Strategies and Teacher Actions	**Factor 4** Perceived Knowledge of Text Interactions and Exposure
23. To grow students understanding of the relationship between written and spoken word, a teacher could read aloud from a big book while pointing to each word as its read.	.422	**.600**	.482	.362
22. Literal comprehension instruction can include retelling the beginning, middle, and end of a story.	.337	**.567**	.307	.393
15. Direct, explicit, instruction in phonemic awareness supports a student's ability to rhyme.	.289	**.519**	.245	.327
25. Having students write in a learning log about what they learned and what they do not understand, during and after reading, supports self-monitoring to improve comprehension.	.222	**.447**	.412	.221

Table 5 Continued

Item	Factor 1 Perceived Knowledge of Phonemic Awareness and Phonics	Factor 2 Perceived Knowledge of Instructional Practices and Student Response	Factor 3 Perceived Knowledge of Reading Strategies and Teacher Actions	Factor 4 Perceived Knowledge of Text Interactions and Exposure
17. The teacher thinking aloud during reading promotes students' active construction of meaning and comprehension.	.346	.309	**.667**	.145
12. Teacher modeling of skills during guided reading will help foster student's ability to utilize these skills.	.388	.249	**.631**	.172
20. Comprehension can be supported through teaching students explicit strategies to monitor their understanding.	.270	.551	**.564**	.111
11. Picture cues can help children identify words in the early stages of reading.	.371	.108	**.538**	.242
8. Children should read different types of text for different instructional purposes (i.e., decodable texts, genre based children's literature, rhyming texts).	.415	.435	**.463**	.278
9. Repeated readings of the same text is an example of an instructional strategy to improve fluency.	.429	.313	**.451**	.326

Table 5 Continued

Item	**Factor 1** Perceived Knowledge of Phonemic Awareness and Phonics	**Factor 2** Perceived Knowledge of Instructional Practices and Student Response	**Factor 3** Perceived Knowledge of Reading Strategies and Teacher Actions	**Factor 4** Perceived Knowledge of Text Interactions and Exposure
5. Time children spend reading or being read to contributes directly to reading improvement.	.135	.309	**.397**	.223
3. Controlling text through consistent spelling patterns (The fat car sat on a hat.) is an example of an effective method for children who struggle to learn to identify words.	.329	.416	.167	**.782**
2. Literacy experiences in the home contribute to early reading success.	.103	.147	.220	**.387**
6. Learning to use context clues (syntax and semantics) is more important than learning to use graphophonemic cues (letters and sounds) when learning to read.	-.255	.128	.058	**.355**
Cronbach's α by Factor	0.774	0.721	0.728	0.424
Overall Cronbach's α		**0.833**		

Table 5 Continued

Items deleted based on α if deleted analyses or negative correlation

4. Poor phonemic awareness contributes to early reading failure.

7. If a beginning reader reads "house" for the written word "home" the teacher should not correct the response.

24. Decodable texts are most effectively utilized to support beginning readers' development of sight word vocabulary.

18. Having a student answer written questions after reading a text is the most valuable method to support reading comprehension.

19. Explicit and systematic instruction of individual words and their meanings (outside of context), supports vocabulary development.

It should be noted that the three items included in Factor 4 had a low alpha, however were deemed useful items to retain because of their content. Thus, I revised items 3 and 6 by deleting the information in parentheses, as to not confuse participants, and added two new items to this factor, pertaining to text interactions and exposure, to give this factor a total of five items for Study 2.

Teacher Reading Assessment Knowledge and Data Literacy

The first multiple choice subscale of the survey contained 15 items that assessed the participants' general reading assessment knowledge and data literacy. This data was analyzed in three ways. An Item Response Theory (IRT) analysis to determine item difficulty and index discrimination was initially conducted in Excel. Then a test for

reliability, Cronbach's alpha, and an Exploratory Factor Analysis were both conducted in SPSS. Although the analyses began with the IRT, and then continued with the reliability and EFA, both analyses were often referred to and revisited in a recursive manner in determining appropriate items to remove or revise in this portion of the survey.

The IRT item difficulties were found by determining the percentage of participants who answered correctly on each item. A desired range for item difficulty, according to Thorndike, Cunningham, Thorndike, and Hagen (1991), is halfway between a guess (e.g.; 25% if there are four answer choices) and correct (e.g.; 100%). This implies the item difficulty range should be around 62.5%. The item difficulty for each item on this subscale was calculated and six items were determined to be within the $\pm.1$ range specified, as recommended by Binks-Cantrell, Joshi, and Washburn (2012). The overall item difficulty of the reading assessment knowledge and data literacy subscale was 0.68, which was in the ideal range. The index discrimination was then calculated by comparing the number of participants with mostly correct, or high, reading assessment knowledge and data literacy responses (top 27%) who answered an item correctly, to the number of participants who answered the same item correctly, but had mostly incorrect, or low (bottom 27%), reading assessment knowledge and data literacy responses (Binks-Cantrell, Joshi, Washburn, 2012). Ebel and Frisbie (1986) consider an index discrimination score ≥ 0.30 to be a good item. Ten items were identified as having a discrimination score of greater than 0.30, which is considered the reasonably good range, and the overall discrimination index for all reading assessment knowledge and data

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literacy items was good at 0.36. However three items, items 23, 27, and 30, had a

discrimination index of ≤ 0.19, which indicated these items were candidates for either a

major revision or deletion. The complete results of the IRT for the reading assessment

knowledge and data literacy items are in Table 6.

Table 6

Study 1: Teacher Reading Assessment Knowledge & Data Literacy - Item Response Theory Results

Item	Item Difficulty	Index Discrimination
19. Examining a class reading average on a district benchmark/unit assessment does not...	88.19	0.21
20. An example of a formative reading assessment is…	51.39	0.62
21. If a teacher wants an assessment that gives current data to be used for the adjustment of instructional goals for a student, the teacher should use…	45.83	0.54
22. A student's independent, instructional and frustrational reading levels, can be found through the administration of…	57.64	0.36

Table 6 Continued

Item	Item Difficulty	Index Discrimination
23. A running record is an example of…	91.67	0.13
24. To interpret a nor-reference reading assessment a teacher compares a student's raw score to…	40.97	0.44
25. On a given assessment, percentile rank is the…	63.19	0.49
26. A criterion-referenced reading assessment is useful in determining the…	86.11	0.28
27. A standardized assessment…	93.06	0.13
28. The international Literacy Association advises educators to ignore grade-equivalent scores, because they…	68.75	0.31
29. To best assess a student's knowledge of a specific reading skill, a teacher or specialist should use…	57.64	0.41

Table 6 Continued

Item	Item Difficulty	Index Discrimination
30. A student who can identify 7 letter-sound correspondences and can blend and segment CVC words presented orally is most likely ready to…	32.64	0.15
31. If two standardized reading assessments both have a mean of 87, but the standard deviation of Test A is 15 and the SD of Test B is 5, we know that…	77.78	0.49
32. An observational checklist of a student's reading behaviors allows the teacher to…	82.64	0.46
33. Standard deviation is the term used to identify the…	83.33	0.36
Overall Totals	**68.06**	**0.36**

The initial reliability analysis attempt produced an alpha of 0.483, which is considered a poor value of internal consistency. However, the analysis also identified an improved alpha if item 30 was deleted. This finding collaborated with the finding in the IRT, thus item 30 was removed and the alpha increased to 0.520. Successive reliability analyses were run while deleting other potentially problematic items. Therefore, based

on the IRT and the reliability results, items 23 and 30 were deleted from the reading assessment knowledge and data literacy items. Item 30 received too varied of responses and item 23 appeared to be too easy as 91% of participants answered it correctly. Further investigation of the reading assessment knowledge and data literacy items caused me to revisit item 27, which had shown up as an alpha if deleted item in the initial reliability analysis, and a low value item on the IRT. This item was answer correctly by 93.4% of participants. Therefore I removed this item as well because of its ease in answering.

An EFA was then conducted and five factors were determined, however all the alphas were below 0.70. But through this analysis, item 20 was identified to be a single factor. Upon further investigation I discovered that 37.5% of the respondents choose one of the distractor answers. Therefore, I revised the distractor answer choice to be less ambiguous.

A second EFA was pursued without items 30, 23, or 27, based on the IRT and reliability results. I also forced the EFA into two factors because I developed this subscale with two priori factors: assessment knowledge and data literacy. The second EFA yielded an alpha of 0.487 for factor 1 and an alpha of 0.419 for factor 2.

However, both factors had an alpha if deleted value; item 22 for factor 1 with an alpha increase to 0.535, and item 21 for factor 2 with an alpha increase to 0.436. A third EFA was then performed based on the low variance explained in the second EFA. Three factors explained 41% of the variance. The results of the third EFA were still quite poor.

Factors 1, 2, and 3 all maintained low or lower alpha scores of 0.504, 0.436, and 0.289 respectively, and item 22 was identified as an alpha if deleted item.

Final factor structure for the reading assessment knowledge and data literacy items. Through the consolidation and synthesis of the results from the IRT, reliability, and EFA, and based on the content of the items themselves and their importance to my research, I determined the best course of action to better develop this section of the survey. Item 30 was deleted, because it was identified by all analyses as a poor item. Items 23 and 27 were both deleted because they were identified by the IRT, and again as alpha if deleted items during the reliability analyses. The deletion of these three items increased the alpha from the original 0.483 to 0.503. Finally, items 20, 21, 22, and 25 were revised for clarity of both the question and the answer choices. This allowed the teacher reading assessment knowledge and data literacy subscale to maintain 12 items in Study 2.

Teacher Knowledge of Language Structure

This subscale of the survey consisted of 20 multiple choice items taken directly from the *Teacher Knowledge of Language Structure* section of the *Teacher Assessment of Early Reading and Spelling*, developed by Bos et al. in 2001. This subscale allowed for assessment of participants' specific knowledge of the structure of language, particularly phonological awareness and phonics skills. The analyses performed on this group of items were congruent to the analyses performed with the teacher reading assessment knowledge and data literacy items.

According to IRT analysis the knowledge of language structure items had four to five answer choices, making the ideal range of item difficulty 60.0% - 62.5%. Seven items were within $\pm$.1 the range of difficulty (Binks-Cantrell, Joshi, Washburn, 2012), and the overall item difficulty was 0.66, which is the ideal range. The index discrimination analysis found fourteen items were greater than 0.30, and the overall discrimination index for all knowledge of language structure items was 0.39, again, which all fell within the good range of scores. Three items were identified as poor items in need of major revision or deletion; items 37, 45, and 50. The completed results of the IRT for the knowledge of language structure subscale are in Table 7.

Table 7

Study 1: Teacher Knowledge of Language Structure Item Response Theory Results

Item	Item Difficulty	Index Discrimination
34. Which word contains a short vowel sound?	92.36	0.26
35. A phoneme refers to:	90.28	0.31
36. A pronounceable group of letters containing a vowel sound is a:	71.53	0.41
37. If *tife* were a word, the letter "i" would probably sound like the "i' in:	95.83	0.08

Table 7 Continued

Item	Item Difficulty	Index Discrimination
38. A combination of two or three consonants pronounced so that each letter keeps its own identity is called a…	70.83	0.62
39. An example of a voiced and unvoiced consonant pair would be:	40.28	0.41
40. Two combined letters that represent one single speech sound are a:	65.28	0.67
41. How many speech sounds are in the word "eight"?	87.50	0.28
42. How many speech sounds are in the word "box"?	17.36	0.41
43. How many speech sounds are in the word "grass"?	47.22	0.64
44. What type of task would this be? *Say the word "cat." Now say cat without the /c/ sound.*	80.56	0.46
45. What type of task would this be? *I am going to say some sounds that will make one word when you put them together. What does /sh/ /oe/ say?*	89.58	0.56

Table 7 Continued

Item	Item Difficulty	Index Discrimination
46. Mark the statement that is false:	50.00	0.56
47. What is the second sound in the word "queen"?	36.11	0.23
48. A reading method that focuses on teaching the application of speech sounds to letters is called:	61.11	0.46
49. A soft c is in the word:	86.81	0.33
50. Identify a pair of words that begin with the same sound:	99.31	0.03
51. All of the following nonsense words have silent letters, except:	47.92	0.67
52. If you say the word, and then reverse the order of the sounds, **ice** would be:	73.61	0.64
53. If you say the word, and then reverse the order of the sounds, **enough** would be:	67.36	0.59
Overall Totals	**66.39**	**0.39**

The initial reliability analysis attempt with all items produced a Cronbach's alpha of 0.731, which is considered "good." It also indicated that the overall alpha would improve with the removal of item 45, from 0.731 to 0.733. As this information was

congruent with the results of the IRT, further inspection of item 45 provided strong rationale to delete that item, as 90% of the participants had gotten this item correct, and thus it was considered too easy. Item 47, "What is the second sound in the word queen?" was also considered a potential item to delete for the improvement of the overall alpha. However, the challenge of this item was useful for discrimination (only 36% of responses were correct) and therefore I decided to leave it on the survey.

The second reliability attempt was performed based on the results of the first analysis and the IRT. With the deletion of various combinations of items 37, 45, and 50, a final and maximum Cronbach's alpha was attained at $\alpha = 0.734$ with the deletion of items 45 and 50. Item 37 remained on the survey for Study 2, as its deletion did not increase the overall reliability of this subscale, and the reason for its identification in the IRT analysis was likely because it was answered correctly by most of the participants.

With the deletion of two items (45 and 50), SPSS found six initial factors in the first EFA. These six factors all had relatively low Cronbach's alpha results with none of them attaining the ideal .700 range ($\alpha = 0.356 - 0.628$). Through the factor analysis, I determined three more items to consider for deletion (items 39, 46, and 48). Therefore, the decision was made to delete a total of five items (39, 45, 46, 48, and 50), which changed the Cronbach's alpha for the knowledge of language structure subscale to 0.723.

Next, a two factor EFA was forced based on Bos et al. (2001) development of their survey around two factors; 1) phonological awareness, and 2) phonics. Based on

the results of this EFA ($\alpha = 0.650$ and 0.616 respectively), and the importance of the content of the remaining items, no further item revisions were made.

Final factor structure for the knowledge of language structure items. Since Bos et al. already established these survey items as reliable in 2001 ($\alpha = 0.600$) the merging of results from the analyses performed on my survey's data (IRT, reliability, and EFA) allowed me to make informed adjustments to the knowledge of language structure subscale of the PKIRA. Items 45 and 50 were deleted based on results of the index discrimination on the IRT analysis and Cronbach's alpha if deleted results from the reliability analysis. Items 38, 46, and 48 were identified from the EFA, and with further consideration of the content of these items, were also deleted. With the deletion of these five items this subscale was shortened from 20 to 15 items for Study 2, and measured two sub-factors of language – phonological awareness and phonics.

Open Response Items: Teacher Ability to Use Data to Drive Instruction

One hundred and thirty one participants completed this portion of the survey containing reading assessment data for three students. Participants were asked to identify each student's area of weakness and then prescribe an intervention to meet the need of each individual student.

Responses for Sam. The first student's data indicated areas of weakness, or low scoring with 14/52 and 1/10, respectively, in both *letter sound identification* and *word reading*. The reason for providing two areas of weakness was to see if participants knew the logical progression of reading instruction, and that most often in order to build word

reading, you must first fill in the missing letter sound knowledge (NRP, 2000). Table 8

provides the answers given by respondents of Sam's area of weakness.

Table 8

Study 1: Open Ended Data Analysis for Data Driven Instructional Practice – Sam's Weakness

Area of Weakness	n	Percentage
Letter Sound Identification	97	68.4%
Word Reading/Decoding	34	23.9%
Phonemic Awareness (i.e.; blending, segmenting, deleting/adding phonemes)	6	4.2%
Phonics	2	1.4%
Other	3	2.1 %
Total Responses	**142**∗	**100%**

∗ number is more than 131, because some participants responded with more than one possible need

By grouping key words provided in the responses I found "letter sound

identification" or simply "letter sounds" to be the most common answer. This is logical

based on the data given. The three responses in the "other" category were non-specific

(e.g., "reading").

Participants were then asked to provide interventions that could support the

Sam's growth. Potential interventions provided by participants are presented in Table 9.

Table 9

*Study 1: Open Ended Data Analysis for Data Driven Instructional Practice –
Intervention for Sam*

Possible Intervention	n	Percentage
Letter Sound Practice Activities (e.g.; alphabet arcs)	32	19.7%
Phonics Activities	28	17.3%
Picture Cards/Songs/Poems	23	14.2%
Word Work (e.g.; high frequency word practice, decoding practice, word sorts)	20	12.3%
Phonemic Awareness Activities	20	12.3%
More Book Reading/Tracking While Reading	8	4.9%
Flashcards	5	3.1%

Table 9 Continued

Possible Intervention	n	Percentage
Structured Intervention Programs (i.e.; DIP, LIPS, Orton Gillingham, Words their Way)	3	1.8%
Explicit Instruction	3	1.8%
Small Group Instruction	3	1.8%
Hands On/Multisensory	3	1.8%
Repeated Reading	2	1.2%
Letter Books	2	1.2%
Elkonin Sound Boxes	2	1.2%
Peer Reading	1	0.6%
Phonemics	1	0.6%
Literacy Centers	1	0.6%
Media for Practice	1	0.6%
No Letter of the Week	1	0.6%
Teaching Annotations	1	0.6%

Table 9 Continued

Possible Intervention	n	Percentage
Not answered/*Not Sure/Don't Know*	*3*	*1.8%*
Total Responses	**163***	**100%**

* number is more than 131, because some participants responded with more than one possible need

Many of the interventions provided could be included within a common category, however there were a few responses that stood on their own, as indicated in Table 18. Most of the categories were clear and appropriate for the student's needs, however a few responses (e.g.; "phonemics") were not interpretable. Also, the "structured intervention programs" were grouped together because they each provide explicit and scripted intervention models for teaching early reading alphabetic skills, and three of them are used specifically with dyslexia students (DIP, LIPS, and Orton Gillingham).

Responses for Valerie. The second student's data indicated an area of weakness, or low scoring with 24/80 words per minute, in *oral reading fluency*. There was an overwhelming agreement from participants that "fluency," "oral reading fluency," or "reading fluency" was the greatest area of need for Valerie. Table 10 displays the data collected identifying Valerie's area of weakness.

Table 10

Study 1: Open Ended Data Analysis for Data Driven Instructional Practice – Valerie's Weakness

Area of Weakness	n	Percentage
Oral Reading Fluency/Reading Fluency/Fluency	127	96.1%
Word Reading	2	1.5%
Oral Reading	1	0.8%
Words per Minute	1	0.8%
Reading Rate	1	0.8%
Total Responses	**131**	**100%**

The "word reading," "oral reading," "words per minute," and "reading rate" responses were included as their own categories, because they lacked specificity. The response, "word reading" could mean the reading of words fluently in text or reading words in isolation, hence this response was included as its own category. The "oral reading" response was not included with the 127 "fluency" responses because it did not include the term *fluency*, and thus could be interpreted as a need *or* ability to read orally. "Words per minute" (WPM) was put in its own category as well because although Valerie's WPM were low, the underlying issue is low fluency. Finally, "reading rate" was placed alone because Valerie's rate of reading is an issue, but fluency is not simply

reading quickly, and this response was not as specific as necessary to fit into the

category with the fluency responses.

Participants then responded to what interventions could be utilized to support

Valerie's need. The responses were quite varied and although some of them could be

grouped together based on key words, I felt many of them should stand alone because

they did not overlap with the wording of other responses. The data for Valerie's

possible interventions is presented in Table 11.

Table 11

Study 1: Open Ended Data Analysis for Data Driven Instructional Practice –
Intervention for Valerie

Possible Intervention	n	Percentage
Repeated Reading	66	37.3%
Fluency Reads/Passages	18	10.2%
Modeling/Practice with Fluent Adult	12	6.8%
Reading Independent Level/Easy/Familiar Text	11	6.2%
Oral Reading/Reading Aloud	10	5.6%
Timed Reading	10	5.6%

Table 11 Continued

Possible Intervention	n	Percentage
Sight Word/High Frequency Word/Vocabulary Practice	9	5.1%
Readers Theatre	6	3.4%
Decoding Strategies	6	3.4%
Reading Instructional Leveled Books	5	2.8%
Listen to Reading	4	2.3%
Partner Reading	4	2.3%
Poetry Practice	3	1.7%
Practicing Reading	2	1.1%
Choral/Echo Reading	2	1.1%
Feedback While Reading/Thinking Aloud	2	1.1%
Record Reading	1	0.6%
Explicit Phonics Instruction	1	0.6%
Running Record	1	0.6%

Table 11 Continued

Possible Intervention	n	Percentage
Cloze Reading	1	0.6%
Not answered/*Not Sure/Don't Know*	3	1.6%
Total Responses	**177**∗	**100%**

∗ number is more than 131, because some participants responded with more than one possible need

Although all answers, except the three who did not know, were focused on building reading or a reading skill, there was great diversity in the responses. The "practicing reading" responses were not included with any other category, because of their lack of specificity. The diverse answers for types or strategies of reading to support student's growth were sorted or individualized, depending on key words. I wanted to include the most precise transference of data to the results section, and thus many categories are purely based on individual response.

Responses for Manuel. The final student's data indicated an area of weakness, or low scoring with 2/8, in *reading comprehension*. The responses were predominately focused on this area of weakness, with only 1 respondent out of 131 indicating an alternative answer to "comprehension" or "reading comprehension." Again, three participants did not respond or were not sure of what this student needed. See Table 12 for Manuel's identified area of weakness.

Table 12

Study 1: Open Ended Data Analysis for Data Driven Instructional Practice – Manuel's Weakness

Area of Weakness	n	Percentage
Comprehension/Reading Comprehension	128	97.7%
Word Reading	1	0.8%
Not answered/*Not Sure/Don't Know*	*3*	*1.5%*
Total Responses	**131**	**100%**

The responses for what interventions could be implemented to support Manuel's growth in reading comprehension were the most abundant and diverse responses in this entire section of the survey. The data collected for this final portion of the survey can be reviewed in Table 13.

Table 13

Study 1: Open Ended Data Analysis for Data Driven Instructional Practice –
Intervention for Manuel

Possible Intervention	n	Percentage
Teach/Practice Comprehension Strategies (i.e.; retelling, inferring, predicting, summarizing, recalling, making connections)	46	23.8%
Questioning During/After Reading	33	17.1%
Graphic Organizers/KWL Charts/ CPW Reading Charts/Story Maps	14	7.4%
Thinking Aloud while Reading	12	6.3%
Discussing Reading/Language Building	10	5.2%
Modeling by Teacher	10	5.2%
Self Monitoring	10	5.2%
Text Annotation/Marking Text	8	4.1%
Read/Reread/Practice Reading/Partner Reading	7	3.6%
Teach Story Elements/Structure	6	3.1%

Table 13 Continued

Possible Intervention	n	Percentage
High Frequency Words/Sight Words/Vocabulary Instruction	6	3.1%
Guided Reading	6	3.1%
Visualizing	5	2.6%
Metacognitive Strategies	4	2.1%
Read Topics of Interest	2	1.0%
Hands On Activities	1	0.5%
Comprehension Checks	1	0.5%
Readers Response Activities	1	0.5%
Write about Reading	1	0.5%
Comprehension Games	1	0.5%
Teach Pre-Reading Strategies	1	0.5%
Find Reading Level	1	0.5%
Literacy Instruction	1	0.5%
Slow Down When Reading	1	.5%

Table 13 Continued

Possible Intervention	n	Percentage
Not answered/*Not Sure/Don't Know/Need More Information/Doesn't Need an Intervention*	5	2.6%
Total Responses	**193**∗	**100%**

∗ number is more than 131, because some participants responded with more than one possible need

There was a wide range of responses offered in this section, and many of the participants gave more than one intervention within their response. Since the act of comprehension is quite a highly skilled mental task, I expected there to be numerous possibilities provided for Manuel. As Table 13 highlights, some of the responses were easily grouped together, however some of them were left as a single category to illustrate the variety of responses. If a participant wrote a specific comprehension strategy, it was included within the *Teach/Practice Comprehension Strategies* category. The overabundance of precision and detail in some responses and the lack of it in others allowed for a more skillful sorting and categorization of the data. Regarding survey development, these questions seemed to be easily interpretable for teachers and thus were not modified for Study 2 of this dissertation.

Discussion

In the following section, I first discuss the participant demographics as relevant to interpretation of the data. Next, I present the constructs measured by this survey. Finally, I discuss the issues related to reliability and validity of each section.

Participant Demographics and Implications

A strength of this validation study was the diverse sample of participants who piloted this newly developed instrument. Ideally this instrument could be used across different states, which may or may not have adopted the Common Core Standards, and within a variety of teacher preparation programs. Therefore, the instrument had to be valid on a geographically diverse sample. Although participants from three states, Texas, Nevada, and Virginia, comprised the majority of the sample, 13 states were represented in total. The balance across grade levels of participants was also noteworthy, as the perspectives on reading assessment were given across prekindergarten through twelfth grades.

The years of experience of these educators, as well as the fact that the majority report holding a master's degree, characterize this sample as a particularly well informed group of teachers. The number of reading courses teachers reported having taken in college, and the professional development received, provides an optimistic viewpoint for perhaps a renewed attention on reading instruction and assessment. Alternatively, there may have been a self-selection bias in which teachers would choose to complete a long survey on reading assessment. Similarly, the majority of participants felt they were *well prepared* to teach reading (53.2%) and, furthermore, *well prepared* to teach struggling readers (50.5%). In fact, only 3.2% and 3.7% felt they were *not prepared* to teach reading, or furthermore, to teach struggling readers. These perception results provide a stark contrast to the demonstrated knowledge found by Moats in 1994, in which her *Informal Survey of Linguistic Knowledge* determined "even motivated and experienced

teachers typically understand too little about spoken and written language structure to be able to provide sufficient instruction in these areas" (p. 81). However, this perception of confidence is congruent to this group of teachers' reported preparation.

Constructs Measured by this Survey

In total, the final version of the PKIRA was comprised of 72 items with five sections or subscales. As certain sections and subscales measured more than one factor, the organization of this version of the PKIRA, used for Study 2, can be more easily understood in Table 14.

Table 14

Final Organization of the PKIRA Survey

Sections and Subscales	Factors Assessed			
Section 1: Demographics, Participants General Experience and Perceived Instructional Preparedness				
Subscale 2: Teacher Perception of Reading Assessment and Instruction	Perceived knowledge of phonemic awareness and phonics	Perceived knowledge of instructional practices and student response	Perceived knowledge of reading strategies and teacher actions	Perceived knowledge of text interactions and exposure

Table 14 Continued

Sections and Subscales	Factors Assessed	
Subscale 3: Teacher Reading Assessment Knowledge and Data Literacy	Teacher assessment knowledge	Teacher data literacy
Subscale 4: Teacher Knowledge of Language Structure	Teacher knowledge of phonological awareness	Teacher knowledge of phonics
Section 5: Teacher Ability to use Data to Drive Instruction	Teacher ability to use data to drive instruction	

The multiple constructs measured by this tool greatly enhances the benefits of its use to support the growth of educators' knowledge and understanding of reading assessment, data driven instruction, and data literacy. Being these are critical topics directly affecting classroom instruction, a goal for this survey is that it will be implemented as a tool to develop and grow the literacy pedagogy skills of today's classroom teachers.

Reliability and Validity

The teacher perceptions of reading and reading assessment subscale of the survey produced a high overall reliability within three of the four factors. Compared to similar

measures (e.g., Saligner et al., 2010, $\alpha = 0.790$) this survey produced a higher overall level of reliability, and mostly higher within factor reliability. Additionally, the factor reliability was frequently higher than other similar surveys, although not all researchers reported reliability of individual subscales, which reduced comparisons. The low reliability of Factor 4 (perceived knowledge of text interactions and exposure) in this subscale, may be related to the small number of items within this factor, but is more likely due to a lack of clarity in the underlying construct. Through the process of item deletion, revision, and further development of items, future versions of the survey are intended to have a more clearly defined and reliable factor.

The knowledge of reading assessment and data literacy subscale of the survey, however, produced an overall low reliability score. It is important to note that unlike the teacher perception subscale, this scale was developed anew. There were few instruments from which to adapt items. Through analysis from both the IRT approach and the EFA the scale was marginally improved. Yet, further validation must occur on this subscale before use in research. However, as there are no available measures in this area, this initial work provides promise and direction for future research.

The third subscale of the survey, the knowledge of language structure, produced a relatively high overall and factor reliability. Compared to the Bos, et al. (2001) survey from which it was taken, this survey produced a higher level of reliability. Through the process of item deletion I was able to minimize the number of items in this subscale, but still maintain a high reliability score. In the future, this portion of the survey will remain

intact, as it proved to be an effective tool in measuring participants' knowledge of language structure, which is a fundamental skill for all literacy educators.

The final section of my survey, which consisted of open-ended responses illustrating teachers' ability to use data to drive instruction, remained without revision as it proved to be an effectively developed tool in the collection of teachers' authentic data literacy knowledge. The initial question, which required the teachers to identify the areas of need of the student, was not highly informative because the teachers typically used the exact verbiage from the vignette or assessment data. The majority of answers contained multiple similarities and often identical key words or terms. However, the second questions captured valuable data as the teacher then reported what instructional practices they would employ after seeing such an assessment profile. The participants generally produced well-informed responses, which may be a reflection of their perpetration and experience. However, the responses also reflected a large range of instructional practices, which derived from an equally large range of theoretical stances. It is interesting to note that teachers primarily focused on instructional practices rather than noting a particular curriculum.

<div align="center">**Conclusions**</div>

The findings of this study provide the basis for a valid and reliable instrument to capture teachers' perceptions and knowledge regarding reading assessment. The use of both IRT and traditional reliability analyses provided a rigorous manner to analyze the items and adapt the instrument. The instrument therefore, was refined and employed with a unique sample of participants, in Study 2 of this dissertation.

CHAPTER IV

STUDY 2: TEACHER KNOWLEDGE OF READING AND ASSESSMENT

Upon completion of Study 1, in which the PKIRA was initially validated, Study 2 commenced. The purpose of this study was two-fold: First, this data collection allowed further confirmation and validation of the PKIRA tool. Second, using PKIRA on a more homogenous and known sample allowed for the collection and analysis of data on educators' perceptions and knowledge of reading assessment and data literacy which could be analyzed in reference to their reported preparation and professional experiences.

Methods

The data collection for this research occurred during a two-week period in September 2016. This study, completed with prekindergarten through twelfth grade teachers within a single school district, collected teachers' responses of the revised PKIRA survey (see Study 1) via an online platform.

Participant Recruitment

Campus specific emails were sent to all faculty members at each of the 16 (elementary through high schools), in a small urban school district in south central Texas. A week after the initial request for participation was sent, a follow up email was sent to remind teachers that their participation would be greatly appreciated. As in Study 1, participants were offered the incentive of winning one of two $50 Amazon gift cards in appreciation of their participation. Initially, one hundred and thirty one participants

responded to my survey. As approximately 850 teachers work in the district and potentially received the email, this represented a response rate of around 15%. However, only 77 teachers completed the survey in its entirety. The response rate of this survey, initially of 15%, but only 9% for the entire survey, is lower than ideal (Schonlau, Ronald, & Elliott, 2002; Wright, 2015). The teachers that chose to complete the survey may represent a particularly motivated or well informed group of teachers. Therefore, these results may not generalize as well to other samples. However, because the primary goal of this study was survey validation, I am not making claims of generalization across the population.

Procedures

The procedures in Study 2 mirror the procedures in Study 1, with the exception of the use of a Confirmatory Factor Analysis (CFA), guided by the results of the EFA in Study 1.

Before beginning any analyses, the data from both multiple choice subscales was recoded as a 1 for correct and a 0 for incorrect, just as it was in Study 1. The final open response section of this survey in which participants were asked to analyses the reading data of three students was treated the same for Study 2 as it was in Study 1. Item responses were categorized by common key words and frequencies were calculated based on the number of responses in each category.

Statistical Analyses

The five sections or subscales of the PKIRA remained consistent from Study 1 to Study 2, with the revisions from Study 1 informing Study 2. The first section

(demographics) was reported in descriptive statistics. The fifth section of Study 2 (open ended interpretation to instruction questions) were analyzed through qualitative categorization. Additionally, the three subscales of the survey were analyzed for reliability, using Cronbach's alpha and alpha if deleted. In addition, as appropriate, items were also analyzed using IRT. Construct validity was determined through a CFA. The statistical analyses were performed using SPSS, Excel, and AMOS software.

Results

As occurred in Study 1, attrition occurred throughout the survey. Of the 131 participants who began the survey, six completed only through the demographics data questions. These six participant's responses were removed in their entirety from the results of this study. Of the remaining 125 participants, 29 completed only through the perception of reading assessment and instruction subscale of the survey. These participants' data was included only in regards to the Likert items in the first subscale of the survey (N = 125). Five of the remaining 96 participants completed only through the knowledge of reading assessment and data literacy subscale (N = 96) and 14 completed through only the knowledge of language structure subscale of the survey (N = 91). These participants' data was included in regards to the data analyses for the second and third subscales of the survey. A total of 77 participants completed the entire survey for Study 2. To maximize the sample size, total participants for each section or subscale of the data collection are included in the results. Table 15 illustrates the demographic information for the participants in Study 2.

Table 15

Study 2: Participant Demographics (n = 125)

	n	**Percentage**
Gender		
Male	8	6.4%
Female	117	93.6%
Ethnicity		
African American	1	0.8%
Asian/Pacific Islander	0	0.0%
Hispanic	15	12.0%
White	108	86.4%
Other	1	0.8%
Years Teaching		
1-3 years	12	9.6%
4-7 years	23	18.4%
8-15 years	50	40.0%
16-19 years	13	10.4%
20 or more years	27	20.6%
Years Teaching Reading/Language Arts		
1-3 years	24	19.2%
4-7 years	21	16.8%
8-15 years	46	36.8%
16-19 years	14	11.2%
20 or more years	20	16.0%
Current Grade Level Taught		
Early Childhood (PK-Kinder)	20	16.0%
Elementary (1st – 4th grade)	68	54.4%
Intermediate or Middle School (5th – 8th grade)	20	16.0%
High School (9th – 12th grade)	17	13.6%
Master's Degree		
Yes, in Reading/Language Arts	7	5.6%
Yes, in another content area	46	36.8%
In Progress	12	9.6%
No	60	48.0%
Specialized Reading Certification		
Yes	17	13.6%
No	105	84.0%
In Progress	3	2.4%

Table 15 Continued

	n	Percentage
Certification Area (participants could select multiple responses)		
Generalist (1st – 6th)	98	26.9%
Early Childhood (PK – K)	60	16.6%
Bilingual Educator	13	3.6%
English as a Second Language	78	21.4%
Special Education	26	7.1%
Reading Specialist/Master Reading Teacher	13	3.6%
Content Specific	44	12.1%
Educational Diagnostician	2	0.5%
Educational Administration	12	3.3%
Other	18	4.9%
College Reading Assessment Courses Taken		
0	31	24.8%
1	20	16.0%
2	34	27.2%
3 or more	40	32.0%
Professional Development on Reading Assessment		
Yes	100	80.0%
No	25	20.0%

The majority of participants were white (86.4%) and female (93.6%) which corresponds to the data collected in Study 1 and the national educator averages (USDE, 2012). It is also important to highlight that the majority of participants took two or more reading assessment courses in college (59.2%) and had received professional develop on reading assessment (80.0%). Therefore these teachers represent well-prepared teachers. This level of preparation may reflect a high valuation of reading professional knowledge of this district, or simply, self-selection of teachers within the greater sample.

Participants' Assessment Experience and Perceived Instructional Preparedness

The first three items of the survey allowed participants to share their personal

experience on data driven instructional practice and the time they apply to assessing.

Items 13 through 15 in the initial section of the survey allowed participants to report

their perception of preparedness to teach children to read. These results can be found in

Table 16 below.

Table 16

Study 2: Participants General Reading Assessment Experience and Perceived
Instructional Preparedness (n = 131)

	n	**Percentage**
Frequency of Instructional Decisions Made Based on Students' Data		
Every day	96	76.8%
At least once per week	24	19.2%
Other	5	4.0%
Frequency Students are Assessed		
Every day	39	31.2%
At least once per week	50	40.0%
Every 2-3 weeks (Progress monitor)	31	24.8%
Once per grading period	5	4.0%
Time Spent Assessing based on Frequency Assessed (previous question)		
1-2 hours	64	51.2%
3-5 hours	28	22.4%
6-10 hours	6	4.8%
10 or more hours	2	1.6%
Other	25	20.0%

Table 16 Continued

	n	Percentage
Perceived Preparedness to Teach Children to Read		
Not Prepared	6	4.8%
Somewhat Prepared	17	13.6%
Adequately Prepared	40	32.0%
Well Prepared	62	49.6%
Perceived Preparedness to Support the Growth of Struggling Readers		
Not Prepared	2	1.6%
Somewhat Prepared	19	15.2%
Adequately Prepared	50	40.0%
Well Prepared	54	43.2%
Perceived Preparedness to Use Phonological Awareness and Phonics in Teaching Reading		
Not Prepared	11	8.8%
Somewhat Prepared	20	16.0%
Adequately Prepared	33	26.4%
Well Prepared	61	48.8%

As with Study 1, the question addressing how much time is spent assessing was dependent on the previous response of how often students were assessed. The majority of Study 2 participants assessed students at least once per week or more (96.0%), which is congruent with the data collected in Study 1. As for the time spent assessing students, again most participants indicated they spent one to five hours (73.6%) during their assessment frequency, assessing children. Two participants indicated they only assessed once per grading period and two participants also spent ten or more hours assessing. Most of the "other" responses for this item indicated participants made a distinction between *formal assessment*, which they noted can take anywhere from three to five

hours, and *informal assessment*, which can simply take a few minutes each day. Some participants also stated they are "always assessing during small group instruction", or through the use of anecdotal records and observations. These "other" answers give insight that future research in this area may need to better define assessments.

The data collected on participants perceived preparedness showed that a majority felt *adequately* to *well prepared* to teach children to read (81.6%) and even *adequately* to *well prepared* to support the growth of struggling readers (83.2%). Finally, a large portion of the participants also felt *adequately* or *well prepared* to use the two foundational components of teaching reading for reading instruction (75.2%). In total, this group presented as reasonably confident teachers of reading.

Teacher Perception of Reading Assessment and Instruction

Reliability. The Study 2 teacher perception of reading assessment and instruction response subscale contained 22 items to identify participants' perceptions of reading assessment and instruction. An initial, overall, reliability analysis indicated a Cronbach's alpha level of 0.857, which was an increase from Study 1's alpha score of 0.833. Item 15 was identified as increasing the alpha to 0.862 if deleted, however that pattern did not appear during the CFA therefore the item was retained. Next, a reliability analyses for each of the four factors established by Study 1 was conducted. Results indicate acceptable Cronbach's alpha levels for Factors 1, 2, and 3 (Perceived Knowledge of Phonemic Awareness and Phonics; Perceived Knowledge of Instructional Practices and Student Response; and Perceived Knowledge of Reading Strategies and Teacher Actions), although a lower than desired alpha level for Factor 4 (Perceived

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Knowledge of Text Interactions and Exposure) was found (see Table 17 for details).

Therefore, individual items were examined which may increase alpha levels. Three

items appeared as improving alpha levels if deleted; items 1 in Factor 1, item 21 in

Factor 2, and item 11 in Factor 3. There were no alpha if deleted items in Factor 4, and

consistent with Study 1, Factor 4 had the lowest reliability at 0.453. Overall, however,

the scale shows reasonable inter-item consistency and stability of factors.

Table 17

Study 2: Teacher Perception of Reading Assessment and Instruction Cronbach's α and α if Deleted Items

Factor	Items n	Cronbach's α	α if Deleted Items	New α
1: Perceived Knowledge of Phonemic Awareness and Phonics	5	.794	Q1	.812
2: Perceived Knowledge of Instructional Practices and Student Response	5	.771	Q21	.795
3: Perceived Knowledge of Reading Strategies and Teacher Actions	7	.782	Q11	.797
4: Perceived Knowledge of Text Interactions and Exposure	5	.453	n/a	n/a
Overall Cronbach's α	**22**	**.857**	**Q15**	**.862**

Confirmatory Factor Analysis. Next, the CFA for this subscale was performed

using the SPSS Amos software to examine the model fit indices and determine how well

the model fit the data. The four factors established during the EFA in Study 1 remained

in Study 2. There were three CFAs performed with the teacher perception of reading

assessment and instruction data set. The first CFA analysis was completed using all 22

items, the second CFA was performed on the 19 items that remained if the three alpha if

deleted items (1, 11, and 21) were removed. Two CFAs were performed to see if the

validity of this survey for future use could be supported through the deletion of these

items Cronbach's alpha if deleted items. The third CFA was performed simply to

explore the model fit with the removal of Factor 4 altogether (because of its low

reliability in both the samples within Study 1 and Study 2), along with the three alpha if

deleted items. The CFA results can be found in Table 18. The results reported are based

on recommendations from Meyers, Gamst, and Guarino (2013) as to which model fit

indices, absolute (i.e., chi squared value; chi squared divided by degrees of freedom;

Root Means Square Error of Approximation) or relative (i.e., Comparative Fit Indices)

are most commonly reported today to support a good model fit.

Table 18

Study 2: Teacher Perception of Reading Assessment and Instruction Subscale Confirmatory Factor Analysis

Model	χ^2 Probability *	χ^2/df	RMSEA	CFI
All Items	0.00	1.97 (good)	0.08 (good)	0.80 (adequate)
Without 3 α if Deleted Items	0.00	1.98 (good)	0.08 (good)	0.84 (adequate)
Without 3 α if Deleted Items and Factor 4	0.00	1.79 (good)	0.08 (good)	0.92 (good)

* $p<.001$

Each of the models analyzed represented adequate to good fits, however the best fit model was Model 3, with both the removal of all three identified alpha if deleted items and Factor 4, completely. Therefore, based on the results of the CFA models, and the low inter-item reliability of Factor 4 compared to the other three factors in this scale, the items comprising Factor 4 was removed from further analysis.

Reading Assessment Knowledge and Data Literacy

Reliability. The teacher reading assessment knowledge and data literacy subscale of the survey for Study 2 consisted of 12 items assessing participants reading assessment knowledge and data literacy. After determining the two factors for this subscale in Study 1, the items within each factor were analyzed in SPSS to determine the reliability within each factor. The results of these analyses are in Table 19.

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Table 19

Study 2: Teacher Reading Assessment Knowledge and Data Literacy Cronbach's α and α if Deleted Items

Factor	Items n	Cronbach's α	α if Deleted Items	New α
1: Teacher Assessment Knowledge	7	.413	Q27	.463
2: Teacher Data Literacy	5	.262	Q31	.366
Overall Cronbach's α	**12**	**.488**	**Q31**	**.508**

The low reliability for this portion of the survey could partially be attributed to the number of items in this subscale (12) or the participant sample size (Hayes, 2008). However, as these items were developed explicitly for this work and not adapted from other scales, the current phrasing of items likely contains ambiguity of interpretation for participants.

Item Response Theory. As with Study 1, an IRT was performed with the data from this subscale in Study 2. Following the same guidelines defined in Study 1, utilizing the work of Binks-Cantrell, Joshi, and Washburn (2012), 5 out of 12 items were found to be within the ideal difficulty range (≥ 0.50 and ≤ 0.70), and a total difficulty index of 65.71. All 12 items had a discrimination index of ≥ 0.30, and a total of a 0.41 discrimination index value, meaning all items were determined to be *good*. These findings provide further support for the validity of this survey.

Confirmatory Factor Analysis. The CFA for this survey subscale was again based on the two factors determined in Study 1 that continued to best fit this model. The analyses for this subscale were also performed in SPSS Amos. The first analysis determined model fit for all the knowledge of reading assessment and data literacy items, and the second analysis determined model fit for the remaining items after the removal of two identified alpha if deleted items (27 and 31), as indicated by the reliability analyses. Again, Meyers, Gamst, and Guarino (2013) were consulted in the appropriate indices to utilize to determine best model fit, and both absolute and relative were reported. Table 20 reports the CFA results for the knowledge of reading assessment and data literacy subscales of the PKIRA.

Table 20

Study 2: Teacher Reading Assessment Knowledge and Data Literacy Confirmatory Factor Analysis

Model	χ^2 Probability *	χ^2/df	RMSEA	CFI
All Items	0.48	1.00 (good)	0.00 (good)	1.00 (good)
Without 2 α if Deleted Items	0.37	1.06 (good)	0.03 (good)	0.96 (good)

* p<.5

This scale had a *good* overall fit in both models, however the better fit being the model with the deletion of the two Cronbach's alpha if deleted items. Therefore, those two items were removed from further analysis.

In total, when considering the model fit of the CFA, the strong results from the IRT analysis, but the low reliability via Cronbach's alpha, indicates that this scale provides a functional starting point for measuring teachers' assessment knowledge and data literacy. However, the low reliability indicates that results should be interpreted with some caution and ideally triangulated with other data sources (e.g., teacher interviews). Yet, to the best of my knowledge, there are no available measures in this area, therefore this scale represents a solid starting point for researchers working with teachers' data literacy and assessment knowledge.

Teacher Knowledge of Language Structure

Reliability. This subscale of the survey consisted of 15 items, after the revisions made in Study 1, and remained true to their original authorship by Bos and colleagues (2001). These items were meant to assess participants' exact knowledge of the structure of language, not the knowledge they perceive they have, as in the first subscale of this survey. The two factors used in the development in 2001 continued in this research; phonological awareness and phonics. Therefore the items within each factor were analyzed for reliability using the SPSS software. There were no items identified, within each of the two factors or within the overall scale that would increase reliability if deleted. Table 21 summarizes the results.

Table 21

Study 2: Teacher Knowledge of Language Structure Cronbach's α and α if Deleted Items

Factor	Items *n*	Cronbach's α
1: Teacher Knowledge of Phonological Awareness	8	.558
2: Teacher Knowledge of Phonics	7	.565
Overall Cronbach's α	**15**	**.733**

The overall reliability of this subscale remained higher in Study 2 of this research than the reliability reported by the original validation research in 2001 (α = 0.600).

Item Response Theory. The IRT for teacher knowledge of language structure subscale was also performed using Excel. Again, following the predetermined guidelines defined in Study 1, it was determined that 7 of the 15 items were within the ideal difficulty range of ≥ 0.50 and ≤ 0.70, with a total difficult index value of 63.88. Twelve of the 15 items were found to be good items based on their discrimination index values of ≥ 0.30, with a total value of 0.46. Thus the IRT for this subscale further supported the validity of this survey tool.

Confirmatory Factor Analysis. This subscale allowed for a relatively simple CFA. The analysis was performed in SPSS Amos and only involved a CFA with all items, since no alpha if deleted items were identified. The data indicated a probability value of 0.09, the χ^2/df at 1.19 (good), the RMSEA at 0.05 (good) and the CFI at 0.86

(adequate), indicating an adequate to good model fit for the teacher knowledge of language structure subscale.

Teacher Ability to Use Data to Drive Instruction

Seventy seven participants completed the entire survey, including the open ended response section at the end. This portion of the survey remained the same from Study 1 to Study 2, as it was developed to collect the data literacy of each participant.

Responses for Sam. The presented assessment data about Sam remained the same as in Study 1, indicating areas of weakness in both *letter sound identification* and *word reading*. Participants generally agreed on Sam's area of need with only eight responses (9.5%) varying from the expected interpretation of Sam's needs. The participant responses to Sam's area of need are shown in Table 22.

Table 22

Study 2: Open Ended Data Analysis for Data Driven Instructional Practice – Sam's Weakness

Area of Weakness	n	Percentage
Letter Sound Identification	61	72.6%
Word Reading/Decoding	15	17.9%
Phonemic Awareness (i.e.; blending)	4	4.7%
Alphabet Knowledge	2	2.4%

Table 22 Continued

Area of Weakness	n	Percentage
Phonics	2	2.4%
Total Responses	**84***	**100%**

* number is more than 77 because some participants responded with more than one possible need

"Alphabet knowledge" and "phonics" were not included with another response category, because these responses represent more general categories, and thus were not specific enough to be included within "letter sound identification."

As in Study 1, participants' were then asked to provide their knowledge of best practices to support Sam's reading growth. These answers were varied, however upon the grouping of key words in the responses, common themes easily emerged as to how best to support Sam's learning (see Table 23). The single response of "phonetic awareness" was left as a category of its own because it was neither phonemic nor phonological awareness, thus its accuracy was unclear. The other responses utilized common language, and thus were grouped together in the results.

Table 23

Study 2: Open Ended Data Analysis for Data Driven Instructional Practice –
Intervention for Sam

Possible Intervention	n	Percentage
Letter Sound Practice Activities	32	39.0%
Word Work (e.g.; high frequency word practice, decoding practice, word sorts)	16	19.5%
Phonics	14	17.1%
Phonemic Awareness Activities	10	12.2%
Explicit Instruction in Letter Sounds	4	4.9%
Guided Reading/Writing	4	4.9%
Phonetic Awareness	1	1.2%
Not Answered	1	1.2%
Total Responses	**82***	**100%**

* number is more than 77 because some participants responded with more than one possible
need

Many of the responses were in alignment with recommendations made by

Foorman and colleagues (2016) in their synthesis report, sponsored by IES, on

foundational skills necessary to support reading for understanding. These researchers

advise teaching students letter-sound relationships as one of the foundational skills of

reading. Furthermore, they suggest explicit instruction of the alphabetic principle occur

through the naming of the letter and its corresponding sound while viewing a

"memorable picture" (p. 19) of a word containing that letter, as well as in connection

with phonemic awareness activities, and using word building activities to increase

students' awareness of how words are made up of letters (Foorman et al., 2016). In

contrast, guided reading and or writing was not recommended in this report as an

effective instructional practice for the learning of foundational reading skills, although

this is often an overarching structure or format that educators use to support beginning

reading.

Responses for Valerie. As is Study 1, the assessment data indicated that Valerie

needed to improve her fluency. Most of the responses clearly articulated this area as

"fluency" or "oral reading fluency," however the single response of "oral reading" did

not specifically state the term *fluency* and thus was categorized as its own result (see

Table 24).

Table 24

Study 2: Open Ended Data Analysis for Data Driven Instructional Practice – Valerie's Weakness

Area of Weakness	n	Percentage
Fluency	75	94.9%
Letters/Sounds during reading	3	3.8%
Oral Reading	1	1.3%
Total Responses	**79***	**100%**

* number is more than 77 because some participants responded with more than one possible intervention

Although the majority of participants were able to identify Valerie's area of need, the responses for instructional practice to grow her fluency were diverse. Common themes did emerge with many of the responses, however three answers remained in a category of their own, one participant did not answer, and one responded, "don't know" (see Table 25).

Table 25

Study 2: Open Ended Data Analysis for Data Driven Instructional Practice –
Intervention for Valerie

Possible Intervention	n	Percentage
Repeated Reading	46	51.8%
Listen to Fluent Readers Model	6	6.8%
Read Out Loud	5	5.7%
Fluency Practice	5	5.7%
Timed Reading	4	4.5%
Decoding	5	3.4%
Guided Reading/Small Group Instruction	3	3.4%
Phonemic Awareness	2	2.2%
Familiar Texts/High Interest Texts	2	2.2%
Fluency Passages	2	2.2%
Common Word Practice	2	2.2%
Shared Reading	2	2.2%

Table 25 Continued

Possible Intervention	n	Percentage
Reader's Theater	2	2.2%
Paired Reading	1	1.1%
Choral Reading	1	1.1%
FCRR Fluency Intervention	1	1.1%
Not answered/*Don't Know*	2	2.2%
Total Responses	**91**∗	**100%**

∗ number is more than 77, because some participants responded with more than one possible intervention

The results for this section of the survey had an overwhelming response of "repeated reading," which is a common practice to improve reading fluency. However, according to research from the What Works Clearinghouse [WWC] (USDE, 2012) intervention report dated May of 2014, "repeated reading was found to have a potentially positive effect on reading comprehension" (p. 1), not reading fluency, and "no discernible effects on…general reading achievement" (p.1). This research did indicate the practice of repeated readings was effective under certain, specific conditions, however that is not how this practice is most typically enacted within classrooms. Similarly, in a separate report the WWC (USDE, 2013) also found limited efficacy for *Read Naturally*, a program that includes the repeated reading of texts along with timed

readings. Specifically, three of the five qualified studies about *Read Naturally* did not

find statistically significant effects of this program on students' reading fluency.

Therefore the teachers' recommendations mirrored traditionally recommended practices

for fluency, but did not align with more recent research evidence.

Responses for Manuel. Manuel's data indicated his need for growth in

comprehension, and all 77 survey respondents agreed (100%), by answering

"comprehension" or "reading comprehension."

The most varied of all the responses in this section came through the indication

of what strategies would best support Manuel's reading comprehension growth.

Responses ranged from broad support like "comprehension strategies" to specific

activities like "turn and talk." Table 26 reports the results.

Table 26

Study 2: Open Ended Data Analysis for Data Driven Instructional Practice –
Intervention for Manuel

Possible Intervention	n	Percentage
Explicit Instruction/Comprehension Strategies	36	32.7%
Asking Questions	12	10.9%
Guided Reading/Small Group Instruction	8	7.4%
Monitor Understanding/Self Monitor	7	6.5%

Table 26 Continued

Possible Intervention	n	Percentage
Think Aloud	6	5.6%
Visualize	5	4.5%
Graphic Organizers/Story Maps	5	4.5%
Modeling	4	3.6%
Vocabulary	3	2.7%
Discuss Reading/Group Discussion	3	2.7%
Mark Text/Highlight	3	2.7%
Stop and Assess During Reading	2	1.8%
Reread	2	1.8%
Drama	2	1.8%
Literature Circles	2	1.8%
Short Stories	2	1.8%
Metacognitive Thinking	2	1.8%

Table 26 Continued

Possible Intervention	n	Percentage
Turn and Talk (Partner Share)	1	0.9%
Active Reading Skills	1	0.9%
Mini-lesson	1	0.9%
Reflecting on Reading	1	0.9%
Read for Meaning	1	0.9%
Not answered	*1*	0.9%
Total Responses	**110**∗	**100%**

∗ number is more than 77, because some participants responded with more than one possible need

Shanahan and colleagues synthesized research to develop recommendations for the improvement of reading comprehension for the WWC (2010) in the form of a practice guide for teachers. The first recommendation of these researchers is to "teach students how to use reading comprehension strategies" (p. 10). According to the researchers, these strategies include activating prior knowledge, making predictions, questioning before/during/after reading, visualization, monitoring understanding, training in inferring, and retelling the text (Shanahan et al., 2010). High quality discussion about the meaning of the text was also noted as a beneficial support to

reading comprehension (Shanahan et al., 2010). Most of these best practices for the instruction of comprehension are included in the responses for this portion of the survey. However, some of the survey answers were too broad, such as Small Group Instruction, to directly compare with research-based recommendations.

ANOVA Results

One-way Analyses of Variance (ANOVA) were performed on data in order to determine any statistically significant differences between participants' characteristics (e.g., means of participants' certifications, degree level, years of experience), and demonstrated knowledge of reading assessment and language. A total of 91 participants completed both the teacher reading assessment and data literacy subscale and the teacher knowledge of language structure subscale of the survey. These two subscales of the survey contained items with a correct/incorrect response, thus they specifically assessed participants' knowledge. A combined average correct on these two subscales was determined for each of the 91 participants (mean knowledge score). This *mean knowledge score* was used as the dependent variable in each of the ANOVAs. According to Levene's Test all four analyses met the assumption of homogeneity of variances (*p* ranged from 0.054 to 0.319). I must note that caution should be used in the interpretation of these findings, because some of the groups within each analysis had a very small sample size.

Master Reading Teacher Certification. There were three levels of response for the demographic question, "Do you have a master reading teacher certification (Texas) or another state level certification specializing in reading instruction?" The three

response choices were as follows; 1) Yes; 2) No; and 3) I am currently working on this certification. A master reading teacher (MRT) certification can be obtained in one of two ways: a) an individual who holds a reading specialists certification can complete a State Board of Education Certification (SBEC) approved master reading teacher preparation program; or b) an individual must have a teaching certification, at least three years of teaching experience, complete and SBEC approved master reading teacher preparation program, and pass the master reading teacher certification exam ("Master Reading Teacher Certification Program," 2016). The requirements for this certificate are not as rigorous as a master's degree in reading, however it remains a specialized certification and requires specific reading courses be completed in order to qualify for the state exam. The table below shows the results of this one-way ANOVA (Table 27).

Table 27

Study 2: ANOVA results for Mean Knowledge Score by Master Reading Teacher Certification Status

				Master Reading Teacher Certification Status					
				Yes MRT (*n* = 14)		**No MRT** (*n* = 74)		**Working on MRT** (*n* = 3)	
	df	*F*	*p*	M	SD	M	SD	M	SD
Mean Knowledge Score	2	0.482	0.619	0.66	0.17	0.63	0.20	0.73	0.13

The null hypothesis for this analysis states there is no statistically significant difference between the mean scores of participants with a MRT, without a MRT, or

getting a MRT certification. There was no statistically significant difference between the means in this analysis thus I failed to reject the null hypothesis.

Master's degree status. Four response levels comprised the question asking participants, "Do you have a master's degree?" Participants could respond, 1) Yes, in Reading/Language Arts; 2) Yes, in another content area; 3) I am currently working on a master's degree; or 4) No. The results of this ANOVA demonstrated no significant difference between participants' master's degree status, and thus I failed to reject the null hypothesis. The results of this analysis can be found in Table 28.

Table 28

Study 2: ANOVA results for Mean Knowledge Score by Master's Degree Status

				Master's in Reading/ Language Arts ($n = 4$)		Master's in Other Content Area ($n = 33$)		Working on Master's ($n = 7$)		No Master's ($n = 47$)	
	df	*F*	*p*	M	SD	M	SD	M	SD	M	SD
Mean Knowledge Score	3	0.224	0.879	0.72	0.08	0.64	0.21	0.63	0.15	0.63	0.20

Total years of teaching. This item asked participants to indicate the total number of years they had been teachers ("How many years, including this year, have you been a teacher?"). There were five possible responses to this questions; 1) 1 - 3 years; 2) 4 - 7 years; 3) 8 - 15 years; 4) 16 - 19 years; and 5) 20 + years. These

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responses were designed around the general attrition rate of new educators versus those with more experience. According to a 2015 study by the National Center for Education Statistics (Gray & Taie, 2015), 10% of beginning teachers did not remain past the first year, 12% did not continue past the second year, 15% did not teach past their third year, and 17% did not teach past their fourth year. The following table displays the results from this one-way ANOVA (Table 29).

Table 29

Study 2: ANOVA results for Mean Knowledge Score by Total Years Teaching

				Total Years of Teaching									
				1-3 years (n = 10)		4-7 years (n = 15)		8-15 years (n = 32)		16-19 years (n = 12)		20+ years (n = 22)	
	df	*F*	*p*	M	SD	M	SD	M	SD	M	SD	M	SD
Mean Knowledge Score	4	2.083	0.090	0.49	0.23	0.65	0.19	0.64	0.13	0.72	0.25	0.65	0.21

The results of this analysis indicated there were no overall statistically significant differences in this data set. However, despite the lack of statistical significance in the omnibus test, the Tukey-Kramer post-hoc analysis revealed there was difference between the highest and lowest performing groups. Specifically, those educators teaching *16 - 19 years* compared to those teaching *1 - 3 years* ($p = 0.047$).

Years teaching reading/language arts. The final ANOVA analysis considered differences between the means of participants years teaching reading/language arts

specifically ("How many years, including this year, have you taught reading/language arts?"). This question also had five possible responses; 1) 1 - 3 years; 2) 4 - 7 years; 3) 8 - 15 years; 4) 16 - 19 years; and 5) 20 + years. The results of this one-way ANOVA can be found in Table 30.

Table 30

Study 2: ANOVA results for Mean Knowledge Score by Years Teaching Reading/Language Arts

				Years of Teaching Reading/Language Arts									
				1-3 years (n = 19)		4-7 years (n = 15)		8-15 years (n = 28)		16-19 years (n = 12)		20+ years (n = 17)	
	df	F	p*	M	SD	M	SD	M	SD	M	SD	M	SD
Mean Knowledge Score	4	4.617	0.002	0.50	0.21	0.69	0.13	0.65	0.14	0.77	0.25	0.64	0.19

*p < .01

The results displayed a statistically significant difference at the *p* < .01 value. The Tukey-Kramer post-hoc analysis disclosed three statistically significant differences at the *p* < .05 and *p* ≤ .001 levels between means of participants teaching reading/language arts; 1) those teaching for *1 - 3 years* and those teaching *4 -7 years* (*p* = 0.024); 2) those teaching *1 - 3 years* and those teaching *8 - 15 years* (*p* = 0.043); and 3) those teaching *1 - 3 years* and those teaching *16 – 19 years* (*p* = 0.001). In all three comparisons, the teachers with greater years teaching language arts demonstrated higher knowledge than the teachers who were within their first three years.

Discussion

Validation of the PKIRA Survey

The primary goal of this study was validation of the PKIRA survey that was developed, piloted, and revised in Study 1, for the purpose of measuring teachers' perceptions and knowledge of reading assessment. This work provides a potentially important tool for both practitioners and researchers, because there is a lack of validated instruments in this area. Specifically, this study allowed the PKIRA to be administered to a unique group of participants with the revisions made from the results of Study 1. Thereby, it provided an opportunity to further validate this new instrument. I will summarize and interpret the main findings for each subscale below.

Teacher perception of reading assessment and instruction. The analysis indicated that this subscale had high overall reliability with $\alpha = 0.857$ indicating that the items have a strong relationship with other items in the same subscale. The factor analysis indicated a four factor structure, however the low alpha level of Factor 4 ($\alpha = 0.453$) led to the decision to delete Factor 4 (Perceived Knowledge of Text Interactions and Exposure). After such changes, the CFA supported the intended three factor structure of this subscale. In total, this subscales measures the following; a) teacher perceptions of phonemic awareness and phonics, b) instructional practices and student response, and c) reading strategies and teacher actions. Additionally, the overall goodness of fit for this portion of the survey showed a "good" fit across all reported indices. Therefore in total, this subscale represents teacher's perceptions regarding reading instruction.

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In general, the findings for this subscale indicated that teachers' perceived knowledge of phonemic awareness and phonics was that these skills play an important role in the development of early literacy and decoding, as the majority of participants indicated a *strongly agree* ($\mu = 65.0\%$) response to the items in Factor 1. For Factor 2, teachers' perceptions were split between *strongly agree* ($\mu = 45.12\%$) and *agree* ($\mu = 41.76\%$) with the given research based instructional practices and student responses to those practices (e.g., summarization, learning log reflections) to improve reading in the classroom. The results of the data collected for Factor 3 indicated participants' perceived knowledge of the given reading strategies and teacher actions (e.g., modeling, explicit instruction, thinking aloud) were appropriate practices to support reading success as indicated by their mostly *strongly agree* ($\mu = 68.32\%$) response to these items. Factor 4 was not further analyzed, because it was determined as a factor to be deleted, based on the reliability and validity analyses.

Teacher reading assessment knowledge and data literacy. There were 12 items in this subscale, which was entirely researcher developed based on prior research. After small adjustments, according to the reliability and CFA results, this subscale's reliability was $\alpha = 0.508$ and a "good" fit for all goodness of fit indices reported. In general, the findings from this sample of 96 educators indicated these teachers had an overall mean reading assessment knowledge and data literacy score of 65.71% for the 12 items on this subscale. Regarding distribution, only one participant got all 12 items correct, however 60 of the 96 participants (62.5%) got at least 8 of the 12 items correct

(66.7%). The data from this subscale shows the majority of participants (62.5%) had

some knowledge of reading assessments and data literacy, but also had room for growth.

      Teacher knowledge of language structure. These 15 items, that measure

teachers' knowledge of language structure, were adapted from Bos et al. (2001). This

scale proved to have high reliability, and the reliability of this sample, $\alpha = 0.733$, was

even higher than the reliability from the original administrations by Bos and colleagues

($\alpha = 0.600$). Factor analysis revealed two stable factors, and all goodness of fit indices

indicated an *adequate* to *good* fit for these items. Therefore this subscale represents a

highly reliable and valid scale for use with teacher research. For this sample, the

findings indicated that 91 participant teachers had a mean score of 63.9% on the

knowledge of language structure items. Not a single participant got all the answers

correct on these items, however 48 of the 91 participants (52.8%) answered at least 10 of

the 15 items correctly for this subscale. This data indicates that the only half of

educators who participated in this study demonstrated a relatively accurate knowledge of

language structure critical to teaching reading, thus leaving half who did not.

Unfortunately, these results mirror Bos et al.'s results (average score of 60% on

language structure), which were published 15 years before this data was collected.

      Teacher ability to use data to drive instruction. The data from these items

indicated much consensus in both the needed focus of instruction and how to support

these three students. The similarity of response may have been partially a result of

sampling teachers who all teach in the same district. However, the specific strategies

reported to use to support each student's area of need was often varied. This indicates

that teachers likely have a large range of tools and practices that they can draw upon.

Participants overwhelmingly indicated a useful or *best practice* to strategy or activity to

support each student's area of need. For example "explicit instruction in letter sounds"

and "visualization" were among the responses to support students' weaknesses in

reading, and these both, as noted earlier, are research based best practices for learning.

This portion of the survey strengthened the quantitative aspects of the other

scales by having teachers integrate multiple knowledge in the form of a representative

sample student whom they may encounter. Additionally, these results would be

particularly useful for administrators to better understand in which areas their faculty

need professional development. The consistency of results indicates much shared

knowledge and similar interpretation of the data. In total, the findings form these items

provided an optimistic view because it indicated that most of the participants from this

sample population could identify a student's need and then provide a practice to grow

that area of need, based on student data.

When these findings are combined with the results of the demographics of the

survey, the significant role of reading assessment in teachers' work is made evident. For

example, 71.2% of participants indicated they assess students *every day* or *at least once*

per week, and 73.6% spend 1-5 hours assessing their students during that daily or weekly

assessment period. Therefore, it is logical that the teachers would have skills in

interpreting student data. If educators are assessing as often as indicated, they likely

realize the importance of collecting student data to show progress or need. Also, the

76.8% of participants who answered they base instructional decisions on students' data

every day, are further supported by their answers on the open response section in which *best practices* were given to support student growth form the analysis of actual student data.

Validation between Teacher Experience and Teacher Knowledge

The trend in the scores between years of teaching experience and scores with teacher knowledge provides further validation that the PKIRA is measuring practical and essential aspects of reading assessment. Previous research has indicated that teacher knowledge tends to increase with years of experience (Bos et al., 2001; Goldhaber, 2002; Kraut, Chandler, & Hertenstein, 2016; Rice, 2010; Salinger et al., 2010; Stronge, Ward, & Grant, 2011). Specifically, the highest mean knowledge score for both *total years teaching* and *years teaching reading/language arts* was from the group of participants in the *16-19 years* level, at 72% and 77% respectively. This could be attributed to the fact that this group of participants has a good deal of experience not just teaching, but specifically teaching reading/language arts.

Interestingly the trend did not continue to the most experienced teachers, as participants with *20+ years* of experience did not have a higher mean score than those with *16-19 years*. This may be a result of the time when they were in teacher preparation in the 1980s when much of the instruction was based around whole language and deemphasized both formal assessments and phonics (Alexander & Fox, 2004). Most troubling though was that participants with *1-3 years* experience had the lowest mean knowledge score with 49%. One may expect that their recent training would prepare them for knowledge on reading assessment. Therefore, this could a call for schools of

education to improve their instruction for preservice teachers in knowledge of language structure and data literacy. Perhaps more practical experience is necessary to fully understand the complexities of reading assessment and interpretation of scores.

Participant Demographics and Knowledge

Transitioning now from survey validation, I will briefly discuss issues related to this sample's findings. Although this small scale study occurred within one small urban area in south central Texas, aspects of the participants' demographic information allowed for important analysis. Specifically, the wide distribution of participants' total years in the classroom and years teaching reading/language arts allowed an opportunity to analyze the depth of teachers' knowledge given varying years of experience (as discussed above). Teachers are the heart of this study and the focus of this research. Being that most participants (70%) are currently in an *Early Childhood (PK – Kinder)* or *Elementary (1st – 4th grade)* classroom is also important, as these are the primary grades in which children are instructed on how to read and learning to read, whereas the older grades (5th – 12th) are more focused on reading to learn (Chall, 1983).

Although the sample had rich practical experience only a small portion of the participants held either a MRT certification or were in the process of obtaining this certification (n = 17). There are many potential reasons for this finding, but it indicates that many teachers may not pursue formal, graduate coursework in the area of literacy pedagogy, which places additional pressure on having high quality preservice instruction and professional development through the school system. Additionally, there were no statistically significant differences in knowledge scores between those with, or without,

an MRT certification. Teachers with an MRT scored only 66% average on the knowledge questions in the survey which seems unacceptable for teachers who are specifically tasked with teaching reading and supporting those who teach reading, of the sample. However, the small sample size of teachers with MRT prevented meaningful comparisons between groups or generalizations from this sample. Therefore further research should consider the obstacles for teachers in seeking higher certification in literacy, as well as the potential impact of such programs.

Similarly with the majority of participants having a master's degree in some educational content area (52.0%), one would expect their level of knowledge to be quite advanced, however there were no statistically significant findings for this level of education and their overall knowledge of reading, reading assessment, and language, according to their responses on the multiple choice subscales. This may be due to the fact that many participants did not have a master's degree specifically in literacy education. For example, a M.Ed. in administration would not provide additional knowledge about literacy. Although not significantly higher than the other groups, it is positive to note that the four teachers with a master's degree specifically in literacy demonstrated the highest knowledge score, with 72.0% correct, compared to the overall mean score of 63.9% correct.

Participants Perceived Instructional Preparedness

Finally, this survey inquired about both knowledge and perceptions of reading assessment, and I discuss teachers' reported perceptions below. In total, there were three questions on the survey that asked about perceived preparedness to teach reading; 1)

How prepared are you to teach children to read?; 2) *How prepared are you to support the reading growth of struggling readers?*; and 3) *How prepared are you to use phonological awareness and phonics in teaching reading?* Eighty two percent of participants felt they were *adequately* to *well prepared* to teach reading, even more (83.0%) felt they were *adequately* to *well prepared* to teach struggling readers, and 75.0% felt they were *adequately* to *well prepared* to used phonological awareness and phonics, two critically important foundational reading skills, to teach reading. Therefore this group had a positive attitude about their preparation and felt confident. However, there was only one participant of the 91 who scored 100% on all the knowledge questions, and only five of the 91 had the next highest mean score of 93.0%. Therefore, the vast majority of teachers had areas where they need increased knowledge about assessment and language structures. In total, this discrepancy between perception and knowledge indicates that although many participants perceived themselves as well prepared, they may be overconfident in their ability to teacher phonological awareness and phonics to teach reading. For as noted above, this study's mean score for the knowledge of language structure (63.9%) was slightly higher than the mean score of 60.0% from Bos and colleagues original study in 2001.

Conclusions

In total, Study 2 provided evidence for five main conclusions. First, through confirmatory factor analysis, reliability analysis, and the relationship between scores and teacher experience, this study provided evidence that the PKIRA is a reliable and valid instrument to measure teacher perceptions of reading assessment and instruction, teacher

reading assessment knowledge and data literacy, teacher knowledge of language structure, and teacher ability to use data to drive instruction. Second, teachers reported frequent use of reading assessments is common in their schools. Third, related to the frequent use of reading assessments, these findings indicate that the teachers in this sample, with more years teaching language arts and reading, demonstrated greater knowledge of reading assessment and reading instruction than their less experienced peers. Most concerning, however, was the low demonstrated knowledge of teachers who were in their first three years of teaching, particularly because they likely completed their reading assessment courses quite recently. Fourth, and unexpected, teachers with master's degrees or MRT certifications demonstrated no advantage in knowledge over their peers without advanced degrees. Findings three and four together indicate that practical experience, more than coursework, may lead to deeper pedagogical and content knowledge. Fifth and final, teachers' demonstrated positive attitude and high levels of confidence in their knowledge of reading instruction and reading assessment. Unfortunately, their demonstrated knowledge indicated gaps in their expertise.

Under the Every Student Succeeds Act (ESSA, 2015) policy makers stressed the need for explicit evidence to support educational decision making. The ESSA focuses on making states more responsible for using data. This Act calls on policy makers and administrators to support data based instructional decision making and provide professional development for educators to learn how to use data appropriately to support student growth through suitable classroom practices (ESSA, 2015). The results from Study 2 of my research support this new policy as they identify a need for educators to

continue to learn to better understand reading assessment and the knowledge necessary to teach reading in order to be more data literate. These findings indicate that new teachers may particularly need support in this area.

As Mandinach and Gummer (2016) state, "Teachers cannot become data literate on their own. They need help, beginning in preservice and continuing through their careers (p. 46)." It imperative that we continue to educate our educators throughout their years of teaching and its imperative that we ensure all teachers have the opportunity to learn about and acquire data literacy in order to support the academic growth of their students. The PKIRA tool may assist administrators in identifying teachers' strengths and areas of need and thus providing appropriate professional development.

CHAPTER V

GENERAL DISCUSSION AND CONCLUSIONS

Introduction

Thirty years have passed since Shulman (1987) first introduced the concept of pedagogical content knowledge. His work was fundamental in a long line of research working to support the instruction of each student as an individual and promoting student growth within a highly diverse population of learners. This individualization of instruction has progressed most rapidly in the area of reading instruction, where concepts of students' frustrational, instructional, and independent reading levels have become commonplace in classrooms. Accordingly, as the need to identify students' knowledge on an individual level has progressed, the need and role of assessment in instruction has developed. Yet, the overarching question this dissertation sought to better understand was have our current educators developed as well? Specifically, have they developed in their knowledge and achievement of the data literacy necessary to provide students with the individualized instruction required to meet the learning demands of our ever evolving population of learners. As reminded by Mandinach and Gummer (2013), educators must combine their pedagogical content knowledge with data literacy in order to develop their instructional decision making in the classroom. To get such information, however, current, valid instruments to measure teachers' data literacy and pedagogical content knowledge of literacy are needed, which is the space that this work aimed to fill.

Ultimately, this research determined that not all current educators are equipped with the knowledge necessary to apply data literacy to the cycle of data driven literacy instruction. Meaningful gaps in teachers' knowledge were exhibited in both data literacy, but also in the more fundamental knowledge of language structures that underlie literacy instruction. Without strong content knowledge, pedagogy and data literacy are less meaningful. On the positive, this work indicates that teachers are using reading assessment regularly in their classrooms, have positive perceptions towards teaching reading, and teachers with more years of teaching reading demonstrate higher knowledge than their less experienced peers. Additionally teachers demonstrated facility in identifying students' areas of need, based on assessment scores.

Study 1

The purpose of this study was to develop and pilot test, for reliability and validity, a new instrument, *Perceptions, Knowledge, and Interpretation of Reading Assessment* (PKIRA), designed to gather data on the perceptions and knowledge of current educators about reading and reading assessment. Through reliability and factor analyses on a diverse sample of teachers, PKIRA was revised and edited to develop a valid and reliable tool to be used in Study 2 of this research.

The novel aspect of this study was that there was no published instrument found in current research that had been developed to assess the knowledge and perceptions of current educators data literacy, thus the development of this survey could play an important part in the future of research based on teachers' knowledge of various aspects of reading assessment. While there are instruments to assess teachers' content

knowledge of literacy, the interpretation and application of reading assessment data represents another layer of knowledge.

Data literacy for current and future educators is "not a passing fad" (Mandinach & Gummer, 2016, p. 46). As policy and district expectations continue to focus on the success of all students, data literacy will continue to be a fundamental skill necessary for all educators, and the ability to measure and progress monitor the data literacy of our teachers provides those supporting the development of teachers the tool necessary to better individualize the instruction of our instructors.

The resulting instrument demonstrated reasonable reliability, through Cronbach's alpha, inter-item reliability analysis, and IRT analysis, and construct validity, through factor structure. Less reliable subscales were revisited and revised before use in Study 2. In total, the survey contained quantitative subscales that measured: a) Teacher perceptions of reading assessment and instruction; b) Teacher reading assessment knowledge and data literacy; and c) Teacher knowledge of language structure. Finally, an open ended qualitative section, in which teachers were presented with three sets of "student" reading data, assessed teachers' practical application for interpreting data and applying it to instruction.

Study 2

The second study of this research was a follow-up to Study 1, and collected data on the knowledge and perception of reading assessment and data literacy of current classroom teachers from one district. The purposes were two-fold; a) to provide further

validation of the instrument, and b) to consider the role of the teacher's background on their knowledge of reading and data literacy.

Regarding the relationship between teacher characteristics and performance on this instrument, unexpectedly I found no statistically significant differences in the mean knowledge scores of those participants with and without MRT certification, as well as with or without a master's degree. This finding is unexpected because graduate training in education was expected to improve knowledge of reading assessment, data literacy, and language knowledge of the survey.

In contrast, there was a positive trend as related to years teaching language arts. Teachers with greater experience teaching showed significantly higher performance than those teachers in their first three years. Teachers teaching 16 – 19 years showed the highest performance on the knowledge assessment. This indicates that practical experience in using reading assessment and teacher reading may deepen teachers' knowledge of reading instruction and assessment overall.

However, another surprising finding was that the trend did not continue to those educators with *20 + years* of experience in education and more specifically experience in reading/language arts. This finding is in contrast to recent research that explicitly studied teachers' years of experience and teacher effectiveness (Kini & Podolsky, 2016). These researchers found gains in teacher effectiveness within the first five years in the classroom, but even more so during the second and even third decades of their careers. Kini and Podolsky's (2016) findings are to be expected as one would think teacher

knowledge would grow as their years teaching increases. However, this may have been a function of the small sample size, which is discussed in the limitations.

Finally, though it is important to draw attention to the relatively low demonstrated knowledge of new teachers in schools. It appears that their recent training did not provide them with an in-depth knowledge of reading assessment and reading content knowledge. As a result, school administrators may need to plan how to provide professional development for this group, and not assume high levels of skill.

Data Literacy in Practice

To ground this research in school experience, as a current reading specialist at a public Title 1 elementary school I experience the demand for data literacy skills from current educators. Beyond the benefits of assessment, there is often a tension related to the time needed for assessment, particularly standardized, summative assessment, versus time for instruction. For example, recently, instead of providing reading intervention for the 35 students I support each day, I spent four days administering a state mandated reading assessment that did not inform classroom teachers' instruction due to the timing and nature of the test. The value of the data from the assessment was unclear to the teachers because it did not give them information for instruction and many feel it is not a good use of teacher time. This tension is not specific to this school because the recent presidential administration acknowledged this in a call to limit standardized testing to no more that 2% of total instructional time – particularly as recent findings report that students spend 20-25 hours per year on standardized assessments (Richmond, 2015).

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Therefore, it is important to acknowledge that being data literate includes the critical skills to determine which data and which assessments are worthy of the time and effort.

On the positive side of how to improve the critical and informed use of data for reading instruction, this research can be connected to the conclusions of Binks-Cantrell, Washburn, Joshi, and Hougen (2012) on the Peter Effect in reading teacher and their preparation. If an educator has not received the benefit of instruction in data literacy and its use to benefit his or her classroom and students, then those same educators cannot be expected to have a knowledge of data literacy. Again, just as we cannot expect our students to retain a knowledge they have not been given, we cannot expect our teachers to know things they have not been taught. Therefore, as data becomes an increasingly important aspect of instruction in schools, teacher preparation should reflect that shift in emphasis.

Study Limitations

Beyond the limitations of survey research in general, there are limitations within these two studies that could be improved through future research. The relatively small sample size in both Study 1 and Study 2 could have played a role in limiting the results, as well as the attrition rate throughout both studies samplings. Thus, recruitment of more inservice educators to participant in future research would be beneficial. For example, only four teachers in Study 2 had an M. Ed. in Literacy, and thus conclusions could not be made regarding this level of preparation and teacher knowledge. Related to this sample size issue, the low response rate (9% in Study 2), and the relatively high education level of teachers in Study 1, indicates that there may be a self-selection bias.

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These findings may not generalize the overall teaching population. Additionally, this work relied on samples of convenience, rather than a more systematic data collection strategy. Finally, any research which relies on one data source does not allow for triangulation. Such work could be enriched through other methodologies, such as teacher interview or classroom observations.

Future Research

Within the immediate data set, there are opportunities for further analysis that were beyond the scope of this dissertation, as outlined in the proposal, but may provide further insight. For example, following the lead of Bos and colleagues (2001), the correlation between teachers' perceptions and performance could be analyzed. Additionally, the trends in regards to years of teaching, identified in Study 2, could be analyzed within the sample from Study 1.

More broadly, this study's results provide a call for further research to better understand the needs of educators learning of data literacy. With a larger systematic sampling of teachers and more widely disseminated survey boundaries, we could come to better understand what educators currently know or think they know about reading assessment, and how to support their learning through professional development, continuing education, and even preservice college instruction. Additionally, longitudinal work which follows teachers from their understanding of assessment data within their preparation programs and throughout the experiences in teaching would provide insight into where teachers are gaining their knowledge. This survey could certainly be utilized as a formative assessment for both school administrators and state-leve or regional

service providers in determining teachers' areas of strength and need, and developing future learning for those who directly impact student success.

Lee Shulman (2016) in his preface of the National Board of Professional Teaching Standards research study (2016), *What Teachers Should Know and Be Able to Do*, attests to the power of teachers to change the world:

> As teachers we use the many sources of professional knowledge, skill and experience at our disposal to engage the minds and hearts of children and youth by teaching and inspiring them. And once we mess with minds and hearts, we are prepared to take responsibility for the messes we have made, the dreams we have inspired, the minds we have brought to life, the prejudices we have forestalled, and the society to which we have given hope. (p. 5)

As our world continues to grow in diversity along with accountability, just being a good reader is not enough to be a good reading teacher (Phelps, 2009). The significant increase in what is required to educate our students is not lost in this research. We must continue to support educator knowledge growth, as opposed to simply condemning our educational system and its teachers for lack of student progress in our nation. We must provide the tools necessary to utilize assessment data to adjust instructional practices, in order to enable learning in today's classrooms. We must be supporters of teacher development, not critics of teacher failure, as teachers are the catalyst for change in our society.

REFERENCES

Afflerbach, P. (Ed.). (2010). *Essential readings on assessment.* Newark, DE: International Reading Association.

Alexander, P. A., & Fox, E. (2004). A historical perspective on reading research and practice. *Theoretical Models and Processes of Reading*, *5*, 33-68.

Allington, R. L. (2006). *What really matters for struggling readers: Designing research-based programs* (2nd ed.). Boston, MA: Pearson Education, Inc.

Applegate, A. J., & Applegate, M. D. (2004). The Peter effect: Reading habits and attitudes of teacher candidates. *The Reading Teacher, 57*, 554-563.

Athanases, S. Z., Bennett, L. H., & Wahleithner, J. M. (2013). Fostering data literacy through preservice teacher inquiry in English language arts. *The Teacher Educator, 48*, 8-28.

American Federation of Teachers, National Council on Measurement in Education, & National Education Association (1990). *Standards for teacher competence in educational assessment of students*. Washington, DC: National Council on Measurement in Education.

American Recovery and Reinvestment Act of 2009, S. 1, 111th Congress, 1st Session (2009).

Amrein-Beardsley, A., & Collins, C. (2012). The SAS education value-added assessment system (SAS EVAAS) in the Houston Independent School District (HISD): Intended and unintended consequences. *Education Policy Analysis Archives, 20*(12), 1-28.

Beaver, J. M. (2006). *Developmental reading assessment, K-3* (2nd ed.) [Measurement instrument]. Cranbury, NJ: Pearson Learning Group.

Beck, C. T., & Gable, R. K. (2001). Ensuring content validity: An illustration of the process. *Journal of Nursing Measurement, 9*, 201-215.

Binks-Cantrell, E., Joshi, R. M., & Washburn, E. K. (2012). Validation of an instrument for assessing teacher knowledge of basic language constructs of literacy. *Annals of Dyslexia, 62*, 153-171.

Binks-Cantrell, E., Washburn, E. K., Joshi, R. M., & Hougen, M. (2012). Peter effect in preparation of reading teachers. *Scientific Studies of Reading, 16*(6), 526-536.

Blair, T. R., Rupley, W. H., & Nichols, W. D. (2007). The effective teacher of reading: Considering the "what" and "how" of instruction. *The Reading Teacher, 60*, 432-438.

Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. *BMJ, 314*, 572.

Blank, R. K. (2013). What research tells us: Common characteristics of professional learning that leads to student achievement. *Journal of Staff Development, 34*, 50-53.

Blue Ribbon Panel on Clinical Preparation and Partnerships for Improved Student Learning. (2010). *Transforming teacher education through clinical practice: A national strategy to prepare effective teachers*. Washington, DC: National Council for the Accreditations of Teacher Education.

Bos, C., Mather, N., Dickson, S., Podhajski, B., & Chard, D. (2001). Perceptions and

   knowledge of preservice and inservice educators about early reading instruction.

   Annals of Dyslexia, 51, 97-120.

Brookhart, S. M. (2011). Educational assessment knowledge and skills for teachers.

   Educational Measurement: Issues and Practice, 30(1), 3-12.

Brunner, C., Fasca, C., Heinze, J., Honey, M., Light, D., Mandinach, E., & Wexler, D.

   (2005). Linking data and learning: The grow network study. *Journal of*

   Education for Students Placed at Risk, 10, 241-267.

Carlisle, J. F., Correnti, R., Phelps, G., & Zeng, J. (2009). Exploration of the

   contribution of teachers' knowledge about reading to their students'

   improvement in reading. *Reading and Writing: An Interdisciplinary Journal, 22*,

   457-486.

Carlisle, J. F., Kelcey, B., Rowan, B., & Phelps, G. (2011). Teachers' knowledge about

   early reading: Effects on students' gains in reading achievement. *Journal of*

   Research on Educational Effectiveness, 4, 289-321.

Center for K-12 Assessment & Performance Management at ETS. (2012, April).

   Coming together to raise achievement: New assessments for the common core

   *state standard*s. Retrieved from http://www.k12center.org/rsc/pdf/Coming_

   Together_April_2012 _Final.PDF

Chall, J. S. (1983). *Stages of reading development*. New York, NY: McGraw-Hill

Clay, M. (2006). *An observation survey of early literacy achievement* (2nd ed.).

   Portsmouth, NH: Heinemann Publishing.

Conley, D. T. (2011). Building on the common core. *Educational Leadership, 68*(6), 1-6.

Connor, C. M., Piasta, S. B., Fishman, B., Glasney, S., Schatschneider, C., Crowe, E., Underwood, P., & Morrison, F. J. (2009). Individualizing student instruction precisely: Effects of child by instruction interactions on first graders' literacy development. *Child Development*, *80*(1), 77–100.

Content Knowledge (2016, May 3). In S. Abbott (Ed.), The glossary of education reform. Retrieved from http://edglossary.org/content-knowledge/

Cooper, J. D., Chard, D. J., & Kiger, N. D. (2006). *The struggling reader: Interventions that work.* New York, NY: Scholastic.

Council of Chief State School Officers Task Force on Educator Preparation and Entry into the Profession. (2012). *Our responsibility, our promise: Transforming educator preparation and entry into the profession.* Washington, DC: CCSS.

Cunningham, A. E., Perry, K. E., Stanovich, K. E., & Stanovich, P. J. (2004). Disciplinary knowledge of K-3 teachers and their knowledge calibration in the domain of early literacy. *Annals of Dyslexia, 54*, 139-167.

Darling-Hammond, L. (1989). Accountability for professional practice. *Teachers College Record, 91*, 60-80.

Darling-Hammond, L. (2002). *Learning to teacher for social justice.* New York, NY: Teachers College Press.

Darling-Hammond, L. (2008). Teacher learning that supports student learning. *Teaching for Intelligence, 2*, 91-100.

Duncan, A. (2009b, June). *Robust data gives us the roadmap to reform.* Speech made at

    the fourth annual IES Research Conference, Washington, DC. Retrieved from

    http://www.ed.gov/news/speeches/2009/06/06-82009.html

Every Student Succeeds Act. (2015). S. 1177. Retrieved from http://1.usa.gov/1LpbN69

Florida Teacher Certification Guides. (June, 2015). Test Information Guide (Reading K-

    12). Retrieved from http://www.fl.nesinc.com/PDFs/ReadingK-12_TIG_5thEd_

    DOE040115.pdf

Foorman, B., Beyler, N., Borradaile, K., Coyne, M., Denton, C. A., Dimino, J.,

    Furgeson, J., Hayes, L., Henke, J., Justice, L., Keating, B., Lewis, W., Sattar, S.,

    Streke, A., Wagner, R., & Wissel, S. (2016). *Foundational skills to support*

    reading for understanding in kindergarten through 3rd grade (NCEE 2016-

    4008). Washington, DC: National Center for Education Evaluation and Regional

    Assistance (NCEE), Institute of Education Sciences, U.S. Department of

    Education. Retrieved from: https://ies.ed.gov/ncee/wwc/Docs/

    PracticeGuide/wwc_foundationalreading_070516.pdf

Fountas, T. C., & Pinnell, G. S. (2007). *Benchmark Assessment System* (2nd ed.)

    [Measurement instrument]. Portsmouth, NH: Heinemann Publishing.

Gamse, B.C., Bloom, H.S., Kemple, J.J., Jacob, R.T., (2008). *Reading first impact*

    study: Interim report (NCEE 2008-4016). Washington, DC: National Center for

    Education Evaluation and Regional Assistance, Institute of Education Sciences,

    U.S. Department of Education.

Goldhaber, D. (2002). The mystery of good teaching. *Education Next*, *2*(1). 1-7.

Good, R. H., & Kaminski, R. A. (Eds.). (2002). *Dynamic indicators of basic early literacy skills* (6th ed.) [Measurement instrument]. Eugene, OR: Institute for the Development of Educational Achievement.

Good, R. H., Simmons, D. C., & Kame'enui, E. J. (2001). The importance and decision-making utility of a continuum of fluency-based indicators of foundational reading skills for third-grade high-stakes outcomes. *Scientific Studies of Reading, 5*, 257-288.

Gray, L., & Taie, S. (2015). *Public school teacher attrition and mobility in the first five years: Results from the first through fifth waves of the 2007–08 beginning teacher longitudinal study* (NCES 2015-337). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved (January, 2017) from http://nces.ed.gov/pubsearch

Greenberg, J., & Walsh, K. (2012). *What teacher preparation programs teacher about K-12 assessment: A review*. Washington, DC: National Council on Teacher Quality.

Hamilton, L., Halverson, R., Jackson, S. S., Mandinach, E., Supovitz, J. A., & Wayman, J. C. (2009). *Using student achievement data to support instructional decision making* (NCEE 2009-4067). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/ publications/practiceguides

Hanushek, E. A., & Rivkin, S. G. (2010). Generalizations about using value-added

    measures of teacher quality. *The American Economic Review: Papers &*

    Proceedings, 100, pp. 267-   271.

Hayes, B. E. (2008). *Measuring customer satisfaction and loyalty: Survey design, use,*

    and statistical analysis methods (3rd ed.). Milwaukee, WI: American Society for

    Quality, Quality Press.

International Reading Association. (2010). *Standards for reading professionals –*

    revised 2010. Newark, DE: Author.

Jacobs, J., Gregory, A., Hoppey, D., Yendol-Hoppey, D. (2012). Data literacy:

    Understanding teachers' data use in a context of accountability and response to

    intervention. *Action in Teacher Education, 31*(3), 41-55.

Johnston, P. (2010). Teachers as evaluation experts. In P. Afflerbach, (Ed.), *Essential*

    readings on assessment (pp. 13-23). Newark, DE: International Reading

    Association.

Kelcey, B. (2011). Assessing the effects of teachers' reading knowledge on students'

    achievement using multilevel propensity score stratification. *Educational*

    Evaluation and Policy Analysis, 33, 458-482.

Kini, T., & Podolsky, A. (2016). *Does teaching experience increase teacher*

    effectiveness? A review of the research. Palo Alto: Learning Policy Institute.

Kraut, R., Chandler, T., & Hertenstein, K. (2016). The interplay of teacher training,

    access to resources, years of experience and professional development in tertiary

ESL reading teachers' perceived self-efficacy. *Gist Education and Learning Research Journal, 12*, 132-151.

Leader-Janssen, E., M., & Rankin-Erickson, J., L. (2013). Preservice teachers' content knowledge and self-efficacy for teaching reading. *Literacy Research and Instruction, 52*, 204-229.

Learning Point. (2004). *A closer look at the five essential components of effective reading instruction: A review of scientifically based reading research for teachers*. Naperville, IL: Learning Points Associates.

Lieberman, A., & Miller, L. (2008). *Teachers in professional communities: Improving teaching and learning*. New York, NY: Teachers College Press.

Lieberman, A., & Wood, D. R. (2003). *Inside the National Writing Project: Connecting network learning and classroom teaching*. New York, NY: Teachers College Press.

Mandinach, E. B. (2012). A perfect time for data use: Using data-driven decision making to inform practice. *Educational Psychologist, 47*, 71-85.

Mandinach, E.B., & Gummer , E. S. (2013a). A systematic view of implementing data literacy in educator preparation. *Educational Researcher, 42*, 30-37.

Mandinach, E. B., & Gummer, E. S. (2013b). Building educators' data literacy: Differing perspectives. *Journal of Educational Research & Policy Studies, 13*(2), 1-5.

Mandinach, E. B., & Gummer, E. S. (2016). Every teacher should succeed with data literacy. *Kappan, 97*, 43-46.

Mann, B., & Simon, T. (2010, July). *Teaching teachers to use data*. Presentation at the

    NCES STATS-DC 2010 Data Conference, Bethesda, MD.

Massachusetts Test for Educator Licensure. (June, 2015). Study Guide (Reading

    Specialist). Retrieved from http://www.mtel.nesinc.com/STUDYGUIDE/

    MA_SG_SRI_08.htm

Mastaglia, B., Toye, C., & Kristjanson, L. J. (2003). Ensuring content validity in

    instrument development: Challenges and innovative approaches. *Contemporary*

    Nurse, 14, 281-291.

Master reading teacher certification program. (July, 2016). Region 13 Education Center.

    Retrieved from http://www4.esc13.net/mrt

McAfee, O., Leong, D. J., & Bodrova, E. (2004). *Basics of assessment: A primer for*

    early childhood educators. Washington, DC: National Association for the

    Education of Young Children. Retrieved from http://www.naeyc.org/

    store/files/store/TOC/257.pdf

McCutchen, D., Abbott, R. D., Green, L. B., Beretvas, S. N., Cox, S., Potter, N. S.,

    Quiroga, T., & Gray, A. L. (2002). Beginning literacy: Links among teacher

    knowledge, student practice, and student learning. *Journal of Learning*

    Disabilities, 35, 69-86.

McCutchen, D., Harry, D. R., Cunningham, A. E., Cox, S., Sidman, S., & Covil, A. E.

    (2002). Reading teachers' knowledge of children's literature and English

    phonology. *Annals of Dyslexia, 52*, 207-228.

McKenna, M. C., Dougherty Stahl, K. A. (2009). *Assessment for reading instruction*

    (2nd ed.). New York, NY: The Guilford Press.

Means, B., Chen, E., DeBarger, A., & Padilla, C. (2011). *Teachers' ability to use data*

    to inform instruction: Challenges and supports. Retrieved from the U.S.

    Department of Education, Office of Planning, Evaluation, and Policy

    Development website: http://files.eric.ed.gov/fulltext/ED516494.pdf

Means, B., Padilla, C., & Gallagher, L. (2010). *Use of education data at the local level:*

    From accountability to instructional improvement. Retrieved from the U.S.

    Department of Education, Office of Planning, Evaluation, and Policy

    Development website: http://www2.ed.gov/rschstat/eval/tech/use-of-education-

    data/use-of-education-data.pdf

Meyers, L. S., Gamst, G., & Guarino, A. J. (2013). *Applied multivariate research:*

    Design and interpretation. Thousand Oaks, CA: Sage Publications, Inc.

Michigan Test for Teacher Certification. (June, 2015). Study Guide (Elementary

    Education). Retrieved from http://www.mttc.nesinc.com/PDFs/MI_

    field103_SG.pdf

Moats, L. C. (1993). Spelling error analysis: Beyond the phonetic/dysphonetic

    dichotomy. *Annals of Dyslexia, 43*, 174-186.

Moats, L. C. (1994). The missing foundation in teacher education: Knowledge of the

    structure of spoken and written language. *Annals of Dyslexia, 44*, 81-102.

Moats, L. C. (1999). *Teaching reading is rocket science: What expert teachers of*

    reading should know and be able to do. Washington, DC: American Federation

    of Teachers.

Moats, L. C. (2014). What teachers don't know and why they aren't learning it:

    Addressing the need for content and pedagogy in teacher education. *Australian*

    Journal of Learning Difficulties, 19, 75-91.

Moats, L. C., & Foorman, B. R. (2003). Measuring teachers' content knowledge of

    language and reading. *Annals of Dyslexia, 53*, 23-45.

National Governors Association & Council of Chief State School Officers. (2010, June).

    Common core state standards for English language arts & literacy in

    history/social studies, science, and technical subjects. Retrieved March, 19,

    2015, from http://www.corestandards.org

National Institute of Child Health and Human Development. (2000). *Report of the*

    National Reading Panel. Teaching children to read: An evidence-based

    assessment of the scientific research literature on reading and its implications

    for reading instruction (NIH Pub. No. 00-4769). Washington, DC: U.S.

    Government Printing Office.

No Child Left Behind Act of 2001, ESEA, 2001, Title 1, Part B, Subpart 1, Section

    1202(c)(7)(A)(IV)(2). Retrieved from https://www2.ed.gov/policy/elsec/

    leg/esea02/107-110.pdf

Oxford University Press. (2015). Oxford English dictionary. Retrieved, April 11, 2015,

    from http://www.oed.com

Pellegrino, J. W., Chudowsky, N., & Glaser, R. (2001). *Knowing what students know: The science and design of educational assessment.* Washington, DC: National Academy Press.

Phelps, G., & Schilling, S. (2004). Developing measures of content knowledge for teaching reading. *The Elementary School Journal, 105*, 31-48.

Phelps, G. (2009). Just knowing how to read isn't enough! Assessing knowledge for teaching reading. *Educational Assessment, Evaluation, and Accountability, 21*, 137-154.

Piasta, S. B., Connor, C. M., Fishman, B. J., & Morrison, F. J. (2009). Teachers' knowledge of literacy concepts, classroom practices, and student reading growth. *Scientific Studies of Reading, 13*, 224-248.

Plake, B. S. (1993). Teacher assessment literacy: Teachers' competencies in the educational assessment of students. *Mid-Western Educational Researcher, 6*(1), 21-27.

Popham, W. J. (2009). Assessment literacy for teachers: Faddish or fundamental? *Theory Into Practice, 48*, 4-11.

Praxis Study Companion. (June, 2015). Reading Specialist. Retrieved from http://www.ets.org/s/praxis/pdf/5301.pdf

Rice, J. K. (2010). *The impact of teacher experience examining the evidence and policy implications.* National Center for Analysis of Longitudinal Data in Education Research. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download? doi=10.1.1.307.2325&rep=rep1&type=pdf

Richmond, E. (2015). Obama to schools: Obsess less about testing. *The Atlantic*.

    Retrieved from https://www.theatlantic.com/education/archive/2015/10/obama-

    on-testing/412447/

Rowan, B., Schilling, S. G., Ball, D. L., Miller, R., Atkins-Burnett, S., Camburn, E.,

    Harrison, D., & Phelps, G. (2001). Measuring teachers' pedagogical content

    knowledge in surveys: An exploratory study. *Study of Instructional*

    Improvement. Consortium for Policy Research in Education: Educational

    Statistics Services Institute of American Institutes for Research.

Salinger, T., Mueller, L., Song, M., Jin, Y., Zmach, C., Toplitz, M., Partridge, M., &

    Bickford, A. (2010). *Study of teacher preparation in early reading instruction*

    (NCEE 2010-4036). Washington, DC: National Center for Education Evaluation

    and Regional Assistance, Institute of Education Sciences, U.S. Department of

    Education.

Schonlau, M., Ronald Jr, D., & Elliott, M. N. (2002). *Conducting research surveys via e-*

    mail and the web. Santa Monica, CA: Rand Corporation.

Shanahan, T., Callison, K., Carriere, C., Duke, N. K., Pearson, P. D., Schatschneider, C.,

    & Torgesen, J. (2010). *Improving reading comprehension in kindergarten*

    through 3rd grade: A practice guide (NCEE 2010-4038). Washington, DC:

    National Center for Education Evaluation and Regional Assistance, Institute of

    Education Sciences, U.S. Department of Education. Retrieved from

    https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/readingcomp_pg_092810.pdf

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*, 1-21

Shulman, L. S. (2016). Preface. In the National Board of Professional Teaching Standards, *What teachers should know and be able to do* (pp. 3-6)*.* Retrieved from http://www.nbpts.org/sites/default/files/what_teachers_should_know.pdf

Skinner, R. R., & Feder, J. (2014). *Common core state standards and assessments: Background and issues*. Cornell University ILR School. Retrieved from http://digitalcommons.ilr.cornell.edu.libezproxy.tamu.edu:2048/cgi/viewcontent. cgi?article=2324&context= key_workplaceezproxy.tamu.edu:2048/cgi/ viewcontent.cgi?article=2324&context=key_workplace

Southwest Educational Development Laboratory. (2015, August 3). *Reading assessment database - Summary chart of early reading assessments for prek-3*. Retrieved from https://www.sedl.org/cgi-bin/mysql/radchart2.cgi

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Spear-Swerling, L., & Brucker, P. O. (2003). Teachers' acquisition of knowledge about English word structure. *Annals of Dyslexia, 53*, 72-103.

Stiggins, R. J. (1991). Assessment literacy. *Phi Delta Kappan, 72*, 534-539.

Stronge, J. H., Ward, T. J., & Grant, L. W. (2011). What makes good teachers good? A cross-case analysis of the connection between teacher effectiveness and student achievement. *Journal of Teacher Education, 62*, 339-355.

Texas Education Agency (2007-2015). *Student assessment division*. Retrieved from http://tea.texas.gov/student.assessment/

Texas Education Agency, The University of Texas System, & The University of Houston System. (2010). *Texas Primary Reading Inventory* [Measurement instrument]. Baltimore, MD: Brookes Publishing Company.

Texas State Board for Educator Certification. (June, 2015). TExES ELAR (4-8) Preparation Manual. Retrieved from http://cms.texesets.org/files/9713/ 7451/0042/elar_4_8_117.pdf

Texas State Board for Educator Certification. (June, 2015). TExES (Generalist EC-6) Preparation Manual. Retrieved from http://cms.texes-ets.org/files/3113/ 2949/1710/191_ generalist_ec_6.pdf

Texas State Board for Educator Certification. (June, 2015). TExES (Generalist 4-8) Preparation Manual. Retrieved from http://cms.texes-ets.org/files/9113/ 2949/1342/111_generalist_4-8.pdf

Texas State Board for Educator Certification. (June, 2015). TExES (Reading Specialist) Preparation Manual. Retrieved from http://cms.texes-ets.org/files/6113/ 5722/7998/ reading_specialist_151.pdf

Thorndike, R. M., Cunningham, G. K., Thorndike, R. L., & Hagen, E. P. (1991). *Measurement and evaluation in psychology and education* (5th ed.). New York: Wiley.

Thurlow, M. L., & Thompson, S. J. (1999) District and state standards and assessments:

Building an inclusive accountability system. *Journal of Special Education*

Leadership, 12, 2, 3-10.

U.S. Department of Education, Office of Elementary and Secondary Education. (2002).

Guidance for the Reading First Program. Washington, DC. Retrieved from

https://www2.ed.gov/policy/elsec/leg/esea02/107-110.pdf

U.S. Department of Education. Institute of Education Sciences, National Center for

Education Statistics. (2012). *Number and percentage distribution of teachers in*

public and private elementary and secondary schools, by selected teacher

characteristics. [Data file]. Retrieved from https://nces.ed.gov/programs/

digest/d13/tables/dt13_209.10.asp

U.S. Department of Education, Institute of Education Sciences, What Works

Clearinghouse. (2013, July). *Beginning reading intervention report: Read*

Naturally®. Retrieved from https://ies.ed.gov/ncee/wwc/Docs/Intervention

Reports/wwc_readnaturally _070913.pdf

U.S. Department of Education, Institute of Education Sciences, What Works

Clearinghouse. (2014, May). *Students with learning disabilities intervention*

report: Repeated reading. Retrieved from https://ies.ed.gov/ncee/wwc/Docs/

InterventionReports/wwc_repeatedreading_051314.pdf

Wayman, J. C., & Stringfield, S. (2006). Technology-supported involvement of entire

faculties in examination of student data for instructional improvement. *American*

Journal of Education, 112(4), 549-571.

Wood, D. A. (1960). *Test construction: Development and interpretation of achievement tests.* Columbus, OH: Charles E. Merrill Books, Inc.

Wright, G. (2015). An empirical examination of the relationship between nonresponse rate and nonresponse bias. *Statistical Journal of The IAOS, 31*(2), 305-351.

APPENDIX A

Teachers' content knowledge of reading instruction and assessment – Item Development Survey 1

Item	Source
1. The 5 components of reading are phonemic awareness, phonics, vocabulary, fluency, and comprehension.	Adapted from Moats, 1994
2. Phonemic awareness involves the understanding and use of the alphabetic principle to read and spell words accurately and fluently.	Researcher developed, from Learning Point, 2004
3. Teachers of 2nd grade and higher do not require knowledge in the assessment of phonemic awareness.	Adapted from Bos et al., 2001
4. Teachers should demonstrate to struggling readers how to segment words into phonemes when reading.	Adapted from Bos et al., 2001
5. For early readers, listening and reading comprehension are equally developed.	Adapted from Moats and Foorman, 2003
6. Phonics instruction is beneficial for struggling readers if they need to build their knowledge of the letter sound correspondence.	Adapted from Bos et al., 2001
7. If a student can read aloud with accuracy, but does not understand what he reads, he needs to improve his vocabulary.	Adapted from Moats, 1994
8. Kindergarten and 1st grade students should be given screener assessments focusing on alphabet knowledge, phonemic awareness, and listening comprehension.	Researcher developed, from Moats, 1994
9. If a student understands the story, but reads slowly and without prosody, the student needs fluency instruction.	Researcher developed, from Moats, 1994
10. Teaching students how to isolate,	Researcher developed, from Salinger et al., 2010

identify, separate, and blend sounds in
spoken words is part of phonics instruction.

Item	Source
11. Teaching students meanings of words through multiple exposure and repetition is part of fluency instruction.	Researcher developed, from Salinger et al., 2010
12. Students in grades 2nd and higher only need assessments focused on fluency and comprehension for instructional decision making.	Researcher developed, from Moats, 1994
13. Reading assessments should be used to determine where to begin instruction and provide interventions.	Researcher developed, from Dorn & Soffos, 2009
14. Teachers can assess students' phonemic awareness by telling them a sound and having them point to the letter that makes that sound on an alphabet chart.	Researcher developed, from TExES Preparation Manual, 2015 (Generalist EC-6)
15. Assessing a student's accuracy and rate of reading is part of vocabulary instruction.	Researcher developed, from TExES Preparation Manual, 2015 (Generalist EC-6)

Teachers' perceived knowledge of the evaluation of reading assessment data – Item Development Survey 1

Item	Source
16. If a student says *park* rhymes with *pet* she has a rhyming deficit.	Researcher developed, from DIBELS
17. If a student segments the word *fold* as /f/ /o/ /l/, he has a phonics deficit.	Researcher developed, from Spear-Swerling and Brucker, 2003
18. If a student puts the sounds /sh/ /ă/ /k/, together to say the word *shack*, he can segment.	Researcher developed, from DIBELS
19. If a student is unable to read common sight words in a story, she has a phonics deficit.	Researcher developed
20. If a student says the word *frogs* has 4 phonemes, she can blend.	Researcher developed, from Carlisle, Correnti, Phelps, and Zeng, 2009
	Researcher developed, from Bos et al.,

21. If a beginning reader reads "home" instead of "house" this error should be corrected, because it will cause a comprehension deficit.	2001
22. While reading aloud, if a student decodes *paddle* as /p/ /a/ /t/ /l/, he has a vocabulary deficit.	Researcher developed, from Moats and Foorman, 2003
23. If a student says *stir* and *heard* end with the same sound, she has a phonemic awareness deficit.	Researcher developed, from Moats and Foorman, 2003
24. If a student reads a text aloud with accuracy and speed, but is unable to correctly answer any questions about the story, he has a comprehension deficit.	Researcher developed
25. If a student names 5 out of 26 letter names and sounds, she has an alphabetic principle deficit.	Researcher developed
26. A beginning reader's sight word recall evaluates his or her phonics knowledge.	Researcher developed, from the TExES English Language Arts and Reading (4-8) Preparation Manual, 2015
27. The word *break* has five phonemes.	Researcher developed, from the TExES English Language Arts and Reading (4-8) Preparation Manual, 2015
28. If a student can identify the beginning grapheme in 9 out of 10 words read aloud to him, by pointing to the letter on an alphabet chart, he understands the alphabetic principle.	Researcher developed, from the Michigan Test for Teacher Certification, 2015
29. If a student can tell you which word does not belong when you tell him "*plant, play, rain, please,*" then that student understands phoneme categorization.	Adapted from the PRAXIS Study Companion, 2015 (Reading Specialist)
30. If a student can read a list of 15 nonsense words, quickly and accurately, then she has an understanding of blending and sound-spelling patterns.	Researcher developed, from DIBELS

Item	Source
31. If a student reads aloud a text with 96 percent accuracy in word recognition and 91 percent accuracy in comprehension, then this is the student's independent reading level.	Researcher developed, from TExES Preparation Manual, 2015 (Reading Specialist)

Teachers' perceived knowledge of the interpretation of reading assessment data – Item Development Survey 1

Item	Source
32. Having students repeatedly read the same text aloud will improve their fluency.	Adapted from Salinger et al., 2010
33. Teacher modeling of skills during guided reading will help foster student's ability to utilize these skills.	Adapted from Carlisle, Correnti, Phelps, & Zeng, 2009
34. Phonics instruction promotes decoding skills.	Researcher developed
35. If a student cannot rhyme, they need direct, explicit, instruction in phonemic awareness.	Researcher developed
36. Thinking aloud during reading will promote active construction of meaning, or comprehension.	Adapted from Carlisle, Correnti, Phelps, & Zeng, 2009
37. Having a student answer written questions after reading the text is the best way to support reading comprehension.	Researcher developed
38. Examining whole class reading averages supports the differentiation of instruction for individual students.	Researcher developed, from Jackson, 2009
39. Phonics instruction should occur in a systematic way, with a series of skills and activities.	Adapted from Salinger et al., 2010
40. Comprehension can be supported through teaching children to monitor their understanding, and to correct problems as	Adapted from Salinger et al., 2010

they occur, during their reading.	
41. Explicit and systematic instruction on new words and their meanings, supports vocabulary development.	Researcher developed
42. Literal comprehension instruction can include retelling the beginning, middle, and end of a story.	Researcher developed, from the TExES Preparation Manual, 2015 (Generalist 4-8)
43. To grow a student's understanding of the relationship between written and spoken word, a teacher could read aloud from a big book, while pointing to each word as he reads.	Researcher developed, from the TExES Preparation Manual, 2015 (Generalist 4-8)
44. According to research, the most effective instruction in word recognition emphasizes student's development of graphophonemic skills.	Adapted from the Florida Teacher Certification Guide, 2015 (Reading K-12)
45. Decodable texts are most appropriately used to support beginning readers' development of sight-word vocabulary.	Adapted from the Massachusetts Test for Educator Licensure, Preparation materials, 2015 (Reading Specialist)
46. After reading, having students write in a learning log about what they learned and what they do not understand, supports self-monitoring to improve comprehension.	Adapted from the New York State Teacher Certification Exam, Preparation Guide (Elementary Assessment of Teaching Skills)

Teachers' knowledge of formal and informal reading assessments – Item Development Survey 1

Item	Source
47. An example of a formative reading assessment is teacher questioning during reading.	Researcher developed, from Afflerbach, 2010
48. If a teacher wants an assessment that gives multiple, current data, to be used for the adjustment of instructional goals for students, the teacher should use a summative assessment.	Researcher developed, from Afflerbach, 2010
49. To identify a student's independent,	Researcher developed, from TExES English Language Arts and Reading (4-8)

instructional and frustrational reading levels, a teacher should record the student's miscues as they read orally from a selected text.	Preparation Manual, 2015
50. An informal reading inventory, or running record, is an example of an informal reading assessment.	Researcher developed, from McKenna & Dougherty Stahl, 2009
51. Norm-reference reading assessment interpretation is guided by comparing a student's raw score with scores of other students.	Researcher developed, from McKenna & Dougherty Stahl, 2009
52. A criterion-referenced assessment is useful in determining overall development of a student, with respect to others.	Researcher developed, from McKenna & Dougherty Stahl, 2009
53. Writing an essay is an example of a formal assessment.	Researcher developed, from McKenna & Dougherty Stahl, 2009
54. Percentile rank is the percentage of students the same age whose scores a given student equals or exceeds.	Researcher developed, from McKenna & Dougherty Stahl, 2009
55. A standardized assessment leaves the interpretation of testing procedures and scoring up to the discretion of the test administrator.	Researcher developed, from McKenna & Dougherty Stahl, 2009
56. The International Literacy Association suggests that educators ignore grade-equivalent scores, as they relate only to the "average student."	Researcher developed, from McKenna & Dougherty Stahl, 2009
57. In monitoring a student's progress for a specific reading skill, a teacher or specialist should use a criterion-referenced assessment.	Adapted from the Florida Teacher Certification Guide, 2015 (Reading K-12)
58. A student who can read six high frequency letter-sound correspondences and can segment and blend CVC words presented orally, is most likely ready to	Adapted from the Michigan Test for Teacher Certification, 2015

sound out printed CVC words.

59. If two standardized reading assessments have similar means, but the standard deviation (SD) of test A is significantly greater than the SD of test B, we know that test A must have relatively spread out scores, while test B's scores must be relatively close to the mean.	Adapted from the Massachusetts Test for Educator Licensure, Preparation materials, 2015 (Reading Specialist)
60. To support a highly proficient reader who reads several grade levels above other students in her class, the teacher should use ongoing informal assessment of the student's reading level to support and select challenging and engaging literature on that student's independent and instructional levels.	Adapted from the Massachusetts Test for Educator Licensure, Preparation materials, 2015 (Reading Specialist)
61. Diagnostic reading assessment data support teacher differentiation of instruction to address the needs of all students.	Adapted from the PRAXIS Study Companion, 2015 (Reading Specialist)
62. Standard deviation is the term used to identify the average amount that scores differ from the mean on a standardized assessment.	Adapted from the PRAXIS Study Companion, 2015 (Reading Specialist)
63. Teachers should administer an observational checklist of reading behaviors to determine the appropriate level of text for each student in their class.	Adapted from TExES Preparation Manual, 2015 (Reading Specialist)

Teachers' Ability to Use Data to Drive Instructional Practice

Student & Grade	Letter Identification (# correctly named out of 52 letters – capital and lowercase)	Letter Sound Identification (sounds correctly given out of 52 letters – capital and lowercase)	Word Reading (# of words read correctly/total # of words)	Oral Reading Fluency (student's WPM* fluency/ grade level WPM requirement)	Reading Comprehension (# of comprehension questions answered correctly/total # of comprehension questions)

Sam – Kinder	47	14	1/10	Not Assessed	Not Assessed
Valerie – 2nd grade	52	50	8/10	24/80	6/6
Manuel – 4th grade	Not Assessed	Not Assessed	12/12	112/112	2/8

APPENDIX B

Teachers' content knowledge of reading instruction and assessment – Revised Item Development Survey 2

Item	Source
1. The National Reading Panel identifies the 5 components of effective reading instruction as phonemic awareness, phonics, vocabulary, fluency, and comprehension.	Adapted from Moats, 1994
2. Phonemic awareness involves the understanding and use of the alphabetic principle to read and spell words accurately and fluently.	Researcher developed, from Learning Point, 2004
3. Teachers of 2nd grade and beyond do not need knowledge in the assessment of phonemic awareness because this skill develops fully in kinder and 1st grades.	Adapted from Bos et al., 2001
4. Teachers should model for students struggling in learning to read, how to segment words into phonemes when reading.	Adapted from Bos et al., 2001
5. For emergent readers, listening and reading comprehension develop equally.	Adapted from Moats and Foorman, 2003
6. Phonics instruction is beneficial for struggling readers if they need to build knowledge of letter-sound correspondences.	Adapted from Bos et al., 2001
7. If a student can read aloud with speed and accuracy, but does not understand what is read, the student needs instruction to improve his or her vocabulary.	Adapted from Moats, 1994
8. To determine areas of instructional need, kindergarten and 1st grade students should be administered screener assessments focusing on alphabet knowledge, phonemic awareness, and listening comprehension.	Researcher developed, from Moats, 1994
9. If a student understands the text, but	Researcher developed, from Moats, 1994

reads slowly and without prosody (expression), the student needs fluency instruction.	
10. Oral identification, isolation, blending, and segmentation of sounds in spoken words begins as a component of phonics instruction.	Researcher developed, from Salinger et al., 2010
11. Teaching students meanings of words through multiple exposure and repetition is part of fluency instruction.	Researcher developed, from Salinger et al., 2010
12. Students in 2nd grade or beyond need assessments focused on fluency and comprehension for instructional decision making, because phonemic awareness and phonics is developed in earlier grades	Researcher developed, from Moats, 1994
13. The evaluation of reading assessments should be the primary tool in determining where to begin instruction and provide interventions.	Researcher developed, from Dorn & Soffos, 2009
14. Teachers can assess students' phonemic awareness by telling them a sound and having them point to the letter that makes that sounds on an alphabet chart.	Researcher developed, from TExES Preparation Manual, 2015 (Generalist EC-6)
15. Determining a student's accuracy and rate of reading is part of vocabulary assessment.	Researcher developed, from TExES Preparation Manual, 2015 (Generalist EC-6)

Teachers' perceived knowledge of the evaluation of reading assessment data – Revised Item Development Survey 2

Item	Source
16. When given the prompt of, "*What rhymes with pat*?", the student responds with "*Pen.*" This student lacks an understanding of rhyming.	Researcher developed, from DIBELS
17. When given the prompt of, "Say all the sounds in the word *fold*.", the student responds "/*f*/ /*o*/ /*l*/." This student lacks	Researcher developed, from Spear-Swerling and Brucker, 2003

vocabulary.

18. When asked orally, "Tell me the word I'm saying when I say /sh/ /ă/ /k/.", the student responds "*shack*." This student can segment.	Researcher developed, from DIBELS
19. If a student is unable to read common sight words in a text, the student has a phonics deficit.	Researcher developed
20. When given the prompt, "How many phonemes (or sounds) do you hear in *frogs*?", the student responds "*Five*." This student can blend.	Researcher developed, from Carlisle, Correnti, Phelps, and Zeng, 2009
21. While reading aloud, an emergent reader reads "*home*" instead of "*house*." This error will cause a misunderstanding of the text.	Researcher developed, from Bos et al., 2001
22. While reading aloud a student decodes the word *paddle* as "*patl*." This student lacks vocabulary knowledge.	Researcher developed, from Moats and Foorman, 2003
23. If a student says *stir* and *heard* end with the same sound, this student lacks phonemic awareness.	Researcher developed, from Moats and Foorman, 2003
24. A student reads a text aloud with accuracy and speed, but is unable to correctly answer any questions about the text. This student has limited comprehension.	Researcher developed
25. If a student can name 5 out of the 26 alphabet letters, the student lacks knowledge of the alphabetic principle.	Researcher developed
26. Emergent readers high frequency word recall illustrates their knowledge of phonics.	Researcher developed, from the TExES English Language Arts and Reading (4-8) Preparation Manual, 2015
27. The word *break* has five phonemes.	Researcher developed, from the TExES English Language Arts and Reading (4-8)

	Preparation Manual, 2015
28. If a student can identify the beginning grapheme in 9 out of 10 words read aloud to him, by pointing to the letter on an alphabet chart, he understands letter-sound correspondence.	Researcher developed, from the Michigan Test for Teacher Certification, 2015
29. When asked "Which word does not belong in the words plant, play, rain, please?", the student response is "*rain*." This student understands phoneme categorization.	Adapted from the PRAXIS Study Companion, 2015 (Reading Specialist)
30. A student's ability to read a list of 15 nonsense words quickly and accurately shows that student's understanding of phonemic awareness.	Researcher developed, from DIBELS
31. If a student reads a text aloud with 94% accuracy of decoding, or word reading, and 91% accuracy of comprehension, then this is the student's independent reading level.	Researcher developed, from TExES Preparation Manual, 2015 (Reading Specialist)

Teachers' perceived knowledge of the interpretation of reading assessment data –
Revised Item Development Survey 2

Item	Source
32. Repeated readings of the same text is a way students can improve their fluency.	Adapted from Salinger et al., 2010
33. Teacher modeling of skills during guided reading will help foster student's ability to utilize these skills.	Adapted from Carlisle, Correnti, Phelps, & Zeng, 2009
34. Phonics instruction promotes decoding skills.	Researcher developed
35. If a student cannot rhyme, they need direct, explicit, instruction in phonemic awareness.	Researcher developed
36. The teacher thinking aloud during reading promotes students' active construction of meaning, or comprehension.	Adapted from Carlisle, Correnti, Phelps, & Zeng, 2009

37. Having a student answer written questions after reading the text is the primary method to support reading comprehension.	Researcher developed
38. Examining a class reading average on a district-wide benchmark assessment supports the differentiation of instruction for individual students.	Researcher developed, from Jackson, 2009
39. Phonics instruction should occur in a systematic way, with a series of skills and activities.	Adapted from Salinger et al., 2010
40. Comprehension can be supported through teaching students explicit strategies to monitor their understanding, and self-correct during reading.	Adapted from Salinger et al., 2010
41. Explicit and systematic instruction on new words and their meanings, supports vocabulary development.	Researcher developed
42. Literal comprehension instruction can include retelling the beginning, middle, and end of a story.	Researcher developed, from the TExES Preparation Manual, 2015 (Generalist 4-8)
43. To grow students understanding of the relationship between written and spoken word, a teacher could read aloud from a big book, while pointing to each word as he reads.	Researcher developed, from the TExES Preparation Manual, 2015 (Generalist 4-8)
44. Research states that effective instruction for word recognition and decoding emphasizes students' development of graphophonemic skills.	Adapted from the Florida Teacher Certification Guide, 2015 (Reading K-12)
45. Decodable texts are most appropriately used to support emergent readers' development of sight-word vocabulary.	Adapted from the Massachusetts Test for Educator Licensure, Preparation materials, 2015 (Reading Specialist)
	Adapted from the New York State

Item	Source
46. During/After reading, having students write/draw in a learning log about what they learned and what they do not understand, supports self-monitoring to improve comprehension.	Teacher Certification Exam, Preparation Guide (Elementary Assessment of Teaching Skills)

Teachers' knowledge of formal and informal reading assessments – Revised Item Development Survey 2

Item	Source
47. An example of a formative reading assessment is teacher questioning during reading.	Researcher developed, from Afflerbach, 2010
48. If a teacher wants an assessment that gives multiple, current data, to be used for the adjustment of instructional goals for students, the teacher should use a summative assessment.	Researcher developed, from Afflerbach, 2010
49. Identification of a student's independent, instructional and frustrational reading levels, can be done through the administration of an informal reading inventory.	Researcher developed, from TExES English Language Arts and Reading (4-8) Preparation Manual, 2015
50. A running record is an example of an informal reading assessment.	Researcher developed, from McKenna & Dougherty Stahl, 2009
51. To interpret a norm-referenced reading assessment, a teacher compares one student's raw score with the raw scores of other students of the same age.	Researcher developed, from McKenna & Dougherty Stahl, 2009
52. A criterion-referenced assessment is useful in determining overall development of a student, with respect to others.	Researcher developed, from McKenna & Dougherty Stahl, 2009
53. Writing an essay is an example of a formal assessment.	Researcher developed, from McKenna & Dougherty Stahl, 2009
54. On a given assessment, percentile rank is the percentage of students, the same age, whose scores a specific student equals or exceeds.	Researcher developed, from McKenna & Dougherty Stahl, 2009

55. A standardized assessment leaves the interpretation of testing procedures and scoring up to the discretion of the test administrator.	Researcher developed, from McKenna & Dougherty Stahl, 2009
56. The International Literacy Association advises educators to ignore grade-equivalent scores, as they relate only to the "average student."	Researcher developed, from McKenna & Dougherty Stahl, 2009
57. In monitoring a student's progress for a specific reading skill, a teacher or specialist should use a criterion-referenced assessment.	Adapted from the Florida Teacher Certification Guide, 2015 (Reading K-12)
58. A student who can identify 7 letter-sound correspondences, and can blend and segment CVC words presented orally, is most likely ready to begin decoding CVC words in print.	Adapted from the Michigan Test for Teacher Certification, 2015
59. If two standardized reading assessments both have a mean of 87, but the standard deviation (SD) of test A is 15 and the SD of test B is 5, we know that test B must have relatively spread out scores, while test A's scores must be relatively close to 87.	Adapted from the Massachusetts Test for Educator Licensure, Preparation materials, 2015 (Reading Specialist)
60. To support a highly proficient reader who reads several grade levels above other students in his class, the teacher should use yearly summative reading assessments to support and select challenging and engaging literature on that student's independent and instructional levels.	Adapted from the Massachusetts Test for Educator Licensure, Preparation materials, 2015 (Reading Specialist)
61. Diagnostic reading assessment data support teacher differentiation of instruction, to address the needs of individual students.	Adapted from the PRAXIS Study Companion, 2015 (Reading Specialist)
62. Standard deviation is the term used to identify the average amount that scores	Adapted from the PRAXIS Study Companion, 2015 (Reading Specialist)

differ from the mean on a standardized assessment.

63. An observational checklist of a student's reading behaviors, allows the teacher to determine the appropriate level of individual and instructional text for that student.	Adapted from TExES Preparation Manual, 2015 (Reading Specialist)