Comprehension, Text Difficulty, Background Knowledge, and Talk: A Comparison of KWL and Listen Read Discuss

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A Dissertation

Presented to

The Faculty of the Curry School of Education

University of Virginia

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by

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May 2017

ABSTRACT

Current controversy surrounding the optimum level of text difficulty to maximize literacy growth indicates that more research is needed to determine whether adolescent readers benefit from reading easy or more challenging texts during literacy lessons. Further, investigating the type of scaffolding that will best assist readers in improving comprehension of texts at varying levels of difficulty is necessary. This mixed methods study investigated 318 ninth graders' comprehension during a 12-week intervention under one of four conditions: easier texts paired with KWL or Listen Read Discuss (LRD) and more challenging texts paired with KWL or LRD. Students' comprehension was measured before and after the intervention using the GMRT-4 as well as after each of the 24 lessons implemented using a researcher-created comprehension quiz. Two-way ANCOVA tests were used to investigate the interaction and any main effects between factors of text difficulty and comprehension strategy. One-way nonparametric tests were used to analyze differences based on students' English language proficiency status, disability status, and reading ability. Qualitative methods were used to analyze the classroom talk to explore differences between student and teacher talk features across the treatments and between subgroups of students.

Findings did not reveal an interaction between text difficulty and comprehension strategy on students' comprehension; however, a main effect for comprehension strategy favoring KWL was found associated with students' comprehension of texts. Analyses revealed that regardless of English proficiency levels or reading ability, students performed significantly better on the quizzes when participating in KWLs. However, students with disabilities performed similarly on quizzes in KWL and LRD treatments.

Results did not reveal a main effect for text difficulty on students' comprehension, indicating that the difficulty level of the text was not associated with students' comprehension. However, a main effect for text difficulty was found for English Language Learners (ELLs), indicating that ELLs did better on comprehension quizzes when they read easy texts.

Fidelity of implementation observations revealed that teachers spent the majority of the lesson building or activating knowledge before reading in both KWL and LRD lessons, although KWL lessons offered a better balance between the amount of time spent before, during, and after reading. Analysis of amount of student and teacher talked indicated that students spoke more frequently during KWL lessons than during LRD lessons. Teachers asked more questions in KWL lessons and analysis of teacher questioning techniques indicated that the teachers more frequently used questioning techniques to assist students in elaborating or evaluating their own responses in KWL lessons than in LRD lessons

Analysis of student talk indicated that students asked more questions, discussed the text, made analogies and connections with other texts, speculated, and shared stories more often during KWL lessons than in LRD lessons. In particular, these types of talk occurred after reading more often in KWL lessons than in LRD lessons when the benefits to comprehension may have been greater. Further, differences were noted in how students discussed knowledge between the two treatments. Inherent to KWLs, students shared more background knowledge and more incorrect knowledge during KWL lessons. Students discussed knowledge frequently in LRD lessons but knowledge discussions

included both students sharing their own background knowledge as well as discussing knowledge presented by the teacher during the lesson. Irrelevant knowledge was shared equally between both treatments. ELLs and below grade level readers talked more often during LRD lessons than KWL lessons and were most likely to talk about knowledge presented by the teacher. Implications for instruction are discussed.

Keywords: adolescents, text difficulty, background knowledge, high school, comprehension instruction, KWL, Listen Read Discuss, classroom talk, ELLs, students with disabilities, below grade level readers, struggling readers, Newsela

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APPROVAL OF THE DISSERTATION

This dissertation, "Comprehension, Text Difficulty, Background Knowledge, and Talk: A Comparison of KWL and Listen Read Discuss", has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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March 15, 2017

DEDICATION

To Rosa, who planted a seed which led me to explore the world of literacy education, and to Mike McKenna, to whom I am forever grateful for inspiring and teaching me how to "fight the good fight" for literacy using science.

ACKNOWLEDGEMENTS

The solitary path of writing is a misnomer, which is understood best when you step back, read through your completed work, and realize the influence, encouragement, and assistance of so many people whose expertise, inspiring words, and time spent watching children made it possible to write. My words here fall short of describing the gratitude I feel towards my village who have collectively made this dissertation a reality.

A word of gratitude goes to the International Literacy Association (ILA), the Virginia State Research Association (VSRA), the Curry School Research and Development Fund, and Ms. Doris Buffet and the Center on Children, Families, and Law, who funded the research that supported this dissertation.

I give a heartfelt acknowledgement to my first advisor and first dissertation chair, Mike McKenna. This dissertation was our idea, and finishing it without Mike was something that I never imagined doing. Although I'd give anything for one more day of Mike's friendship and guidance, I know that the wisdom, kindheartedness, and generosity he shared with me is enough to carry me through a lifetime of literacy research and I will strive throughout my career as a researcher to do justice to his legacy.

To Marcia Invernizzi and Amanda Kibler, co-chairs of my dissertation committee, and two of the most talented researchers that I know. Your guidance, expertise, and thoughtfulness went above and beyond at every twist and turn. Thank you for stepping in, taking me under your amazing wings, and helping me reach the finish line. I am forever grateful to everything that I have learned, and will continue to learn, from you both.

I also thank my dissertation committee: Michael Kennedy and Ji Hoon Ryoo, for patience, expertise, and answering my many, many questions. I am also grateful to all of

the reading faculty and the many Curry faculty who listened, provided feedback, answered questions, and demonstrated unwavering support, including Mary Abouzeid, Ottilie Austin, Tisha Hayes, Nancy Deutsch, and Stephanie Van Hover. I also extend my gratitude to the literacy researchers beyond the walls of the University of Virginia who selflessly shared their knowledge and time including Sharon Walpole, for her mothering and advisement, and Freddy Hiebert, for her excitement about the topic, resources, and expertise.

I thank my fellow Curry students who paved the trail ahead of me as well as those who are close to finishing. Rebecca Bergey and Laura Tortorelli, not a day went by without your moral support and literacy advice. Gail Lovette, I could not have written this dissertation without your no-nonsense, sensible advice, which ranged from child rearing guidance to practical dissertation writing advice. Kat Alves, Kristin Conradi, Bong Gee Jang, Shanna Hirsch, Christine Hardigree and so many others: your strong examples set the bar high, but your kind words and helpful advice made this journey achievable.

I am forever indebted to the teachers who participated in this study, who opened their classroom doors and selflessly shared their time and amazing students with me. I also thank those who wrote lesson plans and assisted in data collection, especially Pearl Lee. Additionally, I thank my incredible colleagues and students throughout my teaching journey who have inspired me to want to learn more about literacy.

I heartily thank my friends and family who cheered me on and provided support and most importantly, childcare. To my mother Maureen Macaleer, my in-laws Cecily and Steve Winchell, and Lisa Thomas: thank you for your time, flexibility, words of

support and making sure my children were happy and loved while I spent hours and hours writing. To my father, Bradley Macaleer, thank you for instilling the belief in me that education is never a waste of time or money. All of my family and friends; I appreciated your endless cheering.

And most of all, I thank my husband, Marshall Lupo III. The hours of watching children, unending support, boxes of chocolate bought on my behalf (ok sometimes borrowed) to ensure that I could write was more than any wife could have asked for. This dissertation would not exist without you.

And lastly, I thank my children, Jacob Wyatt and Annabelle Madeline. You are forever my favorite little people to read to (and with!) and I hope that your love of literacy, which delights me more than anything else in this world, will allow you to explore your passions and take you far in life.

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CHAPTER 1: INTRODUCTION

Given that 70% of adolescents require literacy remediation (Biancarosa & Snow, 2006), the adolescent literacy crisis presents a tremendous obstacle that high schools across the nation confront. Therefore, scrutinizing instructional practices surrounding how to optimize adolescents' comprehension ability is warranted. Although the adolescent literacy crisis has sparked the attention of educators, the lack of effective solutions employed in high schools to improve adolescents' literacy is concerning. The purpose of the present study is to investigate ways to improve adolescent readers' comprehension. This chapter explores various influences, theories, and current problems with comprehension instruction for adolescents.

Elements of Comprehension Instruction

Researchers have identified that the primary literacy need of high school students is comprehension instruction (Compton, Miller, Elleman, & Steacy, 2014; Greenleaf, Jimenez, & Roller, 2002; Kamil, Borman, Dole, Kral, Salinger, Torgeson, 2008). Many of the key elements of instruction to improve adolescents' comprehension are well documented; however, literacy research has yet to demonstrate what combination of elements is likely to be most effective (Biancarosa & Snow, 2006). Key elements of comprehension instruction include text difficulty and the comprehension teaching strategy that a teacher uses during instruction, which includes addressing students' background knowledge.

Text Difficulty

The Common Core State Standards require students not only engage with difficult texts but also develop higher-order thinking skills needed to analyze and interpret such texts (Common Core State Standards Initiative [CCSSI], 2010). Therefore, literacy instruction must assist adolescents in increasing their ability to interpret, generalize, or draw conclusions from increasingly difficult texts (Kamil et al., 2008). The Common Core's emphasis on increasing text difficulty contradicts the traditional view of matching students with instructional level texts. According to the latter view, teachers can best serve students by matching texts with their instructional reading level in order to make adequate growth (e.g., Allington, 2002, 2007, 2013; Betts, 1946; Clay, 1991; Fountas & Pinnell, 1999). The instructional level is "the highest level at which a child could benefit from instructional support" (McKenna & Stahl, 2015) and is characterized by word recognition from 95-98% and comprehension from 75-89% (Betts, 1946). This level has long been thought to ensure success and avoid frustration.

Recent developments in policy bring to light an alternative view of text difficulty for adolescents, one that indicates that students must read texts at or above grade level with scaffolding and support, regardless of reading ability, in order to develop necessary reading skills for career and college readiness (e.g., CCSSI, 2010; Fisher, Frey, & Lapp, 2012; Shanahan, Fisher, & Frey, 2012). Those in favor of increasing text difficulty argue that in order for students to develop comprehension skills, such as making inferences and drawing conclusions from a text, they must read texts at or above grade level. Proponents of increasing text difficulty claim that the practice of keeping below grade level readers in instructional level texts may stunt both vocabulary and comprehension growth (e.g.,

Hirsch & Hansel, 2013; Miller & McKenna, 2016; Willingham, 2006). However, aspects of text difficulty must be examined alongside the supports that a teacher uses to help students access texts.

Comprehension Teaching Strategies

Reading comprehension instruction has different considerations before, during, and after reading. Before reading, a teacher prepares the reader to read the text, which includes building and activating background knowledge, engaging readers with the topic, and setting a purpose for reading (e.g., Pearson & Fielding, 1991). During reading, the teacher promotes active engagement through assisting students in using particular strategies, such as making connections or predictions, to comprehend the passage (e.g., Palinscar & Brown, 1984). Literacy experts agree that assisting readers with applying strategies can be helpful; however, the strategy itself is less important than benefits reaped from the strategy (Willingham, 2006). Therefore, instruction should focus on comprehending the text, rather than mastering a strategy or skill (Kamil et al., 2008). Lastly, after reading, the teacher assists students in developing a mental representation of the text by integrating background knowledge with new knowledge acquired while reading, which is often done through classroom discussions about the text (Kamil et al., 2008; McKenna, 2002).

Four comprehension strategies are well known for instructing students to comprehend: The Directed Reading and Thinking Activity (DR-TA), Reciprocal Teaching, KWL, and Listen Read Discuss (e.g., Readance & Tierney, 2005). Table 1 provides a comparison of the features of before, during, and after reading lesson components for each of the four comprehension teaching strategies.

Before reading, DR-TA (Stauffer, 1969; Stauffer & Harrel, 1975), Reciprocal Teaching (Palinscar & Brown, 1984), and KWL (Ogle, 1986) all offer a similar approach to assisting students in activating background knowledge, engaging with a topic, and developing a purpose for reading. LRD (Manzo & Casale, 1985) offers a different approach before reading in which the teacher builds specific background knowledge and explicitly establishes a purpose for reading with students.

Table 1
A Comparison of Comprehension Teaching Strategies

	Before Reading					**During Reading**		**After Reading**	
	Activate students' background knowledge	Build specific background knowledge for students	Engage readers with a topic	Assist students in setting a purpose for reading	Set a specific purpose for reading for students	Promote active engagement with text	Assist reader in using strategies to comprehend	Discuss text	Assist reader in integrating new and background knowledge
DR-TA	yes	no	yes	yes	no	yes	yes	yes	no
Reciprocal Teaching	yes	no	yes	yes	no	yes	yes	yes	no
KWL	yes	no	yes	yes	no	yes	no	yes	yes
LRD	no	yes	yes	no	yes	yes	no	yes	yes

During reading, both DR-TA and Reciprocal Teaching emphasize how to assist students in utilizing particular strategies while reading, such as making connections and predictions, which are not features of KWL or LRD. DR-TA assists readers in developing their own purpose for reading by encouraging readers to make predictions about what

they will read at the beginning of each predetermined chunk of the text. Students stop, discuss, and adjust their predictions at the end of each chunk before continuing and then seek proof for their assumptions as they read. Reciprocal Teaching similarly emphasizes four comprehension strategies: predicting, clarifying, questioning, and summarizing. The teacher gradually releases responsibility of implementing the strategies as students practice reading and applying the strategies in a small group setting.

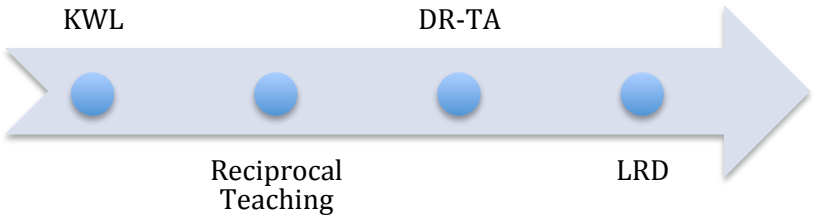
After reading, each of the four comprehension strategies includes text discussion, which is a critical component of comprehension instruction. However, KWL and LRD approach classroom discussion in contrasting ways. KWL involves activating what students know about a topic and engaging students to write questions about what they want to learn before reading. After reading, the teacher assists students in revisiting the questions and contemplating what they learned about a topic in a whole group discussion. On the other hand, LRD is built on the premise that students lack the necessary knowledge to comprehend a text and therefore, the teacher must build that knowledge by presenting important facts prior to reading. LRD ends with a teacher led discussion in which the teacher guides students to integrate knowledge built prior to reading with the knowledge read in the text.

The four comprehension teaching strategies discussed have a number of similarities; however, the major differences are attributable to the type of scaffolding that the teacher provides for students. Alvermann and Eakle (2003) identified that reading comprehension scaffolding falls along a continuum, ranging from a participatory approach, which actively engages students in their own learning, to a transmission approach, which views texts and teachers as “dispensers of knowledge” (p. 24). The

participatory approach takes the stance that readers bring a great deal of knowledge and high level of skill to each reading experience and therefore, scaffolds consist of supporting readers to activate what they already know, assisting readers to develop and set their own purpose for reading, and helping students co-construct interpretations of the texts alongside the teacher. A transmission approach, on the other hand, views teachers as the authoritative source of knowledge in the classroom, and therefore, scaffolds consist of explicitly building specific knowledge for students before reading and directing students towards relevant details and a particular interpretation of the text.

As displayed in Figure 1, KWL falls on one end of the spectrum, as students direct their own learning and analysis of the text.

Figure 1
Continuum of Scaffolding from Participatory to Transmission



Reciprocal teaching offers a great deal of student input into the comprehension process, but requires more teacher direction than KWL through teaching students to use specific strategies while reading. DR-TA allows for students to provide input while making predictions about the text, but the teacher provides more scaffolding and direction through teacher led discussions than Reciprocal Teaching. Lastly, LRD encompasses a

transmission approach, where the teacher builds specific knowledge, sets a purpose for reading, and leads an after reading discussion by asking his or her own specific questions.

Some literacy experts argue that a transmission approach is necessary, in which teachers provide background knowledge (e.g. Hirsch, 2006; Willingham, 2006) and scaffold the reading process with teacher-guided discussions (Kamil et al., 2008). Others argue that a participatory approach is more helpful to assist students in connecting what they know to the topic and to allow students to set their own purpose for reading (e.g. Alvermann & Eakle, 2003; Moje, 2008; Ogle, 1986). In order to isolate elements of instruction to understand their impact, two of comprehension strategies have been selected for this study. KWL and LRD present similar lesson structures using contrasting approaches to the role students and teachers play in integrating background knowledge during the comprehension process.

Background Knowledge

An important component of the comprehension process, knowledge, is often overlooked in comprehension instruction (e.g., Hirsch, 2006; Neuman, 2006; Willingham, 2006). Background knowledge, or the knowledge a reader possesses that is necessary for understanding a text (Lewis, Walpole, & McKenna, 2014), is associated with higher levels of comprehension and is key to the kind of reading needed for success in secondary school and beyond. Hirsch and Hansel (2013) argue that knowledge is crucial for understanding difficult texts. Research suggests that scaffolding reading through building or activating background knowledge prior to reading may assist readers' comprehension of more difficult texts (e.g., Stahl, Jacobson, C. E. Davis, & R. L. Davis,

1989). Less clear, however, is which comprehension strategies are likely to be most effective in building such knowledge.

Statement of Problem

Important questions remain about text difficulty and comprehension strategies for improving comprehension. Which approaches are most likely to be most effective? Which levels are optimal? Does the combination of approach and difficulty matter? These are crucial questions that deserve careful inquiry.

With respect to instruction, there is limited experimental research on the best methods of improving comprehension ability for adolescent readers (Fisher & Ivey, 2006; Lai, Wilson, McNaughton, & Hsiao, 2014). As a result, many instructional interventions aimed at improving literacy skills for adolescents, though well intentioned, have limited impact on the empirical knowledge base related to improving comprehension ability (Biancarosa & Snow, 2006; Lai et al., 2014; Moje, 2008). For example, some literacy experts argue that teachers need to provide background knowledge and heavily scaffold the reading process with teacher-guided discussions (Kamil et al., 2008) and lessons that explicitly provide knowledge for students (Hirsch, 2006; Willingham, 2006) using comprehension approaches such as Listen Read Discuss (LRD) (Manzo & Casale, 1985). Others argue that students bring a great deal of knowledge to the literacy experience and a student-guided approach in which teachers assist students in activating relevant knowledge is more helpful (e.g., Moje, 2008), for example, using a KWL (Ogle, 1986). However, no peer-reviewed research to date has been conducted on the efficacy of either KWL or LRD on adolescents' comprehension.

With respect to text difficulty, battle lines are clearly drawn. Although some literacy professionals argue that adolescents need to read instructional level texts in order to make growth (e.g., Allington, 2002, 2007, 2013; Kamil et al., 2008), others argue that in order to develop inferential skills, read and interpret challenging texts in the content area classroom, meet the requirements for state standards, and develop the literacy skills necessary for the workplace, students must engage with texts at or above grade level (e.g., Fisher & Frey, 2014; S. Vaughn, Roberts, Schnakenberg, Fall, M. Vaughn, Wexler, 2015). However, research has yet to demonstrate the optimum level of difficulty of texts that adolescents need to read in order to improve comprehension ability (National Institute of Child Heath and Human Development [NICHHD], 2000).

Though a wide array of approaches exists to help adolescents improve literacy skills, there is a call for research to better understand what combinations of approaches effectively produce positive outcomes for high school students (Biancarosa & Snow, 2006). Therefore, it is imperative to not only investigate the impact of text difficulty and comprehension teaching strategy, but the interaction between different types of scaffolding of reading comprehension and different levels of text difficulty in order to assist teachers in providing the most impactful literacy instruction.

Conceptual Framework

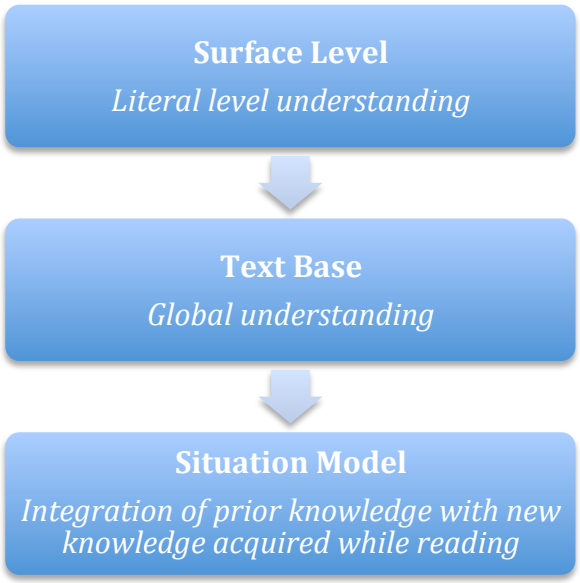
Comprehension instruction consists of developing a wide range of skills, including genre and text structure knowledge; vocabulary; and the ability to make inferences, draw conclusions, or read materials with a specific purpose (e.g., Duke & Carlisle, 2011). In order to theorize best practices for comprehension instruction for adolescent readers, the comprehension process itself must be defined. Comprehension of

texts is a dynamic and complex process outlined by both Construction-Integration Theory and the RAND model.

Construction-Integration Theory

The complexity of the reading comprehension process is illustrated in Kintsch and van Djik's Construction-Integration Theory, which describes a model of text representation in which a reader forms different layers of comprehension while reading (Kintsch,1986, 2013; Kintsch & van Djik, 1978). As displayed in Figure 2, the first layer, the surface level, which involves the reader's basic ability to interpret the words on the page, forms the foundation for comprehending the text base, which is the global understanding of a text. The text base creates the basis for developing the situation model in which the reader's background knowledge and experiences are integrated with knowledge acquired in the text to form a mental representation of the text. Construction-Integration Theory recognizes that a reader's schemata play an important role in helping the reader interpret text ambiguities. Further, it emphasizes that comprehension is a process of constructing interpretations of a text by integrating new knowledge gained while reading with existing knowledge. Although readers may form similar surface level and text-based understandings of a text, readers' mental representations may differ depending on their interest, background knowledge, and purpose for reading. The situation model is a level of understanding in which the knowledge from the text, through integration, can be retrieved and applied in novel situations, thus this is the level of understanding of interest to teachers (Kintsch, 2013).

Figure 2
Construction-Integration Theory

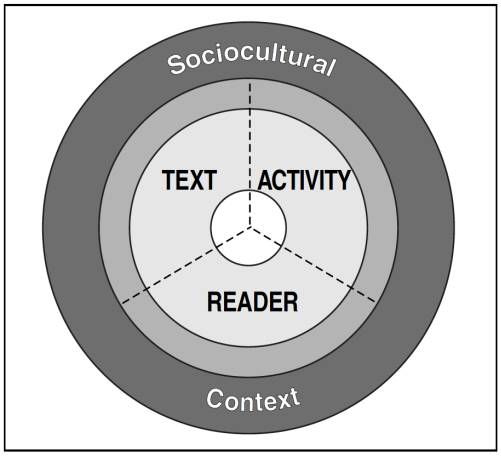


The RAND Model

The dynamic nature of reading comprehension instruction is best described through the RAND model (2002), which posits that reading comprehension is a process that includes interaction among the reader, the text, and the activity within a sociocultural context. The reader brings unique attributes to the reading process, such as specific cognitive abilities, knowledge of vocabulary, background knowledge and experiences, motivation, and the ability to use strategies. The text impacts comprehension because each text has unique features that influence the comprehension process, including aspects of text organization, text cohesion, and genre. During literacy instruction, the reader activity includes the teachers' instruction surrounding the text before, during, and after reading. Talk plays an important role in the activity as the teacher and students use talk to develop and share interpretations of the text. As displayed in Figure 3, the activity

transpires within a particular context, one that includes but extends beyond the classroom and involves sociocultural influences such as a child's home literacy practices and affective beliefs about reading.

Figure 3
RAND Heuristic for Reading Comprehension



**from RAND, 2002, p. xiv*

Construction Integration Theory and the RAND model both have important implications for how research surrounding reading comprehension should be conducted. Construction Integration Theory emphasizes the need for instruction to assist students in both accessing and applying new knowledge acquired while reading and background knowledge in order to form a situation model of a text, a task that some readers fail to accomplish (Compton et al., 2014). The RAND model indicates that investigation of instruction to improve comprehension for adolescents requires examining the text and the comprehension strategies alongside each other in order to observe the interactions occurring between these factors. Furthermore, considerations of the reader and what different readers bring to each reading experience require attention.

Study Rationale and Purpose

The issues of text difficulty and method of teaching comprehension skills to adolescents during literacy interventions require thoughtful attention and grounding in research-based practices. Current controversy surrounding the optimum level of text difficulty to maximize literacy growth indicates that more research is needed to determine whether adolescent readers benefit from reading easier or more challenging texts during literacy instruction. Additionally, investigating the type of scaffolding that will best assist readers in developing a situation model of a text is necessary. Finally, investigating the interaction between text difficulty and the comprehension teaching strategy employed is essential. Therefore, this study utilized a 2 by 2 method to investigate two levels of text difficulty alongside two different comprehension teaching strategies, KWL and LRD. Specifically, this mixed-methods study investigated the following questions:

1. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' growth in comprehension ability?
2. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' comprehension of texts?
3. What are the differences across subgroups of students' comprehension during KWL and LRD approaches with different levels of texts?
4. How do the features of teacher and student talk during background building before reading and text discussions after reading differ between KWL and LRD approaches?
5. How does talk differ before and after reading between KWL and LRD treatments for subgroups of students?

Significance of the Study

To date, there is limited experimental research on methods to improve comprehension ability for adolescent readers (Fisher & Ivey, 2006; Lai et al., 2014), and as a result, many interventions implemented in high schools across the country have limited impact on improving adolescents' literacy skills (Biancarosa & Snow, 2006; Moje, 2008). Current arguments over the impact of text difficulty, coupled with the lack of relevant research on effective comprehension teaching strategies for adolescent readers, have left teachers unsure of how to improve comprehension for adolescents. Findings of this study have the potential to add to an important body of research that may help high school teachers better understand how to improve adolescents' comprehension. Specifically, the results of this study may help to inform decisions about text levels, comprehension teaching strategies, and combinations of the two.

Definition of Terms

The following definitions, which have been developed through an investigation of the literature, are used throughout this dissertation.

Background knowledge: the knowledge a reader possesses that is necessary for understanding a text (Lewis, Walpole, & McKenna, 2014)

English Language Learner (ELL): "a student who is in the process of attaining proficiency in English as a new, additional language" (Wright, 2015, p. 1)

Instructional reading level: "the highest level at which a child could benefit from instructional support" (McKenna & Stahl, 2015, p. 46)

Text difficulty: Refers to how easy or difficult a text is to read, which is influenced by the structure of a text, clarity of language, knowledge demands (CCSSI, 2010, Appendix A) as well as the elements of a text that can be manipulated and studied, such as semantic features, syntax, and cohesion, that impact the difficulty level students will experience when reading the text (Mesmer, Cunningham, & Hiebert, 2012)

Situation model of reading: the mental representation of the text that a reader forms in which the reader's background knowledge and experiences are integrated with the meaning of the text (Kintsch,1986, 2013; Kintsch & van Djik, 1978)

CHAPTER II: REVIEW OF THE LITERATURE

The construct of reading comprehension, defined as an interaction between the activity, the text, and the reader (RAND, 2002) is complex in nature (Afflerbach & Cho, 2011). As such, the instruction of comprehension mirrors this complexity, and several different areas of literature must be examined to understand how to improve comprehension for adolescents. In the following review of the literature, I first address aspects of instruction, which the RAND model refers to as the activity (2002). This includes examining two important components of instruction: background knowledge and talk. I then discuss the research behind two comprehension strategies that are compared in this study, KWL and LRD. Second, I address aspects of the text, including defining text difficulty and examining studies that investigate the influence of text difficulty both on students' comprehension of texts as well as students' overall comprehension ability. Third, I discuss the literature investigating the interaction between students' background knowledge and text difficulty and implications for the present study. Fourth, I address the reader, in particular, comprehension instruction considerations for students based on English language proficiency, disability status, and reading ability. Lastly, I discuss implications of the literature for the present study.

The Activity

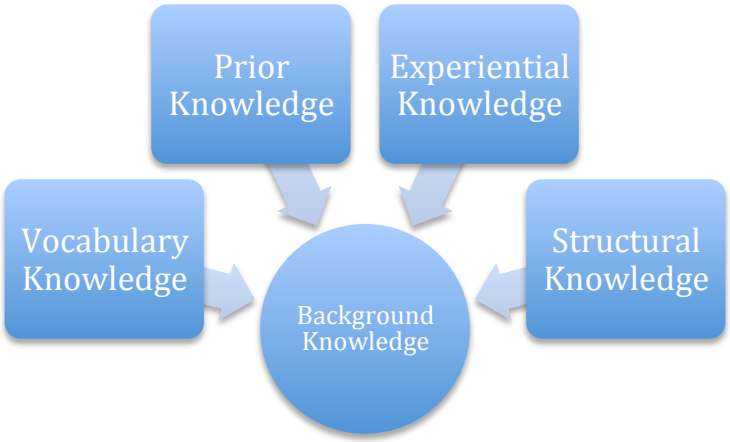
The activity, as defined by the RAND model of reading comprehension (2002), includes the instruction a teacher provides for students, which occurs during three segments of a comprehension lesson; before, during, and after reading. In this section, I first review the literature of two key components of comprehension instruction: background knowledge and classroom talk. I then describe the comprehension teaching strategies chosen for use in the present study, KWL and LRD.

The teachers' goal during comprehension instruction is to assist students in developing a situation model of a text, which is defined as a readers' mental representation of a text in which the reader's background knowledge is integrated with new knowledge acquired while reading (Kintsch, 1986, 2013). In order to assist readers in forming a situation model of the text, the teacher provides instruction to promote the reader's understanding of the text. Two key elements of comprehension instruction are essential in this process: background knowledge and classroom talk.

Background Knowledge

Lewis, Walpole, and McKenna (2014) define background knowledge as an umbrella term that encompasses everything a reader knows and brings to a reading experience. As displayed in Figure 4, the term background knowledge has four main domains: knowledge of vocabulary, background knowledge of the content or topic, experiential knowledge, which includes a reader's prior experiences in the world, and structural knowledge which includes a reader's knowledge of text structure, sentence structure, text organization, and genre. Schema theory provides a framework for understanding how readers use their background knowledge while reading to interpret a text.

Figure 4
Background Knowledge



**from Lewis, Walpole, & McKenna (2014)*

Schema theory indicates that a reader's schemata, or background knowledge, provide an organizational framework for text understanding that can help or hinder comprehension. A reader's schemata play an important role in helping the reader interpret text ambiguities (Anderson, 2013; Freebody & Anderson, 1983). Schema theory designates that a reader's background knowledge will impact his or her expectation of what he or she will read. However, the reader's expectations will shift as they encounter conflicting information in the text. For example, Pressley and Afflerbach (1995) found that incorrect, incomplete, or inaccurate schema did not have a negative impact on readers' comprehension of a text because readers adjusted their expectations as they encountered information in the text that contradicted their own background knowledge. However, Pressley and Afflerbach found that a significant lack of specific knowledge led readers to overly trust the author, therefore impacting readers' ability to question or evaluate what the author said and limiting inferences about the text.

Research has indicated that background knowledge may assist readers in accessing more difficult texts. For example, Recht and Leslie (1988) compared below grade level readers comprehension of a text in which they had high amounts of background knowledge to above average readers' comprehension of the same text in which they had limited knowledge. Findings revealed that struggling readers with high levels of background knowledge read with similar abilities to their more abled peers. Implications of this study indicate that background knowledge is an important consideration during comprehension instruction.

Addressing students' background knowledge during comprehension instruction is key to assisting students in developing a mental representation of a text. Comprehension instruction includes two ways of addressing students' knowledge before reading: activating students' existing knowledge related to the text and building specific knowledge that students may be lacking but is necessary for comprehending the text. Building specific knowledge before reading is supported by empirical evidence. Research has revealed that readers with high levels of background knowledge are able to develop more sophisticated analyses of more challenging texts than readers with low levels of background knowledge (e.g., McNamara, D. Kintsch, Butler-Songer, Kintsch, 1996; McNamara, Oruzu, and Floyd, 2011). For example, Dole Valencia, Greer, and Wardrop (1991) conducted an in-depth study with 63 fifth graders in which the authors compared two approaches to addressing knowledge: activating knowledge prior before reading through an interactive group discussion and building specific knowledge before reading through a traditional lecture. Results revealed that both building and activating knowledge were effective compared to a business-as-usual control group; however,

building knowledge produced the highest levels of comprehension. Dole et al. (1991) argued that building knowledge might have produced better results because it helped students focus on relevant information in the text. However, the authors also concluded that activating knowledge through interaction was also a useful tool in helping students develop their own purpose for reading.

Dole et al.'s study supported previous findings which indicated that activating knowledge not relevant to the main idea of a text may skew students' understanding of the overarching concepts (Stahl et al., 1989; Stahl & Jacobson, 1986) and building specific background knowledge related to the main idea of a passage before reading improved a student's ability to process and recall information (Marr & Gormley, 1982). Together, these findings lead to the conclusion that teacher-guided methods of building specific background knowledge may improve comprehension and interaction may be useful in helping readers develop knowledge before reading.

Classroom Talk

Classroom talk and the approach to addressing knowledge intersect in the literacy classroom because talk is the medium for teaching and learning (Halliday, 1978) and language is teachers most important pedagogic tool (Mercer & Littleton, 2007). Talk permeates all phases of the literacy lesson, from discussions about knowledge before reading to post-reading discussions that allow for the integration of background knowledge and new knowledge to form an interpretation of the text. Comprehension and language goals are often viewed as separate entities, but in order for students to make meaning of a text, talk is essential as comprehension skills are developed through interaction (e.g., Nystrand, 1996; Wilhelm, 2014). For example, Applebee, Langer,

Nystrand, and Gamoran (2003) examined components of language arts instruction for 974 middle and high school students to determine which components of literacy instruction were associated with successful literacy outcomes. The authors found that classrooms containing dialogic talk provided statistically higher literacy gains at the end of the year compared to classrooms that lacked dialogic discussions.

Dialogic talk is defined as a classroom discussion in which teachers and students as co-inquirers who collaboratively develop knowledge and analyses. Collaborative development of ideas through talk in the classroom is thought to promote student learning (e.g., Reznitskaya, 2012). During dialogic talk, authority over classroom discourse is shared and teachers' and students' questions insight meaningful discovery of knowledge. Students are responsible for developing ideas, asking questions, and acquiring an understanding of the content (Nystrand, 1996). In order to collaboratively develop ideas, teachers provide specific feedback while students engage in meta-level reflection, which includes connecting ideas across different contexts. Dialogic talk inspires lengthy, meaningful responses from students that allow students to develop a deeper understanding of context (Juzwik, Borsheim-Black, Caughlan, & Heinz, 2013; Reznikskaya, 2012).

On the other hand, recitation, which is defined as students' oral sharing of previously learned materials, is the most common type of discussion seen in classrooms in the U.S. (Nystrand, 1996). Recitation is a teacher-controlled discussion that often follows an IRE structure, which is defined as Initiation, Response, and Evaluation. Talk follows a general pattern of the teacher initiating a question, students responding to the question, and the teacher providing an evaluation of the students' responses, placing the

teacher as the controller of the classroom conversation (Mehan, 1979). Classrooms where discussions primarily follow the IRE structure are viewed as monologic. Monologic classrooms consist of students reciting knowledge that the teacher provides, rather than developing their own ideas, questions, and analyses of content or texts (Juzwik et al., 2013; Mehan, 1979; Rezkitskaya, 2012). Many researchers have argued that monologic talk has a tendency to shorten students' responses and deprive students of the interaction required to develop an interpretation of a text (e.g., Gibbons, 2002; Wilhelm, 2014).

Further, classroom discussions occur infrequently during comprehension lessons. For example, Swanson et al. (2016) reported in an observational study of literacy instruction in middle and high schools that over 80% of English classes observed did not include any text-related discussions. Further, Dressman, Wilder & Connor (2005) found that classroom discussions rarely occurred for students who read below grade level. Similarly, Applebee et al. (2003) revealed that dialogic conversations occur less frequently in classrooms where students have lower reading ability. Mercer and Littleton (2007) contend that the lack of discussion in schools may stem from teachers' lack of confidence in the impact of student talk on learning, despite findings in literacy research that demonstrate the importance of certain types of classroom talk.

Although research has indicated that classroom discussion is important in learning, not all talk has the same impact on student learning. Research has indicated that the quality of talk between teachers and students influences students' learning processes (e.g., Kucan & Palinscar, 2013; Nystrand, 1996). In the past teachers have been criticized for overusing questions and talking too much; however, Mercer and Littleton (2007) argued that viewing how much teachers or students talk or how many questions teachers ask is

too simplistic of an assessment of classroom talk. Rather, the communicative function of teacher and student talk, which includes assessing the deeper meaning behind utterances that occur during the literacy lesson, must be considered. In the next section, I explore aspects of teacher and student talk that research has identified as having a positive influence on student learning.

Teacher Talk. Kucan and Palinscar (2013) argue that the teacher plays a critical role in the literacy discourse of the classroom. Research has established that teachers who treat learning as a social process and use talk to help students organize their ideas and make their thinking clear have more successful outcomes (Mercer & Littleton, 2007). Additionally, Juzwik et al. (2013) reasoned that teachers have three important goals when engaging in dialogic discussions: to produce in-depth responses from students, extend student talk, and enable as many students as possible to participate.

In order to support students in developing a situation model of a text, teachers use specific conversational moves to assist students in activating, building, and integrating knowledge with the meaning of the text. Mercer and Littleton (2007) propose that teachers encourage students to share their knowledge and opinions, which allows for students to activate relevant knowledge and develop their own interpretations of the text or content. Additionally, the authors suggest that teachers use talk to discover what students know about a topic. For example, Dole et al. (1991) found that interaction was useful in assisting students in activating knowledge and setting a purpose for reading. Further, Nystrand (1996) suggested that teachers refrain from evaluating student responses and instead provide opportunities for students to evaluate their own response in order to question, deepen, and elaborate their ideas.

Asking questions is an important aspect of teacher talk, but all questions are not equal during literacy discussions. Asking open-ended questions, which are defined as questions without predetermined answers, may incite meaningful responses in order to foster deeper analysis of the text (Juzwik et al., 2013; Nystrand, 1996). On the other hand, known answer questions, which are defined as questions that the teacher has a right answer in mind, are often viewed as less desirable because they tend to shorten student talk (e.g., Juzwik et al., 2013; Mehan, 1979). However, Mercer and Littleton (2007) argue that the teachers' purpose and intention behind the question should be evaluated. For example, questions in which the teacher takes up a students' response or asks a student to provide more information are important because they may deepen students' interpretations of a text. However, these questions may appear on the surface as known-answer questions. Further, McKenna (2002) argues that teachers should start discussions with literal level questions before asking open-ended questions in order to scaffold the students' comprehension process and clarify misunderstandings that may have occurred during reading.

Student Talk. Certain aspects of student talk have been identified that promote learning and comprehension. For example, Mercer and Littleton (2007) describe the importance of exploratory talk, in which students challenge ideas, reason, and evaluate evidence from a text. Juzwik et al. (2013) argue that student thinking during talk should include speculating, such as considering why or how something may have occurred. Similarly, the authors identify the importance of students making connections, such as sharing relevant stories, providing relevant textual connections to other texts, or making analogies to connect new knowledge with previous knowledge.

Features of student and teacher talk may differ in comprehension lessons as a result of the comprehension teaching strategy selected for instruction. In particular, the scaffolding provided by a teacher may vary based on whether or not the teacher uses a transmission approach or a participatory approach. For example, a transmission approach to comprehension instruction, in which teachers and texts are the primary knowledge sources in the classroom, may include more teacher talk and less exploratory talk. On the other hand, a participatory approach to talk may include more opportunities for students to extend their learning through talk in order to collaboratively build ideas with the teacher and other students. Therefore, important distinctions in the features of student talk may occur between KWL, which utilizes a participatory approach to classroom instruction and LRD, which embodies a transmission approach.

A Comparison of KWL and LRD

The teacher's selection and implementation of a comprehension teaching strategy is an important influence in how readers integrate background knowledge and how a teacher engages students in talk about the text. Implications of different strategies and the influence on both talk that promotes learning and how to assist students in integrating background knowledge while reading are described below.

KWL. KWL is a popular participatory comprehension strategy in which the teacher activates students' background knowledge and then elicits students' questions about what they want to learn before reading (Ogle, 1986). After reading, students discuss what they learned about a topic in order to integrate their background knowledge with the new knowledge acquired in the text. KWL is a discussion-based technique designed to "honor what children bring to each reading situation" (Ogle, 1986, p. 564).

According to Ogle, the simplicity of the design and minimal instructional demands appeal to teachers.

To assess the implementation of KWL, Ogle asked teachers to use this approach and employed informal evaluations, including collecting student work and videotapes of teachers utilizing KWLs, to evaluate their implementation. Findings demonstrated high participation and engagement from students. Ogle stated that further research is necessary for a more rigorous evaluation; however, few studies have examined the effectiveness of this approach in the thirty years since this article was published.

Despite the lack of empirical research, KWLs are mentioned frequently in content area reading textbooks (e.g., McKenna & Robinson, 2014) and peer-reviewed literature (e.g., Jack & Lin, 2013) as a method that is useful for engaging students with a subject. KWLs are cited as helpful in teaching students to engage in purpose setting during comprehension instruction (e.g., Coyne et al., 2009), activating knowledge about a topic before reading (e.g., Williams et al., 2014), and as a tool to deepen metacognitive understanding of vocabulary (Rupley & Nichols, 2006; Taylor, Mraz, Nichols, Rickelman, & Wood, 2009).

Only one study in a peer-reviewed publication to date has compared the use of KWL with other comprehension strategies. K. Stahl (2008) compared the effects of KWL, Picture Walks, and a DR-TA with second graders (n = 31) reading science texts. Both students in the Picture Walks and the DR-TA groups outperformed the KWL treatment group. Stahl postulated that higher levels of scaffolding during the knowledge building process better assisted students to both activate and utilize relevant knowledge when

developing an understanding of a text, although because this study was conducted with second graders, implications of using KWLs with adolescents are limited.

K. Stahl's research supports the notion found in S. Stahl et al. (1989) and S. Stahl and Jacobson (1986) that building relevant knowledge is helpful in improving students' understanding of a text. However, K. Stahl's findings question whether or not KWLs assist students in activating relevant knowledge. Further, critics site the use of KWL as a generic literacy strategy that fails to truly deepen students' knowledge of text because it is not text specific and it fails to address the complexity of language of texts at the secondary level, particularly in content classrooms (Conley, 2009; Kennedy & Ihle, 2012; Shanahan & Shanahan, 2008).

Listen Read Discuss. On the opposing side, the LRD method is built on the premise that students lack the necessary knowledge to comprehend a text and therefore, the teacher must build knowledge by sharing specific information prior to reading (Manzo & Casale, 1985). After approximately half of a class period of knowledge building activities and lecture, students read the text in order to identify misconceptions or contradictions with the knowledge built before reading. The LRD method ends with a teacher-led discussion in which the teacher asks specific questions to assist students in integrating background knowledge with the new knowledge acquired while reading. Manzo & Casale describe LRD as a flexible heuristic rather than a specific teaching procedure and as such, describe several elaborations of this method. The variations they describe include the addition of a quiz after reading, inversing the lecture and reading, having students identify parts of the text that are disorganized, or setting a specific purpose for students when reading in order to guide knowledge acquisition from the text.

The authors conducted no formal research on the LRD heuristic; however, several teachers utilized LRD prior to the article's publication and Manzo and Casale's reported that teachers felt LRD helped improve students' comprehension. To date, only one study measuring the efficacy of LRD has been conducted with high school students. Watkins, McKenna, A. Manzo, & U. Manzo (1994) compared LRD to a DR-TA and found that LRD led to increased content learning and the likelihood that students read the assigned materials. Additionally, students shared their preference for the LRD method over the DR-TA during post intervention interviews. The authors contend that LRD was effective because the content was more accessible, especially for struggling readers. LRD is less well known than KWL, has fewer mentions in the literature, and no empirical studies to date investigating LRD have been published in peer-reviewed journals.

Contrasting Pedagogical Approaches. LRD provides a stark contrast to KWL in the role the teacher plays in developing students' knowledge before reading, engaging students in the purpose setting process, and assisting students with integrating knowledge after reading. KWL is a generic strategy that can be applied to any text with little preparation by a teacher, while LRD requires a teacher to prepare activities to build relevant background knowledge with students. KWL's participatory approach emphasizes knowledge that students already have and engages students to develop an interest-based purpose for reading through classroom discussions. In contrast, the underlying principle of LRD is that students lack the necessary background knowledge to understand a text so a teacher must provide this knowledge for students.

In order to understand how to better support adolescent readers, research is needed to examine different comprehension teaching strategies such as KWL and LRD;

however, reading is an interaction between the text, the activity, and the reader (RAND, 2002). Therefore, studying elements of comprehension instruction must be done in conjunction with considering text difficulty in order to understand the influence of a comprehension strategy on students' comprehension at varying difficulty levels.

The Text

The importance of the text during the comprehension process is well defined in the literature (e.g., RAND, 2002); however, the question remains, does exposure to easier or more difficult texts over time influence adolescents' comprehension ability? I begin by describing the literature about what makes a text difficult, followed by an exploration of studies that investigate different features of text difficulty and the impact on adolescents' comprehension. Lastly, I conduct a review of studies that investigated the influence of the extended use of easy and more difficult texts on adolescents' comprehension ability.

What Makes a Text Difficult?

The term text complexity is often interchanged with the term text difficulty, although the two differ in meaning. Mesmer, Cunningham, and Hiebert (2012) define text difficulty as the expected performance of students on a particular task while reading, whereas text complexity refers to elements of the text that can be manipulated and studied, such as the syntax, semantic features, and cohesion. The terms readability and Lexile refer to the probable difficulty level assigned to a text based on certain features, usually quantitative estimations of the syntactic and semantic complexity of a text (Hiebert & Pearson, 2014; Hiebert, 2002).

The CCSSI (2010) identified a three-fold approach to investigating text complexity, which included looking at qualitative, quantitative, and reader task

dimensions. Qualitative dimensions of assessing text difficulty emerged before quantitative dimensions (Hiebert & Pearson, 2014) and are defined as features that must be measured by a human reader (Fisher & Frey, 2015). Qualitative aspects of the text's difficulty include factors such as the intricacy of facts, necessary background information needed to understand a text, genre, the amount of figurative language, and the clarity of language for a particular text (e.g., Hiebert & Pearson, 2014; Mesmer, Cunningham, & Hiebert, 2012).

After quantitative features emerged, readability formulas were developed in order to more quickly and efficiently estimate aspects of text difficulty, which calculate average sentence length, word frequency, and word length (Hiebert & Pearson, 2014). Readability measures grew in popularity because of their ease in use, but were often criticized because sentence length, word length, and frequency of words often failed to capture qualitative aspects of the text that can contribute to its difficulty (e.g., Anderson, Hiebert, Scott, & Wilkinson, 1985).

Alongside the popularity of readability measures and the call to match readers with instructional level texts emerged a particular type of text sets. These text sets aimed to provide the same content to students at different reading levels by simplifying texts to provide different versions. A simplified version of a difficult text was created by simplifying sentence structure, using easier vocabulary, and reducing the overall length of the passage. Companies such as Newsela (newsela.com) have created such text sets in order to provide readers with the same content at different readability levels.

In recent years, a new way of viewing text difficulty has emerged to replace inadequacies of readability measures, which include a broader look at many factors that

make a text difficult. As a result of redefining what makes a text difficult, quantitative calculators have evolved to include measurements of discourse structure or different aspect of text cohesion. For example, the Coh-Metrix system (Graesser, McNamara, Cai, Conley, Li, & Pennebaker, 2014) provides a more thorough analysis of factors that make a text difficult. The use of more advanced measures has allowed for researchers to better understand certain key features of text difficulty, the results of which are discussed below.

Lexical Complexity. Lexical or semantic complexity refers to the structural complexity of a word as well as its familiarity to the readers. The structural complexity of a word is defined as the "the elements of a word's construction that influence the difficulty of decoding it" (Mesmer, Cunningham, & Hiebert, 2012, p. 238) whereas the familiarity of a word refers to the rarity or frequency that a word appears in the text: more frequent appearances ease the burden on readers (Arya, Pearson, & Hiebert, 2012). Readability measures often estimate semantic complexity by examining average word length and word frequency with the underlying assumption that longer words and the larger variety of words generally make a text more challenging. However, more recent analyses of lexical complexity focus on the familiarity of the word to the reader (e.g., Hiebert, 2002).

Several studies have investigated the influence of lexical complexity on adolescents' comprehension of a text and found that when students read more unfamiliar words in a text they perform worse on comprehension assessments (Arya, Pearson, & Hiebert, 2011; Stahl & Jacobson, 1986; Stahl et al., 1989). Results reveal that lexical difficulty, in particular, how familiar a word is to a reader, plays an important role in assisting the reader in understanding a text.

Syntactic Complexity. Syntax refers to the sophistication level of the sentences in a text (Reed & Kershaw-Herrera, 2016). Mesmer, Cunningham, and Hiebert (2012) identify that "syntax functions within phrases and clauses to enable the reader to assign case relations among concepts represented by content words" (p. 242). The syntactic complexity of a text is often estimated in readability estimates by examining the number of words per sentence with the assumption that a higher number of words per sentence will increase the difficulty of a text (e.g., Arya, Hiebert, & Pearson, 2011). Further, methods of simplifying texts often include removing details of a text to shorten the overall length of text in order to ease the cognitive burden on readers (Hiebert & Pearson, 2014). However, reducing the number of words per sentence may eliminate connective cues such as conjunctives and other syntactic elements such as relative clauses that aid the reader in understanding a text. For example, connective cues may indicate that the sentence has a problem-solution structure, thus providing an explicit clue to how a sentence should be interpreted (Hiebert & Pearson, 2014). Furthermore, a text full of simple sentences may require that a reader make inferences in order to connect the ideas that were disconnected by eliminating connective cues such as conjunctions. Reducing sentence length in an effort to make the text less difficult influences its cohesion and may have the opposite of the intended result (Arya, Hiebert, & Pearson, 2011).

Text Cohesion. Text cohesion refers to the level of explicitness in which the ideas in a text are linked (e.g., Reed & Kershaw-Herrera, 2016) and is an important influence on a reader's comprehension of a text (Kintsch & van Djik, 1978). Cohesive texts are organized in a way that the relationship between the ideas is clear to the reader. This is accomplished through the use of connective cues such as conjunctions and signal

words (e.g. consequently), by linking ideas through repeated use of related words within and across sentences, and by referencing previously stated ideas using relative pronouns and the like. On the other hand, a lack of cohesion in texts requires the reader to make implicit connections between sentences and ideas in order to make sense of the text, which often requires extensive background knowledge (e.g., Arya, Pearson & Hiebert, 2011). As a result, high cohesion texts are considered easier than low cohesion texts regardless of length.

Studies of the influence of text cohesion have mixed results on the influence on a reader's comprehension of texts. For example, in some studies, students who read less cohesive texts did worse on comprehension assessments when compared to students who read highly cohesive texts (McKeown, Beck, Sinatra, & Loxterman, 1992; McNamara et al., 1996). However, in other studies, cohesiveness of a text did not influence a students' comprehension (e.g., Sinatra, Beck, & McKeown, 1993). Recent research reveals that different aspects of text cohesion may play different roles in making a text easier or more difficult for students to comprehend (Mesmer, Hiebert, & Cunningham, 2012). It is possible that differences in the outcomes of the studies examining text cohesion are a result of manipulating different aspects of text cohesion.

Together, the findings of the research on lexical complexity, syntactical complexity, and text cohesion support the notion suggested by Hiebert and Pearson (2014) that assessing a text's difficulty requires looking beyond sentence and word length. Companies such as Newsela (newsela.com), which provide texts at varying reading levels, need to consider how modifications to the simplicity of the text influence the cohesiveness of a text. For example reducing the sentence length and overall length of the

passage has the potential to increase the difficulty of a text as the reader may need to infer how ideas and sentences are connected. Further, the influence of the use of simplified texts, such as those provided by Newsela (newsela.com), on a reader's comprehension ability has yet to be explored in the research.

Influence of Text Difficulty on Adolescents' Comprehension Ability

Although the influence of text difficulty on students' comprehension of texts is important, it is inherently different than the larger question of this study, which sought to understand whether or not exposure to easier or more difficult texts influences a reader's comprehension ability. This study examined the differences in students comprehension ability over the course of a semester long intervention; however, longitudinal research is necessary to investigate possible long-term consequences to students' reading ability when exposed to difficult or easier texts. For example, Barr's 1992 study of elementary students revealed that students who were exposed to below grade level texts throughout elementary school never made significant gains. Findings of Barr's study imply that matching below grade level readers to instructional level texts may stunt comprehension ability. However, to date no research explores the long-term effects of matching adolescents with instructional level texts.

Despite the importance of the question of the influence of text difficulty on adolescents' comprehension ability, only two studies to date have examined short-term effects of text difficulty on adolescents' comprehension abilities. Table 2 displays a comparison of the participants, setting, and results of the two empirical studies that have investigated the short-term influence of text difficulty on adolescents' comprehension.

Table 2
Summary of Text Difficulty Literature Review

	Participants	Setting	Summary of Results
Fisher & Frey (2014)	7th-8th graders (n = 322)	After school intervention at 3 middle schools	Experimental group read above grade level texts and outperformed the control group, who were matched with instructional level texts, on the end of the year state standardized test.
O'Connor Bell, Harty, Larkin, Sackor, & Zigmond *(2002)*	3rd-5th graders (n = 46)	One on one intervention during the school day	Comparisons of two experimental groups receiving one-on-one tutoring, one group with instructional level texts and the other with on grade level texts both out performed a control group receiving no intervention with no differences in comprehension growth between treatment groups.

Fisher & Frey (2014*)*. Fisher and Frey (2014) investigated whether text difficulty influenced comprehension ability by comparing two after-school comprehension interventions designed for middle school students (n = 438). The experimental group engaged in repeated close readings of grade level texts with scaffolding and discussion. The control group participated in a business-as-usual approach that included a combination of three elements: wide reading of instructional level texts, small group instruction, and a computer program designed to improve comprehension. Dependent measures included a state standardized assessment and an assessment of students' self-perceptions as readers. Performance on the state standardized tests yielded statistically significant results, indicating that the group reading grade level texts outperformed the control group reading instructional level texts and improved their perceptions of themselves as readers significantly more than their peers in the control group. Although this study reveals a promising step in the right direction, there are several limitations of this study that influence the trustworthiness of the results, including the validity of the comprehension measure and the lack of critical details about the methodology of this study. Lastly, instruction was not controlled across the two groups; therefore the impact

of text difficulty was not isolated in this study. Despite these limitations, Fisher and Frey's study is often cited as evidence to support the use of grade level texts.

O'Connor, Bell, Harty, Larkin, Sackor, & Zigmond (2002). O'Connor et al. (2002) also investigated the influence of the difficulty of the text on growth in reading comprehension ability in a one-on-one tutoring intervention for students who read below grade level in grades 3-5. One experimental group of students (n =16) read instructional level texts at the second grade level and the other experimental group (n =15) participated in the same intervention with grade level texts. Dependent measures included measuring reading comprehension through an informal reading inventory and subtests for the Woodcock Johnson to produce a broad reading score. Both groups were compared to a control group who did not receive an intervention (n =15). Findings indicated that both treatment groups made statistically significant growth in comprehension compared to the control group, $F(2,43) = 13.61$, but no statistically significant results were found between the two intervention groups.

The results of this study indicate that the use of grade level texts may not have negative implications for below grade level readers in an intervention setting, as many advocates for the use of instructional level texts contend (e.g., Allington, 2002, 2007, 2013). However, the instruction was presented in a one-on-one format rather than through whole class or small group instruction and the level of scaffolding to support reading may have been higher than what teachers can provide during regular classroom instruction. Although the results did not favor either intervention group, the small sample size may have contributed to the lack of statistically significant differences between groups. Nevertheless, like the Fisher and Frey (2014) study, the O'Connor et al. (2002) study

questions the long-standing practice of using only instructional level texts during literacy instruction.

Further, results of O'Connor et al.'s study suggest that the instruction that students' receive may mediate the level of difficulty of the text, a conclusion which has been similarly suggested in other literacy studies that controlled for instruction. For example, McKeown, Beck, and Blake (2009) investigated various comprehension instruction approaches and attempted to control for instructional differences by providing professional development and support for all groups. As a result, the authors found that all of the groups made adequate growth. Although their study did not attempt to isolate the impact of text difficulty, it indicates that instruction may be key to improving students' literacy skills.

Implications. Although limited in scope and methodology, the review of the literature on the influence of text difficulty over time on adolescents' comprehension ability reveals several important findings, including corroborating Shanahan's conclusions (1983 & 2011) that research has yet to support the use of instructional level texts to improve comprehension ability for adolescents. Several findings point to design implications for future studies, such as the use of methodologically rigorous, well designed studies with attention to treatment fidelity, random assignment, and controlling for instruction in order to isolate the impact of text difficulty.

Further, both Fisher and Frey and O'Connor et al.'s studies reveal implications for examining comprehension instruction provided for students alongside the influence of text difficulty on readers' comprehension. These implications are supported by previous literature and research. For example, Cunningham and Mesmer (2014) argue that

examining the influence of text difficulty must be considered in conjunction with the reader task, which includes considering the match between the text and the reader alongside the instruction that the reader will be provided. It follows that research is needed to compare the interaction between comprehension teaching strategies and text difficulty on adolescents' comprehension ability to determine if certain instructional approaches better assist adolescents in comprehending more difficult texts.

The Interaction Between Knowledge and Text Difficulty

Construction integration theory (Kintsch, 1986, 2013; Kintsch & van Djik, 1978) asserts that comprehension is a reader's mental representation of a text formed as the reader's background knowledge and experiences are integrated with the meaning of the text. A key element of developing a mental representation of a text occurs in how a reader integrates background knowledge with new knowledge acquired while reading. This leads to the question of whether or not the comprehension teaching strategy that a teacher uses influences a students' interpretation of a text. However, the larger question is whether or not the comprehension teaching strategy that teacher uses allows readers to successfully comprehend more difficult texts.

Specifically, the present study compares KWL and LRD, two comprehension strategies with contrasting ways of assisting students in integrating knowledge. KWL takes a participatory approach, which emphasizes activating students' relevant knowledge and letting students direct the knowledge integration process. In contrast, teachers guide the knowledge integration process in LRD by building specific knowledge and directing the after reading discussion. Therefore, in this section I review literature that investigated an interaction between text difficulty and both students' existing background knowledge

as well as knowledge specifically built by a teacher. Table 3 describes the participants, setting, and summary of the results of studies addressing the interaction between knowledge and text difficulty on reader's comprehension of texts. The fourth column under Knowledge defines how each study developed and assessed knowledge and the fifth column under Text Factors summarizes how each study manipulated text factors.

Table 3
Summary of Interaction Literature Review

	Participants	**Setting**	**Knowledge**	**Text Difficulty**	**Summary**
Arya Pearson, Hiebert (2011)	3rd graders (n =132)	Four public elementary schools in urban and suburban areas	Examined students' existing background knowledge	Syntactic and lexical complexity manipulated	Comprehension of both syntactically and lexically difficult texts was poor compared to comprehension of easier texts when students did not have background knowledge of a topic. Comprehension of both easier and difficult texts was similar for two topics in which students demonstrated background knowledge.
McNamara, D. Kintsch, Butler-Songer, & W. Kintsch (1996)	7th-10th graders (n =56)	Clinical setting	Examined students' existing background knowledge	Text cohesion manipulated	Investigation of the interaction between text coherence and background knowledge demonstrated that background knowledge is necessary for making inferences while reading challenging texts and exposure to challenging texts is necessary to develop inference skills.
McNamara, Oruzu, & Floyd (2011)	4th graders (n =65)	Four public urban elementary schools	Examined students' existing background knowledge	Text cohesion manipulated	Investigation of the interaction between knowledge, text coherence, and genre yielded statistically significant results with a larger effect of knowledge for science texts vs. narrative texts.

Sinatra, Beck, & McKeown (1993)	5th graders (n =54)	Suburban elementary school	Examined students' existing background knowledge	Text cohesion manipulated	Comparisons of students reading across three groups (low cohesive texts, high cohesive texts, and low cohesive texts with scaffolding) revealed no difference in comprehension across groups, however, qualitative analysis revealed improved ability to make inferences for the groups who read low cohesive with scaffolding.
McKeown, Beck, Sinatra, & Loxterman (1992)	5th graders (n =48)	One rural elementary school	Built specific knowledge	Text cohesion manipulated	Knowledge building prior to reading did not improve comprehension of a difficult, or low coherent, texts, however, examination of comprehension at the question level revealed benefits for knowledge building on students' ability to make inferences.
Stahl & Jacobson (1986)	6th graders (n =61)	Rural middle school	Built both irrelevant and specific relevant knowledge before reading	Lexical complexity manipulated	Building knowledge before reading improved comprehension but it did not compensate for effects of lexical difficulty.
Stahl, Jacobson, Davis, & Davis (1989)	6th graders (n =90)	Rural middle school	Built both irrelevant and specific relevant knowledge before reading	Lexical complexity manipulated	Activating irrelevant knowledge prior to reading led students to develop incorrect interpretations of both lexically easier and lexically harder versions of a text while activating relevant information helped students better recall the details of a text.

Students' Existing Background Knowledge. The review of the literature examining the interaction between students' existing background knowledge and their ability to read easier or more difficult text supports Recht and Leslie's (1988) notion that background knowledge may mediate differences in the difficulty of a text. For example, Arya, Pearson, and Hiebert (2011) examined the effects of syntactic and lexical complexity on comprehension of science texts for third graders (n = 142) and found that when students had high amounts of background knowledge about a topic they were able

to comprehend more difficult texts, indicating an interaction between knowledge and text difficulty. Similarly, McNamara et al. (1996) investigated the interaction between text cohesion and background knowledge of middle school readers (n = 56). Results revealed an interaction between students' existing background knowledge and text cohesion, $F(3, 144) = 3.2$. Additionally, low knowledge readers demonstrated higher levels of comprehension with cohesive texts than with texts that lacked cohesion. Similar results were found in McNamara, Oruzu, and Floyd's 2011 study of fourth graders and Sinatra, Beck, and McKeown's 1993 investigation of fifth graders' comprehension.

Further, several studies found benefits to students' comprehension when reading more difficult texts with high amounts of background knowledge. For example, McNamara et al. (1996) and McNamara, Oruzu, and Floyd (2011) found that high knowledge readers answered more inference questions correctly when they read texts that were less cohesive. The authors postulated that the explicitness of the connection between ideas in highly cohesive texts did not provide an opportunity for students to draw inferences. Similarly, Sinatra, Beck, and McKeown (1993) found that readers who received scaffolding when reading challenging texts answered more inference questions correctly. Combined, findings of these studies suggest that background knowledge may improve a reader's ability to comprehend more challenging texts.

Building Background Knowledge. In contrast to the above findings, results of studies examining building specific background knowledge prior to reading do not reveal an interaction between text difficulty and knowledge. Rather, the results indicate that text difficulty and building background knowledge before reading may make separate contributions to a reader's comprehension. For example, McKeown et al. (1992)

investigated whether or not building background knowledge before reading history texts would improve fifth graders (n = 48) comprehension of texts. Results revealed a main effect for text difficulty but failed to reveal an interaction between factors of text difficulty and building background knowledge prior to reading. However, similar to the results of McNamara et al. (1996) and McNamara and Floyd (2011), McKeown et al. (1992) found that an analysis of specific questions revealed that building knowledge before reading enhanced some students' some students' ability to infer concepts not explicitly written in the text. The results of Stahl et al. (1989) and Stahl and Jacobson (1986) suggest that both lexical difficulty of a text and building relevant background knowledge before reading can contribute significantly and independently to students' comprehension.

The findings from studies investigating the interaction between background knowledge and text difficulty indicate that building background knowledge before reading does not necessarily compensate for either a text's lexical difficulty (Stahl et al., 1989; Stahl & Jacobson, 1986) or its level of cohesion (McKeown et al., 1992). Further, the difficulty of text, defined as either vocabulary difficulty or cohesion, appears to make a larger contribution to a student's comprehension than knowledge.

The Reader

The RAND report (2002) identified that a third component in the comprehension equation is the reader, who individually brings a unique set of skills, knowledge, and experiences to the reading event. Additionally, the RAND report suggests that English language proficiency status, disability status, and reading ability may influence students' comprehension. In this section, I address the literature about influences to comprehension

for specific groups of students to identify instructional considerations in regards to comprehension instruction and the use of texts at varying difficulty levels for different readers.

English Language Learners

English Language Learners (ELLs) make up a large population of adolescent readers (e.g., Biancarosa & Snow, 2006; Fisher & Frey, 2014); however, ELLs' language needs are often overlooked during literacy instruction (Goldenberg, 2013; Harper & de Jong, 2009). Understanding the literature addressing comprehension instruction for ELLs is of utmost importance because of the additional challenges ELLs may face when comprehending texts in English. However, within the group, variance among ELLs' backgrounds, contexts, grade, or age make drawing conclusions from the literature complicated (Bunch, Walqui, & Pearson, 2014). Further, ELLs' language skills are often viewed as a deficit (Gutierrez & Orellana, 2006; Ortega, 2009) despite evidence that the knowledge of two languages is often accompanied by higher metalinguistic awareness and cognitive flexibility and thus can strengthen, rather than weaken, literacy skills (Reyes, 2012).

Comprehension Considerations. Comprehension of written language in a second language is different from comprehension in a first language as there are additional factors involved in the interaction between the two languages. Bernhardt (2011) explains that a major difference in the comprehension process for ELLs lies in the fact that the input of a text is often in English and the output is often in the reader's first language. While processing texts, the reader may rely more heavily on the set of

procedures for processing a text that he or she knows better, thus comprehension in English is influenced by an ELL's first language.

Verhoeven's (2011) Interactive Processing Model also describes how monolingual and bilingual children process language differently by explaining the transfer that occurs between two languages to support comprehension. Bilingual children have language skills in their first language that interact with their second language to support reading. Transfer can take place between these two sets of skills as students develop reading comprehension skills in a new language. Verhoeven suggests that because bilinguals draw upon different linguistic systems in order to comprehend texts, the reader's working memory may work harder. Because the reader's working memory is more taxed, comprehension may be compromised.

Background Knowledge. Inarguably, background knowledge plays an important role in the comprehension process for ELLs (e.g., Bernhardt, 2011; Grabe, 2007; Nassaji, 2007). Although ELLs' cultural schemata may differ from monolingual English speakers, background knowledge is often an area of strength for ELLs. Grabe (2007) argues that language learners bring a wider range of experiences to the comprehension process, which increases ELLs' funds of knowledge (Gonzales, Moll, & Amanti, 2005; Moll, 1992). For example, ELL's knowledge of more than one language and ability to understand concepts from multiple cultures are strengths and provide ELLs with increased knowledge compared to their monolingual peers.

Empirical research has highlighted several conflicting considerations regarding the influence of background knowledge on ELLs' comprehension. In some instances, ELLs are better able to comprehend a text when they have familiarity and cultural

awareness of the themes (e.g., Dehghan & Sadighi, 2011; Droop & Verhoeven, 1998). On the other hand, other studies have demonstrated that familiarity of the topic does not influence ELLs' comprehension after they reach a certain threshold of English proficiency (Carrell, 1983; Lee, 1986; Roller & Matambo, 1992). Further, Nassaji (2007) argued that readers must have the necessary background knowledge as well as the ability to use the knowledge while reading to form a mental representation of a text. One caveat to this argument is that background knowledge has the potential to be a hindrance to comprehension for ELLs because they may overuse their background knowledge and make inaccurate generalizations rather than adopt new knowledge while reading (Bunch, Walqui, & Pearson, 2014).

Text Difficulty. The question remains whether or not the difficulty level of a text influences ELLs' comprehension ability. In schools, ELLs are often exposed to simplified versions of grade level texts that are controlled for language and sentence structure, although research has yet to show positive gains in literacy for ELLs as a result of reading simplified texts. Further, analysis of the texts show that simplified texts are often choppy and disjointed, lacking in cohesive ties, and are not necessarily easier to read (Bunch, Walqui, & Pearson, 2014). This practice of exposing ELLs to simplified text may further limit ELLs' exposure to English texts and could account for lower gains in the area of literacy (Grabe, 2007). Modifying texts to ease the lexical and syntactic complexity for ELLs removes the access to rich, cohesive language that is needed to acquire proficiency in a new language as well as prevents the development of academic literacies necessary for comprehending content area texts (McIntyre, 2010; Saunders, Goldenberg, & Marcelletti, 2013). Similarly, others also argue that ELLs need exposure

to high quality, rich texts in the secondary content classroom in order to improve literacy skills (e.g., Lee, Quinn, & Valdés, 2013). An alternative is the use of elaborated texts, which have been modified to add background information, repeat information, and make cohesive connections between ideas and information in the text. Elaborated texts have been shown to have a positive impact on ELLs' comprehension (Bunch, Pearson, & Walqui, 2014).

Few empirical studies have investigated the influence of text difficulty on ELLs' comprehension of texts. Limited findings indicate that alterations to the syntactic difficulty of the text yield differences in comprehension outcomes for beginning and intermediate English speakers, but not for advanced English speakers (Eslami, 2014), suggesting that students' proficiency in English may also influence their ability to comprehend a text. Results point to the importance of considering a language learner's proficiency level when investigating instructional implications of text difficulty.

Bunch, Pearson, and Walqui (2014) argue that raising the level of difficulty of texts that ELLs read is unlikely to improve comprehension; however, matching students with instructional level texts is complicated. ELLs are entering the educational system at different ages and at different time points in the academic year, thus muddying the waters of grade level equivalents used in text matching. Instead, the authors argue that considering instructional pedagogy that supports ELLs' reading of grade level texts is an important area of research.

Students with Disabilities

Students with disabilities are a heterogeneous group with varying needs (Leach, Scarborough, & Rescorla, 2003). The term "students with disabilities" includes both

students identified as having learning disabilities, which Gersten, Fuchs, Williams, and Baker (2001) define as a "broad array of difficulties with tasks involving language and abstractions" (p. 280) as well as students with non-learning related disabilities.

Comprehension Considerations. Despite the fact that students with disabilities are more likely to struggle with reading than their non-disabled peers (Kavale & Reece, 1992), there is a lack of empirical, methodologically rigorous studies that demonstrate success with interventions at the secondary level for students identified as having disabilities (e.g., Edmonds et al., 2009; Lai et al., 2014). However, the literature reveals several important aspects of instruction that improve comprehension for students with disabilities. First, students with disabilities require explicit, intense literacy instruction with additional support (Foorman & Torgesen, 2001). Teaching comprehension strategies helps students with disabilities improve comprehension (e.g., Gersten et al., 2001). However the use of a flexible approach to strategy instruction that emphasizes passage comprehension over teaching a particular strategy is helpful in assisting students in thinking cognitively about what they read (Resnick, 1987).

Background Knowledge. The importance of background knowledge has implications for instruction for students with disabilities. Gersten et al. (2001) argue that students with disabilities have limited factual knowledge, vocabulary, and knowledge of text structures, all of which are necessary for comprehension. This supports Bos and Anders' (1990) notion that students with disabilities require explicit building of specific background knowledge before reading, which favors an approach such as LRD. Further, Kennedy and Ihle (2012) argue that students with disabilities require explicit instruction in order to access complex discourse patterns in secondary content texts, and generic

strategies such as KWL may fail to do that. However, findings from Gersten, Baker, Smith-Johnson, Dimino, & Peterson (2006) suggest that students with low background knowledge who engaged in interactive instruction had improved reading outcomes when compared to students who received class lecture prior to reading.

Additionally, background knowledge influences how students with disabilities process new information while reading. Gersten et al. (2001) argue that students with disabilities have limited knowledge of expository text structures, which affects how students retrieve and store new information while reading. Knowledge of text structures allows the reader to chunk and organize the ideas of a passage while reading. Therefore, lack of structural understanding may trigger a reader to randomly retrieve information while reading. For example, a reader may not recognize that a passage is written in chronological order or cause effect order, which in turn would influence how a reader interprets information from the passage. Further, Williams (1991) argues that students with disabilities may use background knowledge inappropriately, for example, imposing personal points of view, which may impede a reader's ability to understand the main idea of the passage.

Together these findings indicate that building knowledge before reading, which should include addressing knowledge about how a text is organized, may help students with disabilities comprehend better. However, knowledge building should occur in an interactive manner that allows for students to talk about what they are learning and connect what they are reading to information they already know.

Text Difficulty. Little empirical evidence exists that shows how a disabled student's reading comprehension ability is influenced by reading easier or more

challenging texts. A widely accepted belief is that students with disabilities require texts that they can and want to read (e.g., Wharton-McDonald, 2011). However, students with disabilities often to struggle to read grade level texts (e.g., Gersten et al., 2006), and in particular, have difficulty comprehending expository texts (e.g., Gersten et al., 2001). Secondary school reading presents a range of difficulties in addressing aspects of text difficulty. On the one hand, content area reading often requires reading of difficult expository texts, which is often a challenging task for students with certain reading disabilities. On the other hand, students with disabilities are required access to similar content in mainstream classrooms as students without disabilities. Consequently, these notions are in conflict because in order to enable students with disabilities to access the texts in content area classrooms, they must be provided with texts that are below grade level (Gersten et al., 2006; O'Connor, Beach, Sanchez, Bocian, & Flynn, 2015).

Providing students with opportunities to read both easier and grade level texts in order to access content and improve reading skills may be a solution worth further investigation. For example, in O'Connor et al.'s 2015 study, students first read easier texts matched to their instructional reading levels in order to teach content and reading strategies in history classes. After students grasped the content and strategies, they then read grade level texts about the same topics practicing the same strategies. As a result, students with disabilities made significant gains in both reading and history content.

The literature on the relationship between motivation and reading provides some insight into the influence of text difficulty on comprehension for students with disabilities. Motivation is an important consideration because students with disabilities often have limited task persistence, thus making comprehension, a cognitively challenging and often

long encounter, extremely difficult (Gersten et al., 2001). One way to motivate students with disabilities to read challenging texts is through peer interaction before, during, and after reading in order to help students interpret texts. For example, Gersten et al. (2006) found that interactive instruction that included talk amongst peers was associated with better comprehension performance. This finding supports the notion that talk is an important aspect of the comprehension process (e.g., Palinscar & Brown, 1984). Further, motivating students with disabilities by providing accessible texts may improve students' self-efficacy as students have successful encounters with reading (Quirk & Schwanenflugel, 2004).

Students Who Read Below Grade Level

Despite the fact that over eight million fourth through twelfth graders struggle to meet literacy standards in the U.S (National Assessment of Educational Progress [NAEP], 2013), lack of attention to students who comprehend below grade level is concerning. To date, many interventions implemented in high schools across the country have limited impact on improving comprehension for students identified as reading below grade level (Biancarosa & Snow, 2006; Lai et al., 2014; Moje, 2008). Students who read below grade level may include ELLs and students with disabilities (Edmonds et al., 2009) as well as students who do not choose to engage in wide reading practices in or out of school (Kamil et al., 2008; Moore & Hinchman, 2006). Below grade level readers may possess undervalued literacy skills in areas that are not utilized in school, but may lack skill in approaching and making sense of texts prevalent in the academic setting compared to their peers (Moore & Hinchman, 2006; Moje, 2008). Many may appear to lack motivation and engagement in reading due to years of failure with literacy activities (e.g.

Moore & Hinchman, 2006) and therefore are unsuccessful in academic comprehension activities (Kamil et al., 2008; Vaughn et al., 2015).

Comprehension Considerations. The literature reveals that comprehension instruction for below grade level adolescents can improve literacy outcomes (Edmonds et al., 2009); however, the lack of comprehension instruction that occurs in school settings is confounding (Edmonds et al, 2009; Gersten et al., 2006; Swanson et al., 2016). Although few empirical studies have demonstrated the efficacy of intervention programs in the high school setting, there is agreement amongst literacy professionals about what elements may improve literacy skills for students who read below grade level, such as the need for direct, explicit instruction of comprehension and practice reading a wide variety of texts with scaffolding and support (Biancarosa & Snow, 2006; Compton et al., 2014; Greenleaf, Jimenez, & Roller, 2002; Kamil et al., 2008). In order to improve comprehension skills, adolescents require practice reading a wide variety of authentic texts, including texts of different genres, topics, and reading levels (Biancarosa & Snow, 2006; Fisher & Ivey, 2006; Kamil et al., 2008). Below grade level adolescent readers require scaffolding and support while reading texts (Biancarosa & Snow, 2006) and carefully planned discussions following reading to help analyze the text and integrate background knowledge with knowledge acquired while reading (Kamil et al., 2008).

Background Knowledge. Addressing background knowledge during instruction is supported by the literature (e.g., Recht & Leslie, 1988; Willingham, 2006). However, syntheses of literature examining interventions for adolescents (e.g., Edmonds et al., 2009; Wanzek et al., 2013) reveal a dearth of attention to instructional practices related to assisting students in building, activating, and integrating background knowledge. The

topic of background knowledge often appears in the literature for adolescents who read below grade. However, the literature usually reveals that below grade level readers lack the necessary background knowledge to comprehend grade level texts (e.g., Gersten et al., 2001) rather than providing ideas on how to assist students in activating and using background knowledge while comprehending efficiently.

Consequently, Dressman, Wilder, and Connor (2005) found that teachers' beliefs about the abilities and knowledge of students who read below grade level were often inaccurate. Further, according to the authors, teachers felt that students with lower levels of reading achievement were incapable of engaging in certain types of instruction, such as reading independently or engaging in classroom discussions, both of which are necessary components of comprehension instruction. Additionally, Lee and Anderson (2009) identified that certain misconceptions about students and families who are at risk for failure are often accepted as facts in schools, despite evidence that contradicts these beliefs. Together, these findings suggest that below grade level readers may receive little comprehension instruction in secondary schools and the instruction they receive often fails to assist students in using their background knowledge to comprehend. Therefore, improving instruction that assists adolescents in integrating knowledge in order to improve comprehension may first require changing teachers' ingrained beliefs about the abilities of students who read below grade level.

Text Difficulty. Similarly, there is a lack of literature that addresses the influence of text difficulty on below grade level readers' comprehension. This may be attributed to the lack of availability of easier materials in content areas in secondary schools (e.g., Allington, 2007). One recent study found that below grade level readers made

improvements by reading both easier texts and grade level texts in content area classrooms when coupled with reading comprehension instruction (O'Connor et al., 2015). However, further research is needed to both investigate what types of instruction assist below grade level readers in accessing grade level texts (e.g., Edmonds et al., 2009) as well as the impact of exposure to easier or more challenging texts on below grade level readers' comprehension ability.

The Present Study

The review of the literature presents a gap in identifying the influence and interaction between comprehension teaching strategy, text difficulty, and adolescents' reading comprehension ability. In particular, the gap in the research fails to identify the efficacy of comprehension strategies, such as KWL and LRD, and their influence in how a teacher assists adolescents in forming a mental representation of the text. Additionally, there is a surprising dearth of research investigating how the difficulty level of texts read during literacy instruction influences adolescents' comprehension ability, or further, how particular comprehension teaching strategies influence readers' ability to comprehend texts of varying difficulty levels. Lastly, examining how comprehension teaching strategies and the difficulty of the text influence readers of varying English proficiency levels, disabilities, and reading abilities is imperative to understand how to improve comprehension for all students.

The overarching goal of this study is to examine the interaction and main effects of text difficulty and comprehension teaching strategy on adolescents' comprehension ability. To accomplish this goal, I had three objectives. First, I examined whether or not there was an interaction or main effects for comprehension teaching strategy and text

difficulty on adolescents' comprehension ability as well as comprehension of texts. Second, I explored differences in how teachers and students use talk before, during, and after reading in KWL and LRD lessons. Third, I explored how the treatment influenced students based on English language proficiency status, disability status, and reading ability. To achieve these objectives, five research questions were addressed in this study:

1. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' growth in comprehension ability?
2. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' comprehension of texts?
3. What are the differences across subgroups of students' comprehension during KWL and LRD approaches with different levels of texts?
4. How do the features of teacher and student talk during background building before reading and text discussions after reading differ between KWL and LRD approaches?
5. How does talk differ before and after reading between KWL and LRD treatments for subgroups of students?

CHAPTER III: METHODOLOGY

In this 2 by 2 study, I compared 9th-graders' comprehension during a 12-week intervention under one of four conditions: easy texts paired with KWL or LRD and challenging texts paired with KWL or LRD. The purpose of this mixed methods study was to examine the relationship between text difficulty, comprehension teaching strategy, and adolescents' comprehension. A pre and posttest was used to determine differences in comprehension growth across the treatment groups. Comprehension quizzes were used after each lesson to assess and analyze differences between students' comprehension of texts. Qualitative data were collected during classroom observations to analyze the teacher and student talk in order to further understand students' response to the treatment.

Research Design

A mixed-methods design was used for this study. Mixed methods design is defined as the rigorous collection, analysis, and integration of both qualitative data and quantitative data in order to "provide a stronger understanding of the problem or questions" (Creswell, 2014, p. 215). Consequently, qualitative analysis may illustrate a more complete picture of the associations and range of the relationship between factors (Yoshikawa, Weisner, Kalil, & Way, 2008). Duke and Mallette (2011) established that the synergy between qualitative and quantitative methods in literacy research both in and amongst studies has the potential to produce richer findings and solutions to support the development of literacy.

Mixed methods designs often approach research through a pragmatic lens, which is problem centered and seeks real-world solutions (Creswell & Clark, 2011). The use of mixed methods allows for greater flexibility in research questions as well as the ability to

maximize strengths of one method to balance weaknesses in another method (Onwuegbuzie & Mallette, 2011). Although there are clear strengths to mixing methods, blending qualitative and quantitative research should only be used when the findings will be "superior as a result of utilizing both quantitative and qualitative methods" (Onwuegbuzie & Mallette, 2011, p. 304). Further, mixed methods studies should be used only when the results from either quantitative or qualitative measures alone will not sufficiently answer the research questions (Yoshikawa et al., 2008).

The present study utilized mixed methods in order to examine the relationship between two components of literacy instruction, text difficulty and comprehension teaching strategy, on adolescents' reading comprehension. Quantitative methods are well suited to address the effects of a treatment (Teddlie & Tashakkori, 2009), and in the present study, were used to examine differences in adolescents' comprehension as a result of text difficulty, comprehension strategy, or an interaction between the factors. However, the assessment of comprehension for adolescents has many challenges (e.g., Afflerbach & Cho, 2011; Vaughn et al., 2015) and quantitative data failed to show why or how a treatment worked (Onwuegbuzie & Mallette, 2011).

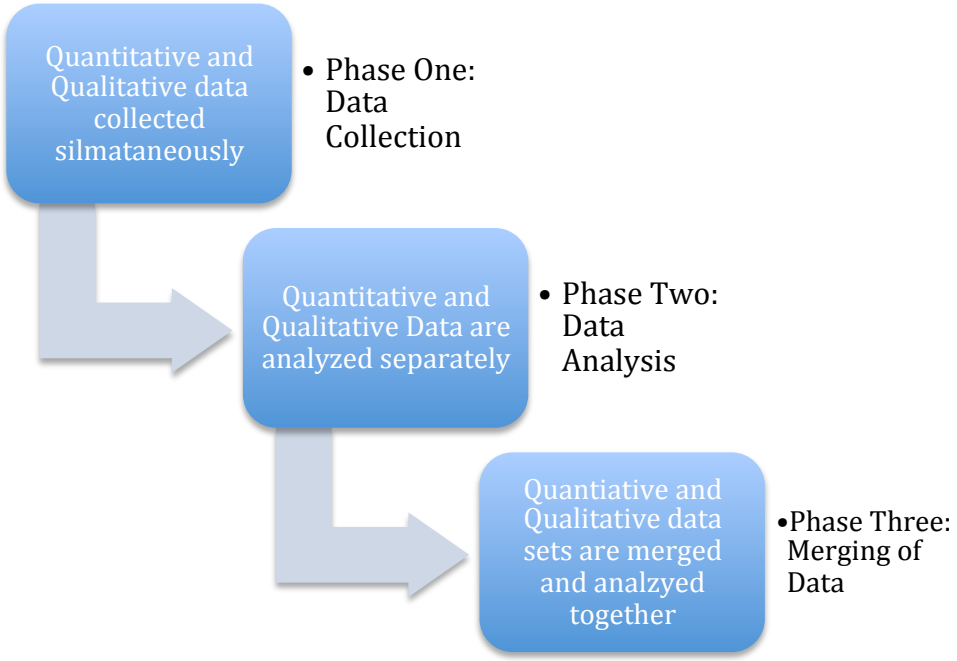
Qualitative methods, on the other hand, assisted with exploring the processes through which texts and comprehension strategies were employed in the participating classrooms in ways that might have influenced comprehension. As such, in the present study they provided "an insider's perspective to the questions by investigating the relationship among the variables as they occur[red] naturally" (Onwuegbuzie & Mallette, 2011, p. 301). Assessment of comprehension must go beyond assessing students' competency and instead, should be viewed as a way to learn about a student's process of

making meaning with a text (Afflerbach & Cho, 2011). Qualitative methods were used to explore the comprehension strategy used in the classroom.

Further, because adolescent readers are a heterogeneous group (e.g., Leach, Scarborough, & Rescorla, 2003), the use of qualitative data may reveal different experiences with the treatments between students. Because qualitative measures are time consuming, a smaller pool of participants was selected for investigation using qualitative methods (Creswell, 2014). Purposive sampling, which is defined as the deliberate selection of participants based on certain qualities or characteristics (Teddlie & Tashakkori, 2009), was used in order to capture different students' experiences with the various treatments.

A convergent parallel mixed method design was used to collect and analyze data for this study (Collins, Onwuegbuzie, & Sutton, 2006; Creswell, 2014). This design is appropriate if both the quantitative and qualitative methods are measuring different aspects of the same concept (Collins, Onwuegbuzie, & Sutton, 2006). Convergent parallel mixed methods studies collect quantitative and qualitative data simultaneously and analyze them separately, then examine how the data converge or diverge (Creswell, 2014). In this study, quantitative data were collected before and after the intervention in the form of a pretest and posttest. Additionally, students took a comprehension quiz after each lesson. Qualitative methods were collected throughout the treatment to explore how the teacher and student talk about the lesson and texts varied between treatment groups. The qualitative and quantitative data sets were analyzed separately and then the two data sets were merged (Creswell & Clark, 2011). Figure 5 provides a graphic display of the research design phases of a convergent mixed methods design.

Figure 5
Phases of Convergent Mixed Method Design



Setting and Participants

Setting

Three high schools participated in this study. These schools were asked to participate in this study because they all served linguistically and economically diverse populations of students and were within a reasonable driving distance, so this is a convenience sample. One of the schools was located in a small city in a south Atlantic state. The other two high schools were located in a rural county surrounding the city. The lessons for this study occurred during students' English classes, honors English classes, or remedial reading classes during the regular school day. Schools report that students choose what level of English classes to take with some suggestions by the teachers based on past performance. Students were placed into remedial reading based on 8th grade

standardized reading assessments. Classes varied in size from 15-27 students and seventeen different classes total participated in this study. Each of the classes met on a block schedule for approximately 90 minutes every other day.

Teachers

Four Language Arts teachers across the three different schools were responsible for the delivery of the instruction. Teachers volunteered to participate in the study and all ninth grade English teachers who volunteered at each of the three schools participated. One of the teachers held a master of teaching degree. The teachers ranged from zero to three years teaching experience; therefore, all of the teachers participating in this study were relatively inexperienced. The teachers' lack of teaching experience may have influenced their decision to participate in a study in which lesson plans were provided to them. Further, their lack of experience needs to be taken into account when analyzing data. For example, inexperienced teachers are still learning how to handle classroom behaviors and manage time during lessons. These factors may have influenced the teachers' implementation of the lesson plans.

Additionally, two collaborative teachers, an English as a Second Language Specialist and a Special Education teacher, taught several sections collaboratively with one of the Language Arts teachers. Collaborative teachers assisted in planning of instruction, co-taught during the lessons, and provided additional support to specific students during the lessons. The collaborative teachers had either zero or eight years of teaching experience and one of them held a masters degree in special education.

Students

Three hundred and eighteen ninth grade students participated in this study at the beginning of their ninth grade year. I chose to examine ninth graders for this study because many schools focus on remediating ninth graders in order to maximize opportunities for success throughout high school. All students in the participating ninth grade English Language Arts classes or remedial reading classes participated in the study. The participants were comprised of 128 females and 190 males.

Ethnic/Racial Identification. Table 4 describes the self-reported demographics of the students who participated in this study. The teachers collected this data during this study. School 2 had the largest number of Hispanic, African American, and Asian participants and school 1 had the least amount of racial diversity.

Table 4
Participant Demographics

	School 1	School 2	School 3	**Total**
Caucasian	57	59	19	135
African American	2	21	0	23
Hispanic	8	104	16	128
Asian	0	18	0	18
Two or more races	0	14	0	14

English Language Proficiency. 36% of the participants were English Language Learners. It is important to recognize participants' language proficiency status because the literature about improving comprehension ability for English Language Learners indicates that ELLs' English proficiency levels influence the comprehension process (e.g., Bernhardt, 2011; Verhoeven, 2011). Schools assessed ELLs' English proficiency levels using the World-class Instructional Design Assessment (WIDA) during the previous

spring. WIDA scores, provided by the individual schools, differentiate students' English proficiency levels on a six level scale ranging from level 1 (entering) to level 6 (reaching) before students are exited from the ELL classification. As shown in Table 5, the majority of ELLs were identified as proficient at levels 2-4. No students in the present study were identified at the English proficiency level of 1. ELLs from all three schools participated in this study; however, school 2 had the largest number of ELLs.

Table 5
English Language Learners' Proficiency Status

	School 1	School 2	School 3	Total
Classified ELL, ELP levels 2-4	4	62	6	72
Classified ELL, ELP level 5-6	3	38	2	43
Total Classified ELL (ELP level 2-6)	7	100	8	115
Students not identified as ELLs	60	112	27	199

Students with Disabilities. The participating schools identified that 13.2% of students who participated in this study were disabled. The teachers disclosed whether or not a student was identified as disabled but did not reveal students' specific learning disabilities, with the exception of the teacher at school 3 who provided a copy of students' individualized learning plans to the researcher. As displayed in Table 6, students were identified as having disabilities at all three schools; however, school 1 had the largest

percentage of participants who had identified disabilities because the teacher participating at this school taught collaboratively with a special education teacher.

Table 6
Students' Disability Status

	School 1	School 2	School 3	Total
Identified with a disability	19	19	4	42
Not Identified with a disability	48	193	31	276

Students Who Read Below Grade Level Identification. 68% of students who participated in this study read below grade level, according to the results of the first administration (pretest) of the fourth edition of the Gates-MacGinitie Reading Test (GMRT-4, see below for a description). Students were identified as reading below grade level if their grade equivalent score on the GMRT-4 fell below the ninth grade level. Students who read below grade level were further classified into two groups, students who read near grade level and students who read far below grade level. Students were identified as reading near grade level if their grade equivalent score on the GMRT-4 fell between sixth and eighth grade. Students who read far below grade level had grade equivalent scores of fifth grade or below. As shown in Table 7, 23% of students in the study read near grade level, 45% of students read far below grade level, and 32% of students read on grade level. All students from school 3 were identified as reading below grade level because at school 3 only students enrolled in a remedial reading course participated in the study. It should be noted that several students joined the study after the

pretest was administered and therefore did not take the pretest and are not included in the table below.

Table 7
Students' Reading Ability

	School 1	School 2	School 3	Total
Students who read near grade level	13	38	21	72
Students who read far below grade level	21	104	14	139
Total Students who read below grade level	34	142	35	211
Students who read on or above grade level	33	68	0	101

Treatment Design

This 2 by 2 design compared students' comprehension performance across two different levels of texts using two different instructional approaches over a twelve-week period. As displayed in Table 8, group one read easy texts at the fifth or sixth grade level while the teacher implemented a KWL lesson. Group two read challenging texts on or above the ninth grade level text about the same topics using the same KWL lesson plans. Group three read easy texts while the teacher implemented an LRD lesson for each text. Group four read challenging texts using the same LRD lesson plans.

Table 8
2 by 2 Research Design

Comprehension Strategy	Text Difficulty Easy texts (5th or 6th grade level)	Challenging texts (9th -12th grade level)
KWL	Easy texts with KWL	Challenging texts with KWL
LRD	Easy texts with LRD	Challenging texts with LRD

Instructional Approach

This study compared two popular methods of scaffolding reading, KWL and LRD, which approach the concept of building, activating, and integrating background knowledge throughout the reading process in contrasting ways. These two instructional approaches were picked for this study because of how they differ in their approach to knowledge building as well as their ease of implementation and practicality for teachers to utilize in a high school setting. Implementation of the intervention lasted for 12 weeks with two 45-minute lessons occurring each week.

KWL. The well-known participatory approach of comprehension instruction, the KWL (Ogle, 1986), utilized a three-column chart to help students activate and integrate knowledge from the text to scaffold a reading experience. This approach stems from the idea that students bring a great deal of knowledge to the reading experience and teachers need to activate this knowledge to improve comprehension. Before reading, students described what they knew about a topic in the first column of the chart and created questions about what they wanted to learn about this topic in the second column. After reading students then answered the questions about what they learned while reading in the third column. Both the knowledge that students activated prior to reading and the

integration of knowledge after reading varied from student to student and was driven by student background and interest. This method consisted primarily of whole group instruction with some time for students to reflect on their own knowledge and interests (Ogle, 1986).

LRD. An alternative method, coined Listen, Read, Discuss (LRD), provided a transmission approach to comprehension instruction in which the teachers to built specific knowledge necessary about a topic before reading. First, the teacher engaged students in activities and lecture about the topic in order to provide relevant background information about a topic before reading. This method is grounded in the idea that students lack the necessary background knowledge to comprehend a text so the "listen" phase of this method was designed to provide a full preview of the content prior to reading in order to support students' comprehension of the text (Manzo & Casale, 1985). Students then read the text, and after reading, the teacher engaged in a discussion about the text utilizing thoughtfully prepared questions that revisited the knowledge that was shared prior to reading to help students integrate knowledge and comprehend the text.

Materials

Lesson Design. Each forty-five minute lesson was written surrounding one text. All lessons included pre-reading activities and discussion, time for students to read the articles independently, and a post-reading discussion. The lessons were not scripted and teachers were encouraged to make adjustments within each framework to account for their students' particular needs and interests. See Appendix A for a sample KWL and LRD lesson plan.

KWL. KWL lessons followed the format outlined in Ogle's description of how to implement a KWL lesson (1986). Each lesson began with a list of questions that the teacher asked students related to topics in the article in order to assist students in activating relevant background knowledge. The teacher then engaged students in a discussion about what they want to learn from the article based on what they know about the topics. Prior to reading, the teacher then helped students establish a purpose for reading using the questions students asked. Students then read the texts independently followed by a final discussion in which the teacher asked students to reflect on what they learned. Throughout the lesson the teacher wrote responses in a KWL chart on the board and students used a graphic organizer to record their own responses.

LRD. As suggested by Manzo and Casale (1985), LRD lessons began with a combination of lecture and activities to build background knowledge before reading, including: anticipation guides, accompanying videos, small group discussions, and PowerPoint presentations (see Appendix A for an example). These activities served to assist students in learning the necessary background knowledge to aid in comprehension of the text. Before reading, the teacher assisted students in establishing a purpose for reading. Manzo and Casale suggested students' read in order to identify: (a) examples of the knowledge that was built prior to reading, (b) contradictions in the text-based on knowledge built or known before reading, and (c) questions or points of confusion in the text. Lesson plans utilized a graphic organizer to assist students in reading for these purposes (see Appendix A for an example). After reading, the teacher engaged students in a discussion about the text using discussion questions from the lesson plan to assist student in integrating background knowledge with information in the text.

Quiz. Both KWL and LRD lessons end with the same quiz. After the text discussion, students answered two to four comprehension questions designed to assess comprehension of the overarching concepts in the article. All students answered the same questions regardless of text level or treatment. See Appendix D for a sample quiz.

Materials Design. Four KWL lessons and four LRD lessons underwent a two-phase pilot at two different high schools before this study began. I wrote all of the lessons and then asked content area specialists and an English Language Learner specialist to review the lessons. I then observed all of the lessons and collected feedback about the lessons from teachers (n = 3) and students (n = 106). Data from observations and feedback were used to revise the lessons between phases one and two of the pilot and again after completion of the pilot. I revised the lessons to ensure that the lesson plans (a) were easy to follow and implement for teachers, (b) were implemented similarly across different teachers, (c) honored the KWL or LRD designs outlined by Ogle (1986) and Manzo and Casale (1985) respectively, (d) could be implemented in forty-five minutes, (e) were interesting and engaging for students, (f) activated or built knowledge needed to understand the text, and (g) assisted students in integrating knowledge built or activated after reading. Observations and interviews of the teachers during the pilot revealed that the lesson structure and format of both the KWL and LRD lessons were easy to implement and the lessons modeled the structure outlined in the seminal articles.

The eight lessons used and revised during the pilot study were employed in the study as well as served as a template for designing the remaining 40 lessons. Grant money was used to pay several teachers, including science and history experts, to write the remaining lessons and assist in the development of quizzes accompanying each lesson.

An English Language Learner expert was paid to review the lessons and made suggestions to accommodate the needs of ELLs. I provided feedback, reviewed, and edited all lessons to ensure that each lesson met each of the criteria described above.

Texts. I selected texts from the newsela.com website. This site provides texts about the same topic at multiple reading levels. Newsela simplifies texts by making alterations to the vocabulary, sentence structure, and length of texts to provide the opportunity for students to read the same content at different readability levels. Using texts that have been altered to accommodate different reading levels allowed me to isolate the impact of text difficulty without interference of variances that may potentially occur with the use of two different texts about the same topic from two different sources.

Expository texts related to the topics and types of texts that students encounter in ninth grade History or Science classrooms were used during this study to supplement content area learning. Texts were chosen at a variety of topics and background knowledge levels of students. For example, texts that included topics that many students were familiar with, such as popular movies, current events, or the well-known topic of the Holocaust. Additionally, topics that most students did not have much background knowledge about, such as the chemistry behind glow-in-the-dark cement or Syrian historic landmarks were used as well. Access to the texts used in the present study is available on the Newsela website. See links for accessing the texts accompanying the sample lessons in Appendix A.

This intervention utilized both easy texts and challenging texts. Data was gathered during the pilot studies, including student work, field notes from observations, and teacher and student feedback. These data were used to estimate an “easy” level that

provided an instructional level for many students, including those who read below grade level. Texts at the fifth or sixth grade reading level were used to ensure that students who read three to four grades below grade level were reading texts that were at or near their instructional reading level. For the purpose of the present study, challenging texts were defined as texts that are on or above grade level, therefore texts at the ninth-twelfth grade reading level were used. I recognize that both the level of ease and the level of challenge for the texts varied student-to-student and text-by-text. However, it was necessary to assign all students to read the same texts for sufficient comparison.

Procedures

A number of procedures are outlined in this section to describe steps that were taken to minimize threats to the internal and external validity of the study.

Random Assignment

Randomization occurred at the classroom level for comprehension teaching strategy and the student level for text difficulty. Teachers were randomly assigned a method, either KWL or LRD. Randomization occurred by placing an equal number of slips of paper with KWL and LRD in an envelope and then randomly drawing a piece of paper to assign to the list of teachers in random order. One teacher was assigned to teach both LRD and KWL lessons to balance the treatment groups because she taught remedial reading, as opposed to regular English or honors English. This further ensured that there were a relatively equal number of students within both the KWL and LRD treatment groups and that different levels of English classes, ranging from honors to remedial reading, were equally represented across treatments.

Individual students were randomly assigned to read either easy texts or challenging texts throughout the intervention. I used block randomization to ensure that the characteristics of students across the four treatment groups were equally distributed. Five blocks were used for randomization: students classified as ELLs with an English proficiency of 2-4, students classified as ELLs with an English proficiency of 5-6, students identified by the school as having a disability, students who were both classified as an ELL and had a disability, and the remaining students were placed into the fifth block. Students were randomly assigned within blocks using the random number generator in Microsoft Excel.

Teacher Training

All teachers participating in this study received a two-hour training prior to the start of the intervention that emphasized how to improve comprehension ability for adolescent learners and the importance of addressing background knowledge. The training for teachers in the KWL treatment group included information about the correct implementation of KWL and the importance of activating and honoring the knowledge that students bring to the reading experience. Teachers in the LRD intervention received training about how to implement the LRD lessons and the importance of building knowledge to assist students in comprehending a text. Both trainings encouraged teachers to deviate from the lessons within each framework and provided information for teachers about how to address misconceptions that students may have from their background knowledge using examples from exemplar teachers in the pilot study. Further, the training provided ideas to assist language learners in accessing the knowledge presented during the lessons.

Measures of Fidelity of Implementation

Fidelity of implementation was established using two measures: classroom observations and completion of a weekly log by teachers. Myself or trained research assistant observed each teacher a minimum of once a week to establish if the lessons were accurately implemented within the instructional framework assigned (KWL or LRD) as well as to determine if students were reading the correct level of text (easy or challenging). A checklist was used to assess the fidelity of each comprehension strategy (see Appendix B for fidelity of implementation checklist). At the onset of the treatment, I, a trained research assistant, and a third experienced researcher, all observed several lessons together and completed the checklist. We initially had 90% agreement across the checklist items and were able to dissolve disagreements through discussion to obtain 100% agreement. Additionally, teachers completed a weekly log (see Appendix C) to note any discrepancies or adjustments made during the implementation of the lesson.

Data Collection

In a convergent parallel design, qualitative and quantitative data are collected simultaneously and analyzed separately. Table 9 displays the data collected at each of the three phases of the intervention.

Table 9
Assessment Schedule

Phase One: Before the Intervention	Phase Two: During the Intervention	Phase Three: After the Intervention
GMRT-4 Pretest administered	Weekly classroom observations of focal classes Quizzes administered after each lesson and collected weekly	GMRT-4 Posttest administered

Quantitative Data

A pre and posttest measuring reading comprehension ability was used to determine students' comprehension ability before and after the intervention. Additionally, students took a quiz after reading to assess students' comprehension of texts during the lessons.

Comprehension Ability. The Gates-MacGinitie Reading Comprehension 4th edition subtest ([GMRT-4], W. MacGinitie, R. MacGinitie, Maria, Dreyer, & Hughes, 2000) was used to measure students' reading comprehension ability through a paper-based, individually administered test. During the assessment, students read 11 short narrative and expository passages and completed 48 multiple-choice questions to assess students' literal understanding and critical reasoning of a text. The GMRT-4 was developed with the understanding that background knowledge plays an important role in the assessment of comprehension. Passages were selected and questions developed to ensure that students would not be able to answer questions based on background knowledge alone. However, questions were developed to require that students utilized both background knowledge and information from the passage to construct an understanding of text (W. MacGinitie, H. MacGinitie, Maria, & Dreyer 2008).

Students completed the GMRT-4 pretest approximately two weeks prior to starting the intervention and the GMRT-4 posttest was administered within one week of completion of the intervention. Students took level 7-9, forms S & T, and normal curve equivalent scores (NCE) were used for the analyses. NCE scores are reliable for scoring procedures because they are derived from percentiles that have been transformed into a scale of equal units and range from 1-99. The Kuder-Richardson 20 formula coefficients

were calculated for levels 7-9 and were .91, according to the manual (MacGinitie et al., 2008). Standard deviation at the 9th grade level was 9.38.

During the development of the GMRT, texts were sought to represent various ethnic and cultural groups. Questions and passages underwent two separate reviews to address cultural diversity and potential issues with cultural bias, including a differential item questioning procedure (DIF). Analysis of questions using the Mantel-Haenzel procedure for detecting differences in items was used and questions were eliminated as necessary (MacGinitie et al., 2000). Although language learners were included in the sample, there is no information presented in the technical manual about how English proficiency levels may impact the results of the assessment. After investigating other comprehension assessments for adolescents, I have discovered that other similar comprehension assessments have similar limitations.

Despite the limitations, I determined that the GMRT-4 was the best choice to quantitatively assess the participants' reading comprehension ability for two reasons. First, the GMRT-4 is effectively used to investigate comprehension treatment effects for adolescents in well-designed studies (e.g., Vaughn et al., 2015) as well as studies of adolescent ELLs (e.g., Lesaux, Kieffer, Faller, & Kelley, 2010). Second, when I investigated other comparable assessments, I examined how each assessment addressed background knowledge in the assessment of comprehension because the impact of knowledge on comprehension is a key component of this study. The GMRT-4 was the only group administered comprehension assessment that placed an emphasis on the importance of comprehension as an integration of knowledge, thus making the GMRT-4 the best choice for this study despite the limitations.

Researcher Created Comprehension Quizzes. After reading and engaging in a culminating discussion for both KWL and LRD lessons, students answered two or three researcher-created multiple-choice questions to assess their comprehension of the texts. Questions were written to ensure that they could be answered when reading either the easy or challenging text levels. Students were allowed to use the texts and their notes to answer the questions.

Over the span of the intervention, students answered a total of 53 questions. Although the few number of items assessed in each quiz may seem problematic in establishing differences between groups, total number of questions answered over the course is sufficient data to examine differences between groups. The comprehension quizzes were piloted prior to the intervention and questions were rewritten that were unclear. Further, Cronbach's alpha calculations ensured the internal consistency of the measure was at an acceptable level, $\propto = .713$, according to Nunnally's (1978) standards. See Appendix D for a sample quiz.

Qualitative Data

Qualitative methods are used to "obtain insights into experiences and the meaning(s) attached to those experiences of selected individuals" (Onewugbuzie & Mallette, 2011, p. 302) and are useful in exploring treatments where quantitative results do not pick up differences between treatment groups (Yoshikawa et al., 2008). A pragmatic approach to research guides both the qualitative and quantitative aspects of this study, emphasizing a problem-oriented approach to examining a process in a natural setting (Dressman & McCarthey, 2011).

Purposive Sample Selection. Qualitative data included classroom observations of selected classes. Because quantitative measures require a large sample size, a small purposive sample of a larger pool of participants is often examined using qualitative methods in a mixed methods design (Onewugbuzie & Mallette, 2011). Purposive samples generally include a small sample of thirty or fewer participants. According to Teddlie and Tashakkori (2009), purposive sampling is defined as selecting participants based on a specific purpose as opposed to random sampling. This includes selecting participants based on:

- research questions
- expert judgment of researchers
- the depth of the information that participants can provide

For the purpose of this study, two focal classes (n=29) were selected for observations, one utilizing LRD and one using KWL. Additionally, after randomization procedures were conducted, eight focal students were selected, four within each of the focal classes. An equal number of students were selected who had been randomly assigned to both text difficulty groups (easy and challenging) before the selection procedure began. I selected both focal classes and students before the start of the intervention through observations of all of the classes and collection of WIDA data, disability data, and school based reading data such as previous performance on state standardized tests and reading level assessments. My decisions were based on selecting classes that included:

- Students who were identified as English Language Learners at varying English proficiency levels

- Students who were not identified as language learners
- Students who had an identified disability
- Students who did not have an identified disability
- Students who read far below and near grade level

Because the RAND model (2002) identified that an important part of the interaction that occurs during comprehension is the reader, the criteria for selection of focal classes and students affects the conclusions drawn from this data. ELLs have different literacy instructional needs from monolingual students (e.g., Goldenberg, 2013; Harper & de Jong, 2009); therefore, it is important to examine both students who were identified as language learners of varying English proficiency levels as well as students who were not identified. Because of the dearth of literature on literacy interventions at the high school level (e.g., Vaughn, 2015), I felt it was important to closely examine the influence of the treatment on students who read below grade level. However, it is important to note I gained different insights than had I examined different classrooms with different subgroups of students, for example, students who read on/above grade level.

Two classes were selected as focal classes, one KWL (n=15) and one LRD class (n=14). One teacher, Lisa (all names are pseudonyms), taught both KWL and LRD lessons in her remedial reading classes and was observed 20 times (10 KWL and 10 LRD lessons) across the 12-week treatment. As displayed in Table 10, student demographics and students represented from different subgroups were similar across the two classes.

Table 10
Student Demographics and Subgroups for Focal Classes

	KWL	LRD	Total
Students who read near grade level	9	11	20
Students who read far below grade level	5	4	9
ELLs proficiency level 2-4	3	3	6
ELLs proficiency level 5-6	0	1	1
Students not identified as ELLs	11	11	22
Students with identified disabilities	1	2	3
Students without identified disabilities	13	13	26
Hispanic	6	8	14
Caucasian	8	7	15

Classroom Observations. The goal of observations was to gather information about students' experiences with the texts and comprehension strategy across all treatment groups. Participant observation allowed me to gain in-depth information about the participants' experiences with the treatments. My role as a researcher during classroom observations was to observe students' experiences with the lessons in order to understand how the teachers and students' talk before, during, and after reading influenced the knowledge building process.

Each focal class was observed 10 times, thus capturing 42% of the lessons implemented during the treatment. During observations I focused on classroom discussions and student interactions between both the teacher and with other students. I focused on observing the focal students but was open and captured all students in my observations. In order to understand the differences in how students' comprehension processes differed between the two treatments, I looked for examples of students discussing knowledge presented by the teacher or their own background knowledge, discussing the text, and constructing interpretations of the text. KWL and LRD differ significantly in the approach to building or activating knowledge before reading, so I

looked for examples of the teachers sharing knowledge and responding to knowledge shared during the lesson. Additionally, I also remained open to observing the classroom lessons as they unfolded, as suggested by Silverman (1993). I recorded class lessons with multiple recorders around the room, which were placed near focal students, and took extensive field notes. Observation protocol included recording attendance and seating, capturing what was occurring in the classroom immediately at the onset of observations, and keeping a continuous record detailing what occurred during the lesson. After each lesson, I went back and listened to the recordings in order to add details to my notes, followed by a reflection on the lesson and a summary. See Appendix F for a sample observation protocol.

Researcher as an Instrument. In qualitative research, the researcher plays an active role and the relationship with the participants and role of researcher can impact the data collection and analysis process (e.g., Creswell, 2014). Therefore, it is important to acknowledge my role as a researcher and describe the ways in which my previous and current relationships, as well as my own social identities and understandings of literacy and pedagogy, could have impacted data collection and analysis.

Prior to the start of this study, I had a professional relationship with each of the three schools and had spent time in their schools as a literacy consultant. I worked directly with two of the four teachers participating in this study previously. My prior professional relationships provided me with access to these schools and may have allowed for the teachers to have a greater trust in me as a researcher. At the same time, my previous involvement may have impacted who volunteered to participate in this study, such that those who reacted more positively to my consulting might have been more

likely to volunteer. If this is the case, then it is possible that participants may differ from non-participants in their approaches to literacy instruction, beliefs about students, desire to improve their literacy instruction, and willingness to try the intervention.

I have no previous relationship with any of the students. In the research setting I primarily observed students but occasionally interacted with students by asking them questions about why they said or did certain things or how they felt about the intervention or topics addressed.

Additionally, I have fourteen years experience teaching in K-12 schools as an ESL teacher, a middle school English Language Arts teacher, a high school reading specialist, and literacy coach. My previous experiences as a teacher as well as my recent experiences as literacy consultant influenced my research in two ways. First, my experiences as a teacher shaped what I saw in the classroom from a pragmatic lens. As a result of my experiences as a teacher, I understand that there are many influences to the implementation of lessons and to students' comprehension process. I view the classroom as a constantly changing environment rather than a static place. Additionally, because of my experiences as a reading specialist, I am sensitive towards students who struggle with literacy. As a result, I developed intervention curricula and undertook classroom observations with specific ideas about how students can be helped, which shapes how and what I see in the classroom. For example, I am aware of student involvement and how students are motivated by or disengaged by a particular lesson, comprehension strategy, or topic.

Second, my prior experience as a teacher caused me straddle the world of research and the world of teaching and colored my expectations of what I believed I would

observe. The deeply ingrained culture of schools operate, at times, seemingly independently and in some instances, disconnected from the world of research. School climates are such that beliefs about children, their capabilities, and teaching methods that are common amongst teachers and administrators are seen as truths, but in fact, research has shown us that some beliefs are false or misguided (e.g., Dressman, Wilder, & Connor, 2005; Mercer & Littleton, 2007). Because I will always be shedding some of these beliefs developed through my teaching, I chose an open coding procedure in order to remain open to seeing what evolved in the lessons, rather than looking for what I believed would occur.

Data Analysis

In this study I explored the relationship between adolescents' comprehension and different comprehension strategies and text difficulty conditions in an English language arts classroom. Quantitative measures examined whether or not comprehension was dependent on the text difficulty level or the comprehension strategy or an interaction between these variables. Qualitative measures further explored how the teacher and students' talk during different phases of a comprehension lesson differed between treatments. A convergent parallel design was used for this study so both qualitative and quantitative data were collected and analyzed separately then integrated and analyzed to establish the nature of the relationship between text difficulty, comprehension strategy, and adolescents' comprehension. Table 11 describes an overview of the analysis plan broken down by research question and data source.

Table 11
Overview of Analysis Plan

Research Questions	Data	Analysis
1. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' growth in comprehension ability?	GMRT-4 posttest with pretest as a covariate	Two-way ANCOVA
2. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' comprehension of texts?	Average Score on Comprehension Quizzes	Two-way ANCOVA
3. What are the differences across subgroups of students' comprehension during KWL and LRD approaches with different levels of texts?	Average Scores on Comprehension Quizzes GMRT-4 pretest and posttest difference scores	Mann Whitney U one-way nonparametric tests
4. How do the features of teacher and student talk during background building before reading and text discussions after reading differ between KWL and LRD approaches?	Classroom observations of two focal classes	Coding
5. How does talk differ before and after reading between KWL and LRD treatments for subgroups of students?	Classroom observations of two focal classes	Coding

Quantitative Analyses

Quantitative analyses in this study explored the interaction between variables of text difficulty and comprehension strategy on students' reading ability and comprehension of texts.

Comprehension Ability. A spreadsheet was created with GMRT-4 pre and posttest data and demographics of participants in SPSS-24. To minimize threats to the internal validity of this study, I first ran the appropriate statistical analyses to evaluate assumptions to determine if there were any violations and to ensure that there were no biases or increases in Type I or Type II errors.

Two-way ANCOVA tests. I ran one two-way analysis of covariance (ANCOVA) model with the entire data set using the GMRT-4 pretest scores as a covariate and the posttest score as the dependent variable, which allowed me to control for possible pre-existing differences between groups and minimize threats to the internal validity of this study. Independent variables included method of instruction (KWL or LRD) and text difficulty (easy or challenging). I calculated F scores to determine if there was an interaction. Main effects were examined post hoc. Effect sizes were calculated for any interactions or main effects.

One-way nonparametric tests. In order to examine differences between subgroups of students by English proficiency, disability status, and reading ability, I used Mann Whitney U one-way nonparametric tests. Nonparametric tests were used to account for small cell sizes across the treatments. I used difference scores as a dependent variable and I ran 2 one-way tests using treatment and text difficulty as independent variables for each subgroup of students.

Comprehension of Texts. Data from the comprehension quizzes were collected weekly by my research assistant and I and scored by my research assistant. My research assistant re-entered 10% of the data and found 3 errors, which accounted for less than 1% of the data, so I determined that the scores were accurately entered. Average quiz scores were calculated across the treatment for all students who took a minimum of five quizzes. Data for students who took fewer than five quizzes were not used because the small number of items would not allow for sufficient analysis of students' comprehension in the treatment condition.

One 2-way ANCOVA test was used to analyze differences of comprehension of texts between groups with the GMRT-4 pretest as a covariate and the average quiz scores as the dependent variable. The same protocol for analysis used for the GMRT-4 was also employed to analyze the quizzes. Similar to the protocol established for analysis of the GMRT-4, one-way nonparametric tests were used to compare average quiz scores across the treatment groups for students by language proficiency status, disability status, and reading ability.

Qualitative Analysis

During the observations I took notes, which I then completed immediately following each observation after listening to the audiotapes several times. Completion of notes consisted of filling in details of the lesson that occurred as I listened to the audio recordings. Additionally, as I completed my notes, I selected relevant portions of the classroom dialogue for transcription. Excerpts were selected for transcription that demonstrated students interacting with instruction to build or activate knowledge or constructing meaning of texts.

Field notes were uploaded into Dedoose (www.dedoose.com), an online source for organizing and coding software. Two sets of descriptors were assigned to each data set in Dedoose. The first set of descriptors indicated the treatment that students participated in (KWL or LRD). The second set of descriptors indicated the lesson topic and number. This allowed me to compare what occurred between treatments but also across the same lesson and topic.

A flexible research design was used for analysis of the data in order to remain open to unexpected results. I analyzed field notes from classroom observations through a process of open coding, as described by Silverman (1993). The early use of themes or concepts from the literature was avoided in order to prevent imposing themes that did not fit with the participants' experiences with lessons and texts. I immersed myself in the data in order to generate themes and search for alternative understandings, similar to the process described by Marshall and Rossman (2006).

Analytic notes were created then analyzed to develop codes and a codebook (see Appendix E for the complete codebook). Table 12 displays the final list of codes and a short description of each code. Data were broken into excerpts in order to allow categories of meaning to emerge from the data, as suggested by Teddlie and Tashakkori (2009). Excerpts consisted of a single participant's utterance, for example, a teacher asking a question or a student sharing background knowledge.

I examined student and teacher talk across the ten KWL lessons and ten LRD lessons, including three different types of talk: questions, exploratory talk, and talk that related to students' background knowledge or knowledge presented by the teacher.

Table 12
Codes Used for Qualitative Analysis

	Code Name	**Description**
Questions	Asking Open-Ended Questions	Participant asks questions without more than one possible right answer or garners the opinion of another participant
	Asking Fact-Based Questions	Participant asks questions with one known right answer
	Asking Text-Based Questions	Participant asks questions related to the text
Exploratory Talk	Sharing Opinions	Participant shares their opinion about a topic
	Discussing the Text	Participant brings up facts from the text
	Supporting Vocabulary	Participant elicits or shares definitions of related vocabulary
	Speculating	Participant speculates about a concept from the lesson
	Making Analogies	Participant uses an analogy to compare two things
	Sharing Stories	Participants shares a personal story related to the topic
	Making Connections to Other Texts	Participants makes connections to other texts
Knowledge Related Talk	Sharing Background Knowledge	Participant brings up non-text related factual background knowledge
	Sharing Irrelevant Knowledge	Participant shares knowledge that is irrelevant to the topic
	Sharing Incorrect Knowledge	Participant shares knowledge that is incorrect
	Sharing New Knowledge	Participants discusses facts from the lesson that are not in the text

Question types included open-ended questions, fact-based questions, and questions about the text. Open-ended questions are defined as questions that did not have

one known right answer or questions that garnered opinions of others (Juzwik et al., 2013). Fact-based questions are defined as questions that had one or several known, right answers based on factual information (Mehan, 1979). Questions about the text included any questions that related to information directly in the text.

Exploratory talk is defined as talk in which participants "engage critically but constructively" with ideas from the lesson and includes talk in which speakers challenge ideas, reason, and evaluate evidence (Mercer & Littleton, 2007, p. 59). For the purpose of this study, exploratory talk incorporated several different types of codes, including eliciting or sharing vocabulary definitions, discussing the text, speculating or making analogies related to the topic, sharing opinions or relevant stories, or making connections to other texts.

Lastly, because the two comprehension strategies compared in this study addressed knowledge in different ways, I examined how knowledge was discussed in the lessons. Excerpts were coded to identify when participants shared background knowledge and discussed knowledge presented by the teacher. Further, excerpts were coded to identify when participants shared incorrect or irrelevant knowledge in order to understand differences in how students shared less desirable knowledge between the two methods.

Further, each excerpt was coded to identify whether or not the exchange happened before, during, or after reading and whether or not the teacher or student initiated the exchange. Lastly, in order to compare differences in talk across subgroups of students, each excerpt that was initiated by a student was again coded to identify the speaker's English language proficiency status, disability status, and reading ability.

One third of the data were initially coded, and then I conducted a thorough review of the data and preliminary findings. An experienced qualitative researcher examined my codes and preliminary findings, and after discussions I made some adjustments to the codebook before coding the remaining data. The first third of the data were recoded as needed. After completion of coding, a second experienced qualitative researcher coded 20% of the data again to ensure inter-coder agreement and reliability of the results (e.g., Creswell, 2014; Creswell & Clark, 2011). We initially had 80% agreement and were able to resolve all disagreements through discussion to obtain agreement on all remaining items. A few codes were adjusted and previously coded data were recoded as necessary.

During the final stage of analysis, the contrast principle, which is defined as examining how data points are different from each other, was used to examine differences across participants and treatments (Spradley, 1979). Similarities and differences were sought between treatments (KWL and LRD), lesson timing (before, during, or after), initiator (students and teacher), and subgroups of students based on language proficiency status, disability status, and reading ability.

Merging of Datasets

After both qualitative and quantitative analyses were completed, I examined the results side by side to merge the findings. Qualitative findings were examined to explain quantitative findings. Additionally, quantitative findings were examined to explain the results of the qualitative analysis. Fidelity of treatment data were used to understand both qualitative and quantitative results as well as unexpected differences between the results. Equal weight was given to both quantitative and qualitative methods as they both explored different aspects of the treatment. Students' experiences across the four

treatment groups were compared by examining results of the one-way nonparametric tests alongside qualitative findings to examine patterns across the treatments groups for different students.

CHAPTER IV: RESULTS

The purpose of this 2 by 2 study was to examine the interaction between text difficulty and comprehension strategy on readers' comprehension. Three hundred and eighteen students were randomly assigned to read easy or challenging texts and participated in either KWL or LRD lessons for twelve weeks. All students took a pretest and posttest to measure comprehension ability before and after the intervention and a comprehension quiz after each of the twenty-four lessons to measure comprehension of texts. Fidelity of implementation observations were used to understand how the KWL and LRD strategies were implemented and qualitative observations were conducted to understand how the talk varied between comprehension strategy lessons. In the first section, I examine the treatment fidelity. Next I examine the quantitative findings, followed by analysis of the qualitative findings.

Fidelity of Implementation

Teachers implemented KWL or LRD lesson plans that were written by the researcher, but teachers were encouraged to adjust the plans within the KWL or LRD framework to meet the needs of their students. Therefore, treatment fidelity assessment focused on a checklist of ten items rather than how well a teacher followed the lesson plan. Table 13 presents the list of items used to assess fidelity for the LRD and KWL treatments.

Table 13
Treatment Fidelity Checklist

KWL	LRD
1. Did the teacher use the correct articles?	1. Did the teacher use the correct articles?
2. Did the teacher use all the materials associated with the lesson?	2. Did the teacher use all the materials associated with the lesson?
3. Was the entire lesson implemented?	3. Was the entire lesson implemented?
4. Did the teacher implement the K portion of the lesson using class discussion and sufficiently activate knowledge for the articles?	4. Did the teacher provide interactive activities to build background knowledge before reading?
5. Did the teacher implement the W portion of the lesson and sufficiently engage students to ask questions about what they wanted to learn?	5. Did the teacher provide an opportunity for students to demonstrate that they learned the knowledge and ask questions to clarify information before reading?
6. Did the teacher sufficiently help students set a purpose for reading using the questions in the W column of chart?	6. Did the teacher explicitly set a purpose for reading before students read?
7. Were students provided adequate time to read the article?	7. Were students provided adequate time to read the article?
8. Was the teacher responsive to students' questions during reading?	8. Was the teacher responsive to students' questions during reading?
9. Did the teacher engage students after reading to encourage students to reflect on what they learned?	9. Did the teacher engage students in a discussion after reading to help students clarify misunderstandings and analyze and understand the text by integrating knowledge?
10. Were students provided adequate time to answer comprehension questions and write a title?	10. Were students provided adequate time to answer comprehension questions and write a title?

General Lesson Implementation

KWL lessons were similar in each implementation. Lessons began with the teacher activating students' knowledge about key topics before reading followed by asking students to develop questions about what they wanted to know while reading. Lastly, the teacher engaged students in a discussion after reading about what students learned, in particular, related to the questions they developed. Qualitative notes revealed

that when students demonstrated high amounts of background knowledge about a topic, such as topics related to the Holocaust, more time was often spent before reading to activate knowledge. Similarly, when students demonstrated high interest in a topic, such as the topic of Mars, more time was spent discussing the topic, in particular, after reading.

LRD lessons varied in administration from lesson to lesson. All lessons were accompanied by a PowerPoint in which the teacher presented knowledge related to the topic before reading with opportunities for students to discuss the knowledge in a whole group setting or occasionally in a think pair share with one or two other students. Most lessons included a video or two, which were all accompanied by a writing activity for students to note specific information. Approximately one third of the lessons included small group activities before reading, in which students engaged in small group discussion to complete a background building activity for a short portion of the lesson. Hands on activities were included in a few lessons. For example, in a lesson about drought and cloud seeding, an experiment was performed in which the teacher lit a match in a bottle to demonstrate how cloud seeding would occur.

Across Four Teachers

Each of the four teachers responsible for primary delivery of the instruction was observed 10 or 11 times throughout the intervention and given a score between 0-10 to represent how well they implemented each aspect of the treatment they were assigned to teach. Further, each component of the lesson (before, during, and after) was timed in order to gauge how long teachers spent on different segments of the lesson. In this section, I first present a summary of each teacher's fidelity of implementation. Next, I present a comparison of how the teachers spent their time before, during, and after reading in KWL

and LRD lessons. Table 14 presents a summary of the fidelity of implementation results by teacher, which reveals that all of the teachers implemented the lessons with an acceptable degree of fidelity.

Table 14
Summary of Fidelity of Implementation Results

	Number of classes	Number of Lessons Implemented	Self-Reported Fidelity	Researcher Reported Fidelity	Number of researcher Observations	Average time spent on lessons in minutes	Average time spent before reading in minutes	Average time spent during reading in minutes	Average time spent after reading in minutes
Clara-KWL	6	19	100%	92%	11	41	12.5	10	4
Lisa-KWL	2	24	100%	100%	10	42	22	8.9	11.3
Lisa-LRD	1	24	100%	86%	10	58	44	5.5	3.4
Lucy-LRD	4	22	98.7%	84%	11	45	27.5	6.3	2.5
Carl-LRD	4	24	100%	94%	10	49	29.1	10.7	3.5

Clara- KWL. All six of Clara's (*all names are pseudonyms) regular and honors English classes participated in the KWL treatment. Clara completed 19 of the 24 lessons with four classes. Two of Clara's regular English classes were dropped from the study after six weeks due to behavior issues, which resulted in the teacher's desire to spend more time on their core curriculum. Behavior issues did not result from implementation of the lessons from this study. The two classes that did not complete the study participated in nine lessons. The two classes dropped from the intervention were comprised of many below grade level readers; however, the study remained balanced in

terms of reading ability due to the large number of below grade level readers participating in the study. The balance in numbers between KWL and LRD groups was affected by the removal of two classes, but given the overall balanced design; this did not influence the analyses or results.

Clara self reported that 19 completed lessons were implemented correctly 100% of the time, but her observer reported fidelity of implementation of the KWL treatment was 92% across 11 observations. Clara spent an average of 41 minutes on the lessons throughout the treatment. She averaged 12.5 minutes or 30.5% of the lesson activating students' knowledge about related topics and assisting students in determining what they wanted to learn in the text. In Clara's lessons students spent an average of 10 minutes, or 24% of the lesson, reading the text and 4 minutes, or 10% of the lesson, discussing the text after reading.

Clara deviated from the KWL lesson plans in two ways. First, she reported that she felt that the use of the KWL chart was repetitive and not engaging for her students. As a result, after conducting a few KWL lessons, she asked if she could use technology to elicit students' knowledge as an alternative to the written KWL chart. Clara experimented with various technologies, including socratic.com and polleverywhere.com. She asked students questions to elicit knowledge and ideas about what students wanted to learn and students used a school provided device to respond electronically. All responses were displayed on a SmartBoard so students could see each other's responses. The use of technology enhanced the knowledge activation portion of the lesson and did not detract from Ogle (1986)'s intended learning experience.

The second way Clara deviated from the lessons was during the purpose setting portion of the lesson immediately preceding reading. Instead of asking students to read with the purpose of looking for answers to their "W" questions, she sometimes asked students to look for the main idea and most important details instead. This deviation was considered to be in contrast with Ogle's intended learning experience, in which students read with a self-driven purpose.

Lisa- KWL. Two of Lisa's remedial reading classes participated in the KWL treatment. Lisa completed all 24 lessons with these two classes. Lisa self reported that she completed all 24 lessons 100% correctly, and her observer reported fidelity for KWL lessons was also 100% across 10 observations. Lisa's KWL lessons averaged 42 minutes per lesson. Lisa spent an average of 22 minutes activating students' knowledge before reading. Students read for an average of 8.9 minutes, or 18% of the lesson and an average of 11.3 minutes, or 23% of the lesson, discussing the text after reading.

Lisa rarely deviated from the lesson plans. In most lessons, after reading, students were invited to write what they learned from the text on the board after they completed both reading the text and writing in the "L" portion of their own chart. The teacher used their responses as a springboard for the post-reading discussions. Students demonstrated enthusiasm for writing what they learned while reading on the board.

Lisa- LRD. One of Lisa's remedial reading classes participated in the LRD treatment. Lisa completed all 24 lessons with this class. Lisa self reported that lessons were implemented accurately 100% of the time, but observer reported fidelity was 86% across 10 observed lessons. Lisa spent an average of 58 minutes on the LRD lessons throughout the treatment. Lisa spent an average of 44 minutes, or 76% of the lesson,

building background knowledge before reading. Students spent an average of 5.5 minutes, or 9% of the lesson, reading the text and 3.4 minutes, or 6% of the lesson discussing the text after reading.

Lisa followed the lesson plans for the LRD lessons, but often extended student talk during the before reading segment of the lesson to provide ample opportunity for students to talk about the materials. This often left limited time for reading the text and discussing the text after reading. Students often expressed an interest to share more after reading but the after reading discussion was truncated because class ended.

Lucy- LRD. Four of Lucy's English classes participated in the study. Lucy completed 22 of the 24 lessons with all four classes. Lucy self reported that the lessons were implemented accurately 98.7% of the time, but observed reported fidelity was 84% across 10 observed lessons. However, Lucy often completed portions of the lesson the next day when she was not being observed. Therefore, she likely had a higher fidelity than what was observed in the study. Lucy spent an average of 45 minutes on the lessons throughout the treatment. Lucy spent an average of 27.5 minutes, or 61% of each lesson, building background knowledge before reading. It should be noted that Lucy incorporated a great deal of time for student talk during the L portion of the lessons to allow for students to discuss the knowledge she presented. Students spent an average of 6.3 minutes, or 14% of the lesson, reading the texts and an average of 2.5 minutes, or 6% of the lesson time, discussing the text after reading. However, students were often given time the next day to read or discuss the text, but that was not observed.

Lucy deviated from the lesson plan in two ways. First, on occasion she used a different video or activity that she felt was more engaging for students or built more

important knowledge than what was provided in the lesson plan. This deviation enhanced students' learning and did not detract from Manzo and Casale (1985)'s intentions.

Secondly, Lucy sometimes ran out of time and as a result, students were not provided adequate time to read or discuss the text during the observed lesson. One reason she often ran out of time was because she spent a great deal of time providing students with opportunities to talk and process the knowledge she presented during the "L" portion of the lesson. Although this deviation was in contrast with Manzo and Casale (1985)'s intended learning experience for the "D" portion of the lesson, Lucy often spent time in subsequent lessons discussing the text.

Carl- LRD. Carl self reported that he completed all 24 lessons with all four of his collaborative English classes with 100% fidelity, but his observer reported fidelity rating was 94% across 10 observations. Carl spent an average of 49 minutes on the lessons. He averaged 29.1 minutes, or 59% of the lesson time, building background knowledge before reading. Students spent an average of 10.7 minutes, or 22% of the lesson reading the text and an average of 3.5 minutes, or 9% of the lesson, discussing the text after reading.

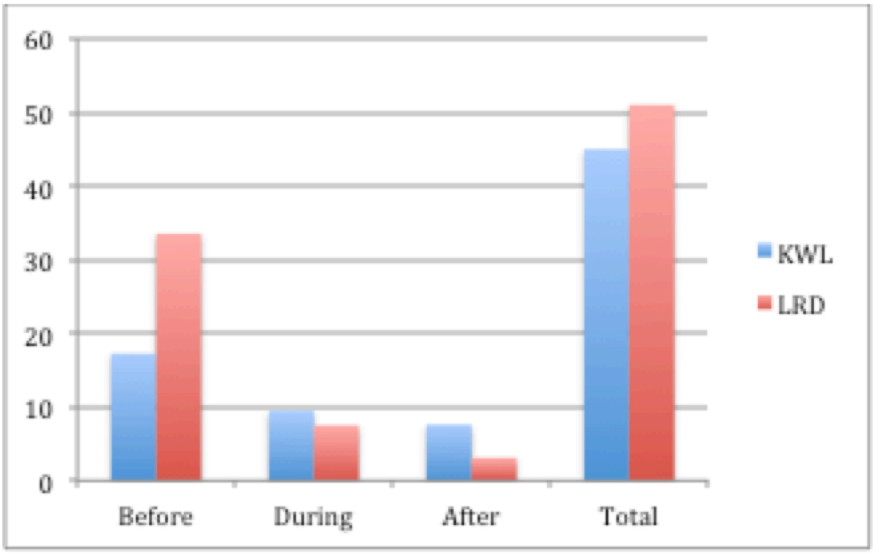
Carl sometimes deviated from the lesson in two ways. During the before reading portion of the lesson, the lesson plan indicated that the teacher should elicit responses from students to ensure that the knowledge building process is interactive. Likely in an effort to save time, Carl often did not elicit responses from students or present opportunities for students to talk or interact. Manzo and Casale's (1985) description of LRD does not explicitly state that the "L" portion of the lesson should be interactive. However, results of the pilot study revealed that students did not adequately build

knowledge unless they had an opportunity to talk about the knowledge. Secondly, Carl's after reading discussions were often very short and contained more teacher talk than student talk about the text. This was a deviation from Manzo and Casale's intention as the "D" portion of the lesson is a critical component of LRD.

Treatment Comparison Before, During, and After Reading

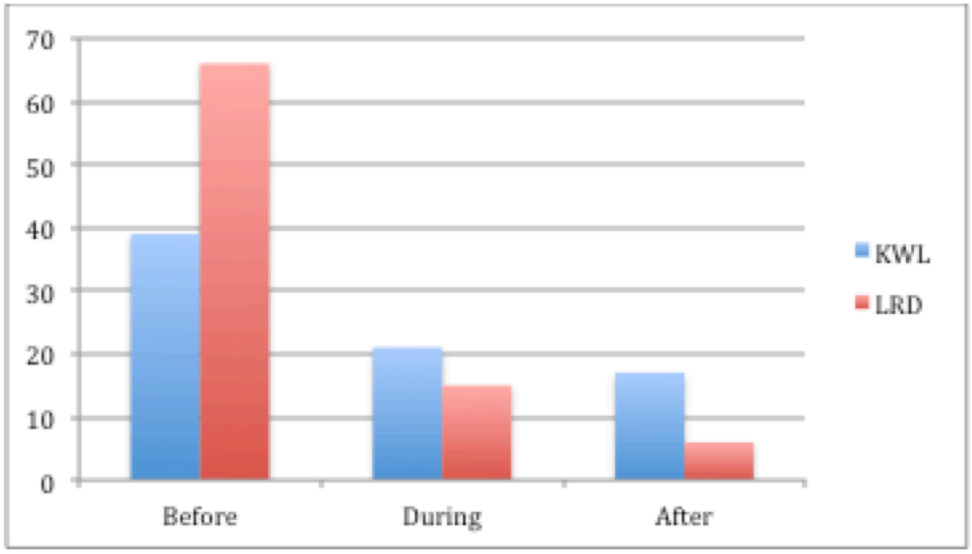
I next compared how the average time spent before, during, and after reading varied across the two comprehension strategy groups. The before reading component of the lesson included all activities to build knowledge in LRD lessons and any time spent activating knowledge and eliciting questions about what students want to learn in KWL lessons. During reading included the time that the teacher provided for students to read and began after the teacher passed out the articles to students. After reading included the time spent discussing the text and topic in both the LRD and KWL lessons. Excluded are transitions and time spent taking the quiz at the end of the lesson. Figure 6 compares the average minutes spent on each portion of the lesson in KWL and LRD lessons.

Figure 6
Average Minutes Spent on Each Portion of the Lesson



LRD lessons overall lasted longer than KWL lessons because the teachers spent more time in LRD lessons building knowledge before reading. Because the average length of the lessons varied between lessons, I also compared the average percent of time spent on each segment of the lesson by treatment, which is presented in Figure 7. The largest chunk of time was spent before reading in both KWL lessons (average of 39% of the lesson) and LRD lessons (average of 66% of the lesson). Subsequently, the shortest chunk of time was devoted to discussing the text after reading in both KWL lessons (average of 17% of the lesson) and LRD lessons (average of 6% of the lesson), despite the fact that the lesson plans in both KWL and LRD treatments called for teachers to spend 15 minutes, or 33.3% of the lesson, discussing the text after reading across both treatments. The significant increase in time spent before reading in LRD lessons is a finding of particular interest.

Figure 7
Average Percent of Time Spent on Each Portion of the Lesson



Quantitative Results

Overview of Data Analysis

Quantitative measures were used to analyze three research questions. Table 15 summarizes the quantitative analysis plan, showing the data and analytic models that were used to analyze each question. Prior to analysis, procedures were followed to ensure careful data analysis. In this section, I describe the steps I took to screen data, how I dealt with missing data, and the results of tests that I ran to assess assumptions for a two-way ANCOVA model.

Table 15
Overview of Quantitative Analysis Plan

Research Questions	Data	Analysis
1. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' growth in comprehension ability?	GMRT-4 posttest with pretest as a covariate	Two-way ANCOVA
2. Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' comprehension of texts?	Average Score on Comprehension Quizzes	Two-way ANCOVA
3. What are the differences in students' comprehension during KWL and LRD approaches with different levels of texts?	Average Score on Comprehension Quizzes and GMRT-4 pretest and posttest difference scores	Mann Whitney U one-way nonparametric tests

Data inspection. I screened all of the data before I began analysis to ensure that there were no errors. A research assistant entered 10% of all data twice and minimal errors were found. Missing data were examined prior to analyses. Of the 318 students who were originally recruited for this study, 219 participants took both the GMRT-4 pretest and the posttest. Two classes were dropped from the study after six weeks (n = 48) due to behavioral issues unrelated to the study and the teachers' need to focus on the core curriculum. Fifteen students took only part of the pretest or posttest so their scores could not be used. Seven students were unable to take the posttest due to illness or suspension. Twenty-nine students either joined the participating class after the intervention began or left the participating class before the study was complete and therefore did not complete the entire intervention and took only the pretest or posttest but not both.

Analysis of the comprehension quiz data included 293 students who took at least five quizzes. Twenty-one students took fewer than five quizzes because they either moved out of the class participating in the study or had excessive absences and so their quiz data were not included in my analysis. Quiz scores from the two classes who were dropped from the study were used for analysis as long as students took a minimum of five quizzes.

Testing Assumptions. In order to minimize threats to the internal validity of this study, I first analyzed five assumptions of a two-way ANCOVA model. The five assumptions tested included: independence of the sample, homogeneity of variance, normal distribution of scores across all cells, whether or not there was a linear relationship between the covariate and the response variable, and independence of the

covariate and the independent variables. I first investigated the independence of the sample by examining the residual plots by group and determined that the residuals fell into a random display of points. Next, I used Levene's test and results supported the homogeneity of variance assumption, $F(3, 215) = .944$, $p = .420$. The Shapiro Wilk's test indicated that the scores were normally distributed across all cells ($p > .05/4$) and the skewness and kurtosis values for all four cells were within limits. I tested the linearity assumption and determined that the regression of the *Y* on *X* axis was linear and the levels of the independent variables were fixed rather than random. Finally, I examined the homogeneity of regression slopes and determined that the covariate and dependent variable were independent of each other $F(3, 1) = .771$, $p > .05$.

After determining that there were no violations of the assumptions, I conducted analyses to examine each of my research questions. In the next section I share the results of the analyses.

Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' growth in comprehension ability?

Two hundred and nineteen students took the GMRT-4 pretest and posttest to measure comprehension ability before and after the twelve-week intervention. One two-way ANCOVA was conducted using GMRT-4 pretest scores as the covariate and posttest scores as the dependent variable to assess the interaction between text difficulty and the comprehension strategy on students' comprehension ability growth over the course of the intervention. Text level (easy and challenging) and comprehension strategies (KWL and LRD) were used as fixed factors. Results indicated that there was no significant interaction between text level and comprehension strategy on students' reading

comprehension ability $F(1, 3) = .086$, $p = .769$. Pretest and posttest means, standard deviations, and difference scores across all treatment groups are presented in Table 16. Mean difference scores were calculated by subtracting the posttest mean from the pretest mean score.

Table 16
GMRT-4 Pretest and Posttest Means and Standard Deviations

	Pre M	*SD*	*Post M*	*SD*	*Mean Difference*
KWL Challenging (n=42)	41.64	22.65	43.67	24.14	2.03
KWL Easy (n=45)	44.64	24.66	44.64	22.14	0
LRD Challenging (n=66)	44.14	21.02	44.67	20.30	.53
LRD Easy (n=66)	41.03	19.92	41.92	20.91	.89
Total (n=219)	42.83	21.72	43.64	21.52	.81
KWL (n=87)	43.20	23.62	44.17	23.00	.97
LRD (n=132)	42.58	20.50	43.30	20.57	.72
Challenging (n=108)	43.17	21.60	43.02	21.36	-.015
Easy (n= 111)	42.50	21.93	44.28	21.77	1.78

Main effects were examined to determine if text level or comprehension strategy was associated with students' growth in comprehension ability. No main effect was found between text level (easy or challenging) and students' comprehension $F(1, 3) = .165$, p

= .684. Similarly, there was no main effect detected between the comprehension strategy used (KWL or LRD) and students' comprehension $F(1, 3) = .047$, $p = .829$.

Eta squared was calculated for the two-way ANCOVA model to determine how much variation the two-way ANCOVA model explained. Calculations revealed that 62.8% variance was attributed to the model; however, the pretest scores explained 62.7% of that variance.

Is the interaction between text difficulty and comprehension teaching strategy differentially associated with students' comprehension of texts?

To determine if there was an interaction between text difficulty and the comprehension strategy on students' comprehension of texts, average quiz scores were calculated for 297 students in the sample who completed a minimum of five quizzes throughout the 12 week intervention. One two-way ANCOVA was conducted using GMRT-4 pretest scores as a covariate, average quiz scores as a dependent variable, and text level and comprehension strategy as fixed factors. Results indicated that there was no significant interaction between text level and comprehension strategy on students' comprehension performance on quizzes $F(1, 3) = .443$, $p = .506$. Table 17 displays means and standard deviations of average quiz scores for each group.

Table 17
Means and Standards Deviations of Comprehension Quizzes

	KWL		LRD		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
Challenging	60.71 (n=66)	17.56	54.38 (n=78)	15.34	57.28 (n=144)	16.64
Easy	62.96 (n=70)	16.44	55.21 (n=79)	14.20	58.85 (n=149)	15.73
Total	61.87* (n=136)	16.97	54.80 (n=157)	14.74	58.08 (n=293)	16.17

**significant at the .001 level*

Main effects for the two fixed factors, text level and comprehension strategy, were assessed to determine if either factor was associated with students' comprehension of texts. Differences were not detected between students who read easy texts ($M = 58.85$) and those who read challenging texts ($M = 57.28$); $F(1, 3) = .547$, $p = .460$. However, results revealed a significant main effect between the KWL group ($M = 61.87$) and the LRD group ($M = 54.80$) on students' comprehension of texts $F(1, 3) = 45.993$, $p < .001$.

Effect sizes were calculated to determine the significance of this finding. Eta squared indicated that 50.2% of the variance was attributed to the two-way ANCOVA model. Partial eta squared was calculated to determine how much variance was attributed to the main effect for comprehension strategy for comprehension. Results indicated that 13.8% of the variance was attributed to the treatment effect, $\eta^2 = .138$. The remainder of the variance was attributed to the covariate, the GMRT-4 pretest scores. Further, a d-family effect size was calculated for the comprehension strategy ($d = .447$), which indicated that the KWL group performed almost half a standard deviation above the LRD group on the comprehension scale. D-family effect sizes are used to measure the differences between the groups and represent the differences in means scaled by standard deviation (Cohen, 1988).

What are the differences across subgroups of students' comprehension during KWL and LRD approaches with different levels of texts?

Treatment outcomes were then examined for subgroups of students. Students were divided into subgroups by English language proficiency, disability status, and reading ability, in order to note differences in students' comprehension before and after the treatment as well as students' comprehension of texts during the treatment. One-way

nonparametric tests were used in order to control for smaller cell sizes across the treatment groups.

To establish differences in students' comprehension between the pretest and posttest, difference scores were calculated by subtracting individual students' posttest scores from their pretest scores. Mann Whitney U one-way nonparametric tests were conducted using difference scores as the dependent variable and both treatment and text level as independent variables in separate tests. Similarly, Mann Whitney U nonparametric tests were used to assess differences between students' comprehension of texts using average quiz scores as the dependent variable and both comprehension strategy and text level as independent variables in separate tests for each subgroup.

By Language Proficiency. To examine differences in students' responses to the treatment by language proficiency, three subgroups of students were examined: students who were classified as ELLs with an English proficiency level of 2-4, students who were classified as ELLs with an English proficiency level of 5-6, and students who were not classified as ELLs. It should be noted that students who were not identified as ELLs may include students who are bilingual or were formerly classified as ELLs. Mean difference scores for each subgroup is displayed in Table 18.

Comprehension Ability. Differences in students' comprehension ability by English language proficiency before and after the treatment were examined using one-way nonparametric Mann Whitney U tests. For ELLs with proficiency levels 2-4, no statistically significant differences were found in students' comprehension growth for either text level (easy or challenging), $p = .247$, or comprehension strategy (KWL or LRD), $p = .726$. Similarly, no differences were found for ELLs with a proficiency level

of 5-6 on text level, p = .085 or comprehension strategy, p = .424. Lastly, no differences were found for students who were not classified as ELLs for text level, p = .958, or comprehension strategy, p = .203.

Table 18
Comparison of GMRT-4 Mean Difference Scores Across Subgroups

	KWL	LRD	Easy Texts	Challenging Texts
All Students (n = 219)	.98	.71	.53	.82
ELLs ELP proficiency 2-4 (n = 40)	3.14	4.38	5.63	2.42
ELLs ELP proficiency 5-6 (n = 37)	5.2	-.47	-1.55	7.47
Not classified as ELLs (n = 142)	-1.19	-.13	-.83	-.24
Students with disabilities (n = 37)	.33	3.55	4.00	1.20
Students without disabilities (n = 182)	1.05	.21	.03	1.10
Far Below Grade Level Readers (n = 88)	4.03	6.25	5.43	5.20
Near Grade Level Readers (n=54)	-.26	.97	-1.30	2.37
At or Above Grade Level Readers (n = 81)	-1.55	-5.13	-3.63	-3.71

Although no differences were found for the treatment factors for any subgroups, examination of the average difference means for each of the three subgroups revealed some interesting results. ELLs with a proficiency score of 2-4 made more growth when participating in LRD lessons and lessons using easy texts. On the other hand, ELLs with a proficiency level of 5-6 showed higher gains when participating in KWL lessons and when they read challenging texts. Further, ELLs made greater gains across the treatment

when compared to students who are not classified as ELLs, as non-ELLs had negative gain scores in each treatment condition.

Post Hoc Tests. In order to understand if the differences between ELLs and non-ELLs comprehension ability growth across the intervention was significant, I conducted a post hoc. I conducted a one-way ANOVA with the fixed factor of English language proficiency status and students' average difference score as a dependent variable. Results revealed significant differences in comprehension ability growth based on English language proficiency status, $F(1, 217) = 5.792$, $p = .017$, indicating that ELLs made significantly more growth in comprehension ability during the intervention than students who were not classified as ELLs. Further, eta squared calculations indicated that 26% of the variance was attributed to the model, and partial eta squared calculations revealed that all of that variance was attributed to English proficiency status.

Comprehension of Texts. Mann Whitney U one-way nonparametric tests were used to explore differences in students' performance on comprehension quizzes based on English proficiency status. As displayed in Table 19, results revealed significant differences between the KWL group ($M = 52.30$) and the LRD group ($M = 44.50$), $p < .001$ for ELLs with a proficiency level of 2-4. Similarly, results revealed significant differences in comprehension performance based on text difficulty for ELLs with a proficiency level of 2-4, favoring easy texts ($M = 52.46$) over challenging texts ($M = 45.02$), p =. 012. Results of analyses of ELLs with a proficiency level of 5-6 revealed significant effects for comprehension strategy instruction favoring the KWL treatment group ($M = 69.51$) over the LRD treatment group ($M = 57.23$), $p = .011$, but no significant differences for text level, $p = .212$. Similarly, students who were not classified

as ELLs demonstrated significant differences for comprehension strategy favoring KWL, $p = .013$, but no differences for text level, $p = .331$.

Table 19
Comparison of Comprehension Quiz Means Across Subgroups

	KWL	LRD	Easy Texts	Challenging Texts
All Students (n = 293)	61.87*	54.80	58.85	57.28
ELLs ELP proficiency 2-4 (n = 69)	52.30**	44.50	52.46*	45.02
ELLs ELP proficiency 5-6 (n = 53)	69.51*	57.23	66.11	62.20
Not classified as ELLs (n = 171)	63.76*	57.35	58.92	60.77
Students with disabilities (n = 37)	46.88	47.02	49.97	44.41
Students without disabilities (n = 256)	63.59*	56.13	60.00	59.35
Far Below Grade Level Readers (n = 137)	51.83*	44.24	50.16	46.21
Near Grade Level Readers (n = 40)	64.73*	55.38	59.92	59.31
At or Above Grade Level Readers (n = 106)	76.71*	65.76	71.17	69.44

**indicates statistically significant differences at the .05 level*
***indicates statistically differences at the .001 level*

By Disability Status. I next explored differences in treatment outcomes for students who were identified as disabled and students who were not. It should be noted that students not identified as learning disabled may include students with unidentified disabilities. Additionally, the group of students with disabilities includes students with reading disabilities, learning disabilities, and disabilities not related to reading or learning.

Comprehension Ability. According to the Mann Whitney U test, no statistically significant differences were found in students' comprehension ability before and after the intervention for students identified with a disability between text level groups, p = .597, and comprehension teaching strategy, p = .530. Similarly, no differences were detected for students who are not disabled for text level, p = .597, or comprehension strategy, p = .530. However, it should be noted that a comparison of mean GMRT-4 scores indicated higher gain scores for students with disabilities who read easy texts (M = 3.55) and participated in the LRD treatment (M = 4.00) compared to students who were not identified as disabled (text level: M = .03, comprehension strategy: M = .21).

Comprehension of Texts. Analyses of differences between students comprehension of texts was established for students with disabilities for both text level (easy or challenging) and comprehension teaching strategy (KWL or LRD). For students with an identified disability, the Mann Whitney U test did not reveal significant differences between the KWL group (M = 46.88) and the LRD group (M = 47.02), p = .793. Further, no differences were found between students who read easy texts (M = 49.97) and challenging texts (M = 44.41), p = .141 for students who were identified as disabled. However, a comparison of means revealed higher average comprehension quiz scores for students who read easy texts. For students who are not identified as disabled, differences were found for comprehension strategy favoring the KWL group, p < .001, but not for text level, p = .824.

By Reading Ability. Mann Whitney U one-way nonparametric tests were used to examine differences in students' comprehension ability before and after the treatment for

students who read on/above grade level, near grade level, and far below grade level. It should be noted that the GMRT-4 pretest scores were used to establish groups.

Comprehension Ability. For students who read on/above grade level, the Mann Whitney U test established no significant differences between students' comprehension ability before and after the treatment for students who read easy or challenging texts, $p = .802$, or for the KWL or LRD comprehension strategy, $p = .690$. Similarly, no differences between groups were detected for students who read near grade level or far below grade level, $p > .05$. However, analysis of difference scores revealed that students who read far below grade level made higher gains in comprehension ability than students who read near grade level or on/above grade level. In fact, students who read on/above grade level made the least gains of any subgroup of students across all treatment groups.

Post Hoc Tests. In order to understand if the difference in gain scores favoring far below grade level readers was significant, I conducted a post hoc test using a one-way ANOVA with the fixed factor of reading ability (near grade level, far below grade level, and on/above grade level) and students' average difference score as a dependent variable. Results revealed significant differences in reading growth based on reading ability, $F(2, 216) = 9.239$, $p < .000$. Further, eta squared indicated that 79% of the variance was attributed to the model, and partial eta squared calculations indicated that all of that variance was attributed to reading ability.

Comprehension of Texts. On the comprehension quizzes, differences were found favoring the KWL group for students who read on/above grade level and students who read far below grade level, $p < .001$. Similar results were found for students who read near grade level, $p = .005$. No differences were found for any reading ability subgroups

for students for text level, $p > .05$. Analysis of comprehension quiz scores between groups revealed that students who read far below grade level had slightly higher mean quiz scores when reading easy texts ($M = 50.16$) than when reading challenging texts ($M = 46.21$). However, students who read near grade level performed similarly regardless of text difficulty.

Qualitative Observations

Overview of Data Analysis

Two of Lisa's remedial reading classes were selected as focal classes, one KWL class (n=15) and one LRD class (n=14). The same ten lessons and topics were observed in both KWL and LRD lessons. History related topics included the Holocaust, D-Day, the Orlando nightclub shooting, Syrian monuments, and immigration. Science topics included extinction of the Blue Tang fish, spread and containment of the Ebola virus, current trends and finds in outer space research related to inhabiting Mars and discovery of Planet X, the chemistry of glow in the dark cement, and the genetics behind inheriting allergies from Neanderthals.

Qualitative methods were used to analyze two research questions for this study. In particular, classroom talk was examined before and after reading to understand how the features of student and teacher talk differed between the KWL and LRD lessons during each part of the lesson. Further, student talk across various subgroups was examined to note differences in talk for students based on English language proficiency status, disability status, and reading ability. Table 20 summarizes the qualitative analysis plan. In this section I first analyze the differences in student and teacher talk between KWL and LRD comprehension strategies. This includes describing the overall amount of talk

across both treatments by student and teacher as well as when the talk occurred (before, during, or after reading). Additionally, I analyze features of the student and teacher talk and differences in student talk across subgroups of students.

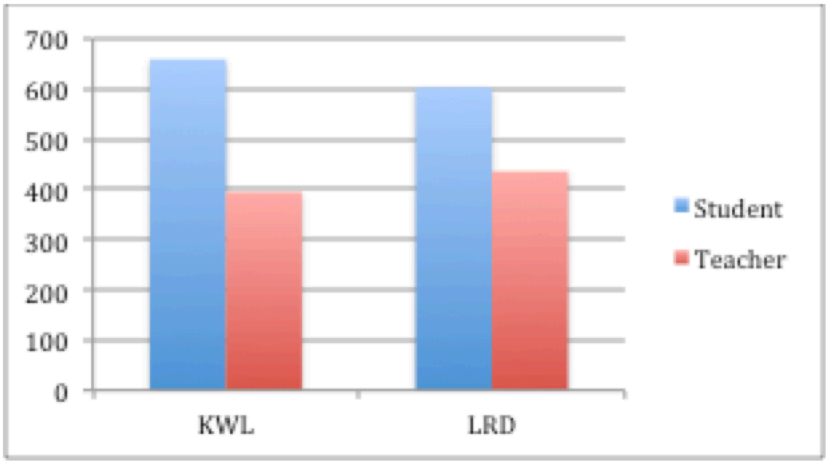
Table 20
Overview of Qualitative Analysis Plan

Research Questions	Data	Analysis
4. How do the features of teacher and student talk during background building before reading and text discussions after reading differ between KWL and LRD approaches?	Classroom observations of two focal classes	Coding
5. How does talk differ before and after reading between KWL and LRD treatments for subgroups of students?	Classroom observations of two focal classes	Coding

How do the features of teacher and student talk during background building before reading and text discussions after reading differ between KWL and LRD approaches?

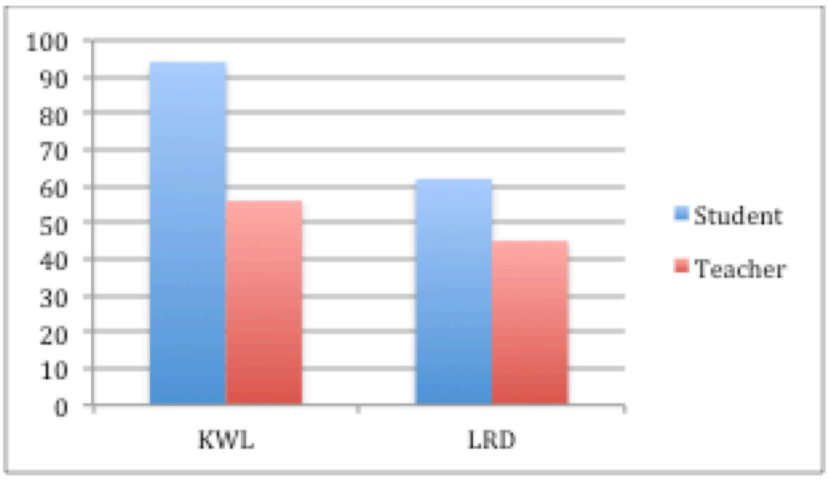
Overall Amount of Talk. Across ten KWL lessons, as displayed in Figure 8, students spoke a total of 659 times, compared to 603 utterances for students in the LRD lessons. Although students spoke more in KWL lessons, the amount of teacher talk across the interventions was similar. Lisa had a total of 395 utterances across the 10 KWL observations compared to 436 utterances in LRD lessons.

Figure 8: Overall Number of Student and Teacher Talk Occurrences



However, as noted in the above section about fidelity and in Table 13, the length of LRD and KWL lessons differed. Lisa's KWL lessons lasted an average of 42 minutes and her LRD lessons lasted an average of 58 minutes. Therefore, it is important to norm the total talk by number of times teachers and students spoke per hour to provide an accurate comparison. Figure 9, which depicts the amount of teacher and student talk per hour, reveals that the teacher had more individual talk occurrences in KWL lessons (56 times per hour) than in LRD lessons (45 times per hour). However, it should be noted that the analysis of the length of teacher talk revealed longer teacher explanations in LRD lessons than in KWL lessons. Therefore, the minutes that a teacher spoke in LRD and KWL lessons, which were not calculated in the present study, may reveal a different picture.

Figure 9
Average Number of Student and Teacher Talk Occurrences



Further, Figure 9 reveals that students spoke significantly more frequently during KWL lessons (94 times per hour) than during LRD lessons (45 times per hour), thus suggesting that the KWL pedagogical strategy produces more student talk than the LRD strategy. However, it should be noted that in approximately one third of LRD lessons students were provided with opportunities to work in small groups on an activity for a short period of time before reading, something that was not observed in KWL lessons. Activities included a vocabulary building game in which students matched words with definitions or created posters to explain a concept they learned previously. The present study did not capture all students' utterances during small group activities; therefore it is possible that the contrast between amount of student talk in KWL and LRD was less stark than it appears.

When Talk Occurred. As displayed in Table 21, student and teacher talk heavily occurred before reading in both KWL and LRD lessons. KWL offered a better balance between talk before reading (73.5% of total talk) and after reading (25.5% of total talk).

Whereas in LRD lessons, 81.5% of the talk occurred before reading and only 17% of the talk occurred after reading.

Table 21
Before, During, and After Reading Talk

	KWL	**% of total talk**	**LRD**	**% of total talk**
Student Talk: All	*659 (94)*		*603 (62)*	
Student Talk: Before Reading	483	73.5%	492	81.5%
Student Talk: During Reading	7	1%	8	1.5%
Student Talk: After Reading	169	25.5%	103	17%
Teacher Talk: All	*395 (56)*		*436 (45)*	
Teacher Talk: Before Reading	263	67%	359	82.5%
Teacher Talk: During Reading	6	1.5%	3	.5%
Teacher Talk: After Reading	126	31.5%	74	17%

**In parenthesis the average number of talk occurrences per hour is indicated*

Mercer and Littleton (2007) suggested that counting teacher or student questions or utterances is too simplistic; therefore, in my analysis of the talk during KWL and LRD lessons, I divided student and teacher talk into three types of talk: questions, exploratory talk, and talk about background knowledge or knowledge presented by the teacher. Further, I examined whether or not the talk occurred before, during, or after reading to better understand the purpose and impact of talk on students' comprehension. Because talk during reading was infrequent in both treatments, as revealed in Table 20, I only compared features of talk before and after reading in my analysis below.

Features of Teacher Talk. Two different types of teacher talk were analyzed in the present study: questions and non-question related talk. Because there were few instances of the teacher sharing her own background knowledge, incorrect knowledge, or irrelevant knowledge, exploratory talk and knowledge related talk were collapsed into one category of non-question related talk for the teacher.

Further, as discussed previously, the lesson length of KWL and LRD lessons differed. Differences in lesson lengths influences both students' and teachers' opportunities to talk, therefore, it is important to examine not only total occurrences of each coded excerpt, but an average of how many times each code occurred within an hour to allow for accurate comparisons between the two treatments. Each table of coded excerpts presents both total occurrences of each code as well as the average number of times a code occurred per hour.

Questions. Table 22 displays the number of questions that teachers asked students across the observed lessons, broken down by question type. Overall the teacher asked more questions in KWL lessons (average 33 per hour) than in LRD lessons (average 23 questions per hour) both before and after reading. Before reading, the teacher asked more than twice as many questions per hour in both KWL lessons and LRD lessons. However, the teacher asked slightly more open-ended questions in LRD lessons (average 6 per hour) before reading than in KWL lessons (5 per hour). Fact-based questioning was more prevalent in KWL lessons, although this type of question dominated teacher talk across both treatments.

Table 22
Teacher Questions by Treatment and Lesson Segment

	KWL		LRD	
	Before	After	Before	After
Questions	201 (29)	82 (12)	168 (17)	60 (6)
Teacher asks open-ended questions "Why did Western African get hit so hard with the Ebola virus?"	35 (5)	11 (2)	56 (6)	15 (2)
Teacher asks fact-based questions "What is a labor camp?"	166 (24)	23 (3)	112 (12)	6 (1)
Teacher asks questions about the text "What is the problem of raising Blue Tang fish in captivity?"	0	48 (7)	0	39 (4)

**In parenthesis the average number of questions asked per hour is indicated*

Fact-based questioning was the most popular type of questioning in both treatments, but, as Mercer and Littleton (2007) suggested, it is important to understand Lisa's use of fact-based questioning and further, understand how it may have differed between the two treatments both before and after reading. Analysis of the teacher's questions revealed that Lisa had four primary uses for fact-based questions during KWL lessons during the before reading segment of the lesson. Before reading in KWL lessons, Lisa's fact-based questions often assisted students with activating knowledge. For example, Lisa asked students "what is cement used for?" during the lesson on phosphorescent cement in an attempt to draw out students' knowledge of cement before reading. Further, Lisa also used fact-based questions in KWL lessons to ask students to elaborate on their responses, such as asking a student who shared about using glow in the dark sticks at a party "What makes it glow?" Additionally, Lisa's use of fact-based questions before reading in KWL lessons often assisted students in evaluating their own response; for example, Lisa questioned a student who said there was a cure for Ebola by

asking “Is there a cure?” Lastly, Lisa often used fact-based questions in KWL to help students relate the topic to their own lives, such as asking students during a conversation about whether or not there was a vaccine to prevent the Ebola virus “Do you need to get a vaccine before coming to school?” Two of Lisa’s uses of fact-based questioning were reflective of the KWL pedagogical approach in which teachers assist students in activating related knowledge. However, Lisa’s use of questioning to ask students to elaborate and evaluate upon ideas aligned with the KWL strategy but were not reflective of the directions in implementing a KWL as outlined in Ogle (1986).

Conversely, Lisa used fact-based questioning in LRD lessons before reading primarily to help students discuss knowledge that was already presented to ensure that the knowledge acquisition process was interactive. For example, after watching a video about phosphorescent cement, Lisa asked students “What did [the video] say about the price of phosphorescent materials?” and “How was limestone made?” Additionally, Lisa sometimes used fact-based questions to help relate the topic to students’ lives, similar to her technique used in KWL lessons, although not as frequently. Occasionally Lisa asked students fact-based questions to activate students’ knowledge of a topic, although this was not a common practice during LRD lessons. No examples were found of Lisa asking students fact-based questions to evaluate their own responses during LRD lessons.

After reading, Lisa’s fact-based questioning in KWL lessons often assisted students in extracting information related to the “W” questions they wrote prior to reading about what they wanted to learn in the article. For example, Lisa referred to one of the W questions on the board written by a student prior to reading which said “How was Ebola discovered?” and asked students “Did we figure out how Ebola was

discovered?" Whereas in LRD lessons, Lisa's fact-based questions after reading focused on things the teacher felt were important to recall such as "What is the Ebola virus?" or "Where did the first outbreak occur?" It should be noted that many of the after reading questions were written in the lessons plans and this use of questioning after reading in LRD was reflective of the "D" portion of the lesson described by Manzo and Casale (1985).

Non-Question Related Talk. Before reading, the teacher's non-question related talk varied significantly in KWL and LRD lessons, as displayed in Table 23. Before reading, the teacher spoke non-question related utterances a significant amount more in LRD lessons (average 20 times per hour) than in KWL lessons (9 times per hour). Further, the majority of the non-question teacher talk before reading in LRD lessons consisted of the teacher presenting factual knowledge related to the text in order to build specific knowledge before reading, which is an inherent feature of the LRD strategy. For example, the teacher showed a slide about the World Health Organization and explained their role in preventing worldwide health issues during the Ebola lesson.

In contrast, much of the non-question talk for the KWL lessons included the teacher sharing opinions, her own background knowledge, stories, speculations, or connections to other texts. Analysis of the talk in KWL lessons revealed that the teacher's talk most often restated what a student said and then added her own opinion, explanation, or information. For example, during the lesson on immigration a student shared that a similarity between the Holocaust and the Syrian crisis was that people from both countries were trying to immigrate in order to escape from a dangerous government regime. The teacher then restated the student's statement and pointed out that the

government in both the Holocaust and the Syrian crisis instigated violence against certain people, and then she suggested that the violence might be another reason that people wanted to leave their country. Additionally, Lisa occasionally provided information about a topic in KWL lessons when introducing a new topic before inviting students to participate. For example, when she introduced the topic of heritage sites during the lesson about Syria, she defined world heritage sites as "cities, buildings, statues, or similar things that we want to preserve and keep because they have historical importance to us" before asking students what they know about heritage sites.

Table 23
Non-question Teacher Talk By Treatment and Lesson Segment

	KWL		**LRD**	
	Before	After	Before	After
Talk	62 (9)	44(6)	164 (17)	13 (1)
Teacher discusses the text "Alex responds with an answer from the text and teacher agrees and builds on what Alex said, referring to the text in her explanation."	0	24 (3)	0	6 (1)
Teacher elicits or shares vocabulary definitions "Alfonso asks what humanely means. Teacher defines it for him."	8 (1)	2 (0)	3(0)	3 (0)
Teacher shares facts from the lesson "The teacher explains that you could fit one million earths into the sun, and compares how many cherry tomatoes you could fit into the sun."	6 (1)	1 (0)	130 (13)	4 (0)
Teacher shares opinions, background knowledge, stories, speculates, makes connections to other texts "I disagree. You would still need headlights at night [if the road was lit by glow-in-the-dark cement] to help you see.	48 (7)	17 (2)	31 (3)	0

**In parenthesis the average number of talk occurrences per hour is indicated*

There are several similarities in non-question talk that the teacher engaged in after reading during KWL and LRD lessons. In both KWL and LRD lessons, the teacher often clarified students' misconceptions, such as explaining to a student who compared the temperature on Mars to Alaska that the temperatures are different because Mars is in fact much colder than Alaska. Similarly, in both KWL and LRD lessons, Lisa sometimes defined words or concepts for students, such as explaining the difference between internal and external symptoms during the Ebola lesson.

There are a few differences noted in non-question related teacher talk after reading in KWL and LRD lessons. For example, the teacher shared more opinions, knowledge, stories, and speculations about the lesson topics more often during KWL lessons (average 2 times per hour) than in LRD lessons, where no occurrences of this type of talk was observed after reading. For example, after reading an article about the Orlando nightclub attack during the KWL lesson, the teacher shared why she felt that gun laws can make the world safer. It should be noted that the teacher often ran out of time in LRD lessons and as a result, did not have an after reading discussion. Therefore, the differences noted in talk after reading talk between KWL and LRD may have occurred because talk did not occur as frequently after reading in LRD lessons, which was the result of the teachers' instructional choice to spend time building knowledge before reading, rather than inherent differences that were a direct results of the LRD pedagogical approach.

Features of Student Talk. Student talk is divided into three sections. The first section explores the different types of questions students asked in LRD and KWL lessons. The second section compared exploratory talk, which included talk in which speakers

reasoned, evaluated evidence, and challenged ideas (Mercer & Littleton, 2007). Exploratory talk includes excerpts where the participants engaged with ideas from the lessons, including discussing the text and vocabulary as well as excerpts in which students made speculations, analogies, connections to other texts or shared opinions and stories. Because several codes individually were small in number, they were combined into one category. Therefore, Table 24 differentiates exploratory talk into three categories: talk related to vocabulary, talk related to the text, and all other exploratory talk. The last section analyzes talk related to knowledge presented by the teacher or background knowledge shared by students in order to understand how the two strategies are similar or different in their approach to knowledge.

Questions. Table 24 displays the number of questions that students asked across the ten lessons, broken down by question type. Overall, students asked more questions per hours in KWL lessons (11 questions) than in LRD lessons (7 questions). Additionally, fact-based questions were the most common type of questions asked in both treatments and students asked far more questions before reading than after reading in both treatments. Students rarely asked any questions about the text in either treatment.

Further, analysis of the data revealed that fact-based questions differed in nature across the two treatments due to differences in lesson structure and the way knowledge was presented differently in KWL and LRD lessons. In KWL lessons, many of the questions were asked during the "W" portion of the lesson, in which the teacher elicited questions from students about what they wanted to learn in the text. For example, in a lesson about the possible discovery of a new planet, Planet X, students asked "What is the name of the new planet?", "How do scientists know that there is a new planet?", and

"Where is the new planet located?" when the teacher elicited questions that students wanted to learn about Planet X. On the other hand, in LRD lessons before reading, students' questions organically developed from the material presented during the "Listen" portion of the lesson. For example, in the same lesson about Planet X, students asked "How many galaxies exist?", "How was Neptune discovered?", and "How can a planet be discovered by detecting a gravitational pull?" in response to the teachers' presentation of information before reading.

Table 24
Student Questions by Treatment and Lesson Segment

	KWL		LRD	
	Before	After	Before	After
Questions	59 (8)	19 (3)	59 (6)	7 (1)
Students ask open-ended questions "Karen asks about whether or not Sandy Hook was discrimination or gun violence."	6 (1)	9 (1)	11 (1)	2 (0)
Students ask fact-based questions "Ash asks if you go to Planet X and turn on a flashlight, would the light work or would the light be absorbed?"	53 (8)	8 (1)	48 (5)	3 (0)
Students ask questions about the text "While reading, Alfonso stops to ask the teacher about the temperature on Planet X."	0	2 (0)	0	2 (0)

**In parenthesis the average number of questions asked per hour is indicated*

Exploratory Talk. Analysis of exploratory talk, which is displayed in Table 25, reveals that students discussed the text twice as often in KWL lessons (average of 12 times per hour) than in LRD lessons (average of 6 times per hour). However, it should be noted that the teacher ran out of class time and was unable to hold a post-reading discussion in four of the ten LRD lessons during the observation period. Further, in the six LRD lessons where the teacher held a post-reading discussion, there was usually

limited time left in the class period due to extended time spent building knowledge before reading. Therefore, it is possible that the talk about the text itself would have occurred more frequently in LRD lessons if more time had been allotted to post-reading discussions. The lack of time spent on post-reading discussions in Lisa's class was an instructional choice made by the teacher, not a reflection of the LRD pedagogical approach described by Manzo and Casale (1985).

Table 25
Student Exploratory Talk by Treatment and Lesson Segment

	KWL		LRD	
	Before	After	Before	After
Talk	63 (9)	116 (17)	118 (12)	73 (8)
Students discuss the text "Because they haven't had signs of Ebola for a while and they thought that it was completely gone. It came out of nowhere and they didn't have an vaccines to kill the disease."	0	85 (12)	0	61 (6)
Students elicit or share vocabulary definitions "Terrorism is the use of violent acts to threaten people."	12 (1)	2 (0)	24 (2)	3 (0)
Students speculate, make analogies, share opinions, make connections to other texts, and share stories. "So 2,500 died. That's how many people go to our high school and Glendale high school combined."	51 (7)	29 (4)	94 (9)	9 (1)

**In parenthesis the average number of talk occurrences per hour is indicated*

Further, analysis of students' post-reading text related talk revealed differences in the nature of the text talk between the two treatments. Post-reading text talk in the KWL lessons emphasized discussing what students put in the "L" column of their KWL chart, indicating what they learned while reading. For example, in a lesson about how the Blue Tang fish is in danger of becoming extinct due to irresponsible human actions, students in

the KWL class raised points from the text such as “the fisherman poisoned the fish to attract the fish”, “keeping a Blue Tang fish requires an 180 gallon salt water tank”, and “the Blue Tang fish will grow to be a foot long”. These responses all were provided in response to questions that students wanted to learn, such as “What type of environment does a Blue Tang fish require?” and “How do fisherman catch Blue Tang fish?”

In contrast, during LRD lessons, students’ comments about the text often stemmed from responding to questions that the teacher asked about the text. For example, when the teacher asked students about why people should not buy Blue Tang fish after watching the movie Finding Dory, students responded with comments such as “Blue Tang fish eat algae from coral reefs which protects the coral reef” and “many Blue Tang fish died in captivity.” Additionally, in LRD lessons students’ text related talk often came from sharing facts from the texts that aligned with what they learned prior to reading. For example, in the same lesson about Blue Tang fish, students’ text related comments included “Blue Tang fish cannot reproduce in captivity” when asked how what they read related to what they learned prior to reading.

Additionally, students discussed vocabulary slightly more often in LRD lessons (27 utterances) than in KWL lessons (14 utterances). Before reading, students shared opinions or stories and made speculations, analogies, or connections with other texts slightly more frequently in LRD lessons (average of 9 times per hour) than in KWL lessons (average of 7 times per hour); however after reading there were more instances of this type of talk in KWL lessons. This is unsurprising given that opinions, speculations, analogies, and connections are more likely to occur when students make meaning of the new information, which happened before reading in LRD lessons and after reading in

KWL lessons. For example, after reading during a lesson about the containment of the Ebola virus, a student in the KWL lesson compared the number of people who died from Ebola in New Guinea to the total number of students who attend two local high schools in her county. In contrast, in an LRD lesson before reading during a discussion about the conflict in Syria and resulting destruction of Syrian monuments, a student compared the insurgency in Syria pitted against the government as similar to an NFL team playing a high school football team, stating that it was not a fair match.

Knowledge Talk. Student talk related to knowledge was analyzed in order to address how KWL and LRD built and activated knowledge prior to reading and assisted students in integrating knowledge after reading. The results are displayed in Table 26.

Students shared factual background knowledge, which was defined as knowledge that students had prior to the start of the lesson, more often in KWL lessons (average of 42 times per hour) than in LRD lessons (average of 16 times per hour), which is unsurprising given that the nature of KWL is to elicit what students know about a topic prior to reading. In some instances, the information students shared across both treatments were very similar. For example, in a lesson about whether or not aspects of allergies are inherited traits, students' background knowledge shared during the lesson in both KWL and LRD lessons primarily related to their own experiences with allergies. Similarly, in a lesson about the chemistry of glow in the dark cement, students primarily shared about their experiences using glow in the dark objects.

Table 26
Student Knowledge Related Talk by Treatment and Lesson Segment

	KWL		LRD	
	Before	After	Before	After
Talk	361 (52)	34 (5)	315 (33)	23 (2)
Students share factual background knowledge "Kate shares that prisoners in concentration camps were gassed or starved to death."	297 (42)	17 (2)	156 (16)	7 (1)
Students share facts from the lesson that were not introduced in the text "After watching the video, Ash explains that [Jupiter] is 10 times the size of earth and made of hydrogen and helium."	0	4 (0)	118 (12)	10 (1)
Students share incorrect knowledge "You can get Ebola from your pet fish."	37 (5)	3 (0)	13 (1)	4 (0)
Students share irrelevant knowledge "Students have an off topic conversation about sending pregnant women into space."	27 (4)	10 (1)	28 (3)	2 (0)

However, in other lessons, the knowledge that students shared varied between KWL and LRD because of the material presented in the LRD lessons, which sparked a different conversation. For example, in a lesson about the discovery of Planet X, students in the KWL treatment shared more general information about space exploration, such as "there are 8 planets in our solar system" and "planets farther away from the sun don't get as much light." Whereas in LRD lessons, although students shared less background knowledge, the background knowledge that students shared was often more specific to the main topic of the lesson, for example, students shared that "the orbit of a planet may not be a normal orbit which doesn't allow us to see it" or "Pluto is a dwarf planet within the Kuiper belt but far from the sun." The latter comments shared in the LRD lesson more directly related to main idea of the lesson, which focused on how the possible existence of Planet X was discovered and why it had gone undetected until recently.

Further, in LRD lessons, students discussed knowledge about the topic that was presented during the lesson with a high degree of frequency (average of 13 times per lesson), whereas in KWL lessons this was infrequent due to the fact that the KWL lessons emphasized what students know rather than the teacher sharing specific information. For example, in the same lesson about the possible discovery of Planet X, students in the LRD lesson discussed the materials presented, sharing information such as "Planet X may be as many as 10 times the size of earth and is made of hydrogen and helium", "Planet X will take 15,000 years to orbit the sun", and "Planet X was discovered the same way as Neptune, by noticing the gravitational pull" after listening to the teacher present information and watching a video about the discovery of Planet X. Therefore, although factual background knowledge was shared by students less often in LRD lessons, discussion of factual knowledge presented during the lesson accounted for a great deal of talk. However, in general, students discussed knowledge more frequently in KWL lessons both before reading (average of 61 utterances per hour) and after reading (average of 21 utterances per hour). In contrast, in LRD lessons students discussed knowledge before reading an average of 45 times per hour and 10 times per hour after reading.

Lastly, students shared more incorrect information in KWL lessons (average of five times per hour) than in LRD lessons (average of once per hour), which is unsurprising given the emphasis on eliciting what students know about a topic during KWL lessons. However, irrelevant knowledge was shared similarly across both treatments.

How does talk differ before and after reading between KWL and LRD treatments for subgroups of students?

I next explored differences in student talk, which included both questions as well as non-question related talk, between subgroups of students by language proficiency status, disability status, and reading ability. It should be noted that because both focal classes observed were remedial reading classes, all students were considered below grade level readers. Therefore, only differences between near grade level readers and far below grade level readers are explored in this section because there were no on/above grade level readers in the focal classes. Near grade level readers were defined as students who read between the 6th to 8th grade levels, as determined by the GMRT-4 pretest score, and students who read far below grade level included students who read below the 6th grade level. Table 27 displays a comparison of talk across the subgroups. Note that only student talk that was attributable to a particular student was included in the table below in order to allow for accurate comparison of amount of talk between student subgroups.

Table 27
Student Talk by Subgroup

	KWL	% of students	% of total talk	LRD	% of students	% of total talk
Student Talk: All	*557*			*478*		
ELLs	13	21%	2%	42	27%	9%
Non-ELLs	544	79%	98%	436	73%	91%
Students with disabilities	42	7%	7.5%	55	14%	12%
Students without disabilities	515	93%	92.5%	423	86%	88%
Near Grade Level	441	64%	79%	330	73%	69%
Far Below Grade Level	116	36%	21%	148	27%	31%

By Language Proficiency Status. In Lisa's KWL class, ELLs made up 21% of the class (n = 3); however, only 2% of the student talk was attributed to ELLs. Only one of the three ELLs spoke during KWL lessons, Felipe, and he had the lowest total English proficiency score of all of the ELLs in Lisa's classes (2.8), as indicated on the WIDA assessment data provided by the school. Similarly, in LRD lessons, 27% of the students were ELLs (n = 4), but only 9% of the total student talk was attributed to ELLs, revealing that ELLs spoke slightly more often during LRD lessons than KWL lessons. In general, ELLs did not speak as frequently as non-ELLs during either strategy. Only two of the four ELLs spoke during the LRD lessons, Xander and Camalia. Xander had the highest English proficiency score of all of Lisa's students (4.9) and Camilia's score fell in the middle (3.4)..

In order to understand why ELLs spoke more frequently during LRD lessons than in KWL lessons, I further analyzed when their talk occurred (before or after reading) and the features of their talk. Similar to non-ELLs, in both KWL and LRD lessons ELLs spoke more frequently before reading (40 utterances) than after reading (15 utterances). After reading ELLs spoke infrequently both in KWL lessons (6 utterances) and LRD lessons (10 utterances). However, before reading ELLs were more likely to speak in LRD lessons than KWL lessons. In LRD lessons, ELLs spoke most frequently about the knowledge presented by the teacher before reading. For example, during the lesson about glow in the dark cement, Camilia shared that bikers riding at night may benefit from the use of glow in the dark cement immediately after watching a video about the use of glow in the dark cement. Further, in LRD lessons the questions ELLs asked were often related to the material presented by the teacher. For example, during a lesson about immigration,

Camilia asked whether or not people who were sick but not granted permission to immigrate to the U.S. would get better in their home countries.

By Disability Status. One student in Lisa's KWL class was identified as having a disability, which constituted 7% of her class. 8% of the talk throughout the intervention was attributed to this student. Similarly, in Lisa's LRD class, 14% of the class (n = 2) was identified as having a disability and 12% of the class talk was attributed to students with disabilities, suggesting that students with disabilities spoke approximately the same amount as students without disabilities in both KWL and LRD treatments.

The features of student talk for students with disabilities and students without disabilities were very similar. Before reading, students with disabilities and without disabilities primarily spoke to share factual knowledge in both KWL and LRD lessons. For example, Karen shared about historical monuments during the lesson about Syrian heritage sites. Students with disabilities spoke the same amount of times after reading in KWL and LRD lessons (11 utterances each), and the percentage of talk after reading and before reading was similar between students with and without disabilities.

Students with disabilities frequently asked questions before reading in KWL and LRD lessons. However, in KWL lessons, most questions were asked when the teacher elicited questions about what students wanted to learn about a topic. For example, Karen asked how much astronomers were paid during the "W" portion of the lesson about Planet X. In contrast, in LRD lessons, similar to the findings of the analysis of the whole group, students with disabilities asked questions organically as they encountered new knowledge. For example, Brock asked a series of questions about how to treat allergies during the lesson on allergies. Similarly, Camilia, a student who was both an ELL and

had a disability, asked if people had worse living conditions in Syria or Pakistan during the lesson on Syria. However, given the small sample size, frequent questioning by students with disabilities may have been attributed to students' personal characteristics rather than the nature of being disabled.

Reading Ability. 79% of the talk during KWL lessons was attributed to near grade level students (n = 9), who made up only 64% of the class. Alternatively, Lisa's KWL class contained 5 students who read far below grade level, which accounted for 36% of the class. However, far below grade level readers' talk only constituted 21% of the class discussion, indicating that students who read near grade level dominated classroom talk during KWL lessons. Further, the majority of the talk for students who read far below grade level in KWL lessons was attributed to one student, Jessica, and two of the five students who read far below grade level never spoke.

However, in LRD lessons, students who read near grade level made up 73% of the class (n = 11) and 69% of the talk was attributed to them. Similarly, students in Lisa's LRD class who read far below grade level (n = 4) made up 27% of her class, yet their talk contributed to 31% of the total talk, indicating that students who read far below grade level spoke more frequently during LRD discussions than KWL discussions. Additionally, all four of the students who read far below grade level participated during LRD lessons.

I further analyzed far below grade level readers' talk in order to determine potential reasons as to why students spoke more frequently in LRD lessons than in KWL lessons. Analysis revealed that students who read far below grade level shared some factual background knowledge prior to reading in KWL lessons. However, the background knowledge shared often came from previous lessons. For example, students

completed a lesson about Mars before completing a lesson about Planet X. In the lesson about Planet X, Jessica frequently shared information before reading that she learned during the Mars lesson, such as the temperature on Mars averaged negative 81 degrees. Other background knowledge shared by far below grade level students during KWL lessons was often very general, which was a similar trait to the background knowledge shared by near grade level students. For example, when asked what the conditions were like in Holocaust prison camps Jessica shared that "it was rough," or during the Planet X lesson when asked what conditions in outer space was like, she shared "it's very dark." Further, students who read far below grade level asked numerous questions before reading, in particular, about knowledge that others shared.

Before reading in LRD lessons, similar to the findings for the whole group as well as the findings for ELLs, both students who read far below grade level and students who read near grade level most often commented on knowledge shared by the teacher. For example, during a lesson about the bombing of Hiroshima during World War II, Alfonso had a series of comments about information the teacher shared, such as expressing surprise about the fact that the U.S. bombed innocent civilians living in Hiroshima, and Antonio wanted to know if the U.S. still had access to atomic bombs.

To better understand why students who read far below grade level talked more during LRD lessons, I further analyzed their talk. Analysis revealed that much of the talk recorded for students who read far below grade level occurred during opportunities for students to do activities in small groups during LRD lessons, something that did not occur during KWL lessons. For example, during the lesson about the possible extinction of the Blue Tang fish, students created posters about why Dory movie goers should not

adopt a Blue Tang fish, which sparked a great deal of chatter from all students, including students who read far below grade level. It should be noted that not all talk was transcribed for small group activities. When they occurred, I would observe and record talk for one group and catch parts of the talk that occurred in nearby groups. Therefore, it is possible that more talk for far below grade level students occurred than is revealed in this study.

Summary

No interaction or significant differences were found between text difficulty and comprehension strategy on students' comprehension ability for the entire sample as well as for subgroups of students. Additionally, no significant interaction was found between text difficulty and comprehension strategy on students' comprehension of texts. However, a significant main effect was found for the factor of comprehension strategy on students' comprehension of texts favoring the KWL treatment. Subgroups of students similarly performed better after participating in KWLs, except for students with disabilities. No main effect for the factor of text level on students' comprehension of texts was found for the whole group; however, ELLs performed significantly better on the quizzes after reading easy texts.

Fidelity data indicated that teachers spent more time talking about the text in KWL lessons than in LRD lessons, but in general revealed that teachers spent the bulk of their time building or activating knowledge before reading in both comprehension strategy groups. Analysis of classroom observations showed that teachers asked more fact-based questions in KWL lessons; however, fact-based questions were often used to ask students to evaluate their own responses or to elaborate on their responses. Classroom

observations also revealed that in KWL lessons students shared more factual knowledge and incorrect knowledge, whereas in LRD lessons students spoke most often about the material presented by the teacher. Further, students' questions in KWL lessons were mostly elicited by the teacher during the "W" portion of the lessons whereas most student questions in LRD lessons organically developed from the material presented by the teacher. After reading, students' talk in KWL lessons was related to their "L" column responses, whereas in LRD lessons student talk often focused on answering the teacher's questions or discussing information that aligned with what they discussed before reading.

Lastly, analysis of subgroups of students talk revealed that students who read far below grade level and ELLs spoke more frequently in LRD lessons than in KWL lessons, often about the knowledge presented by the teacher. Students with and without disabilities did not exhibit any differences in talk in either LRD or KWL.

CHAPTER V: DISCUSSION OF THE RESULTS

Adolescents today are expected to develop higher order thinking skills needed to interpret rigorous texts (CCSSI, 2010). However, 70% of adolescents require literacy remediation (Biancarosa & Snow, 2006) and many adolescents fail to develop an adequate situation model (Compton et al., 2014). The adolescent literacy crisis has led researchers to examine what combinations of approaches effectively produce positive comprehension outcomes for high school students.

Despite the gravity of the issue, the connection between research and practice has yet to clarify certain elements of comprehension instruction. For example, the question about whether or not adolescents need to read instructional level texts or texts at or above grade level to improve comprehension ability has little research backing (e.g., Shanahan, 1983, 2011). Additionally, investigating how to best address building and activating knowledge before reading requires further investigation. Lastly, exploring ways to improve text-based discussions is necessary to understand how to enhance students' comprehension. Further, examining how teachers assist students with varying levels of English proficiency, disabilities, and reading abilities to interpret texts at varying levels of difficulty is of utmost importance.

This mixed methods study was conducted to investigate the interaction and main effects of text difficulty and comprehension teaching strategy on adolescents' comprehension. Three hundred and eighteen ninth graders were randomly assigned to read either easy or challenging Newsela texts and four teachers were responsible for the primary delivery of either KWL or LRD lessons accompanying the texts. Two-way ANCOVA tests were used to examine treatment effects for both students' comprehension

ability before and after the intervention as well as students' comprehension of texts after each lesson using the GMRT-4 pretest as a covariate. Nonparametric tests allowed for examination of differences between subgroups of students and ANOVA tests were used post-hoc to further explore differences. Qualitative observations allowed for exploring differences in teacher and student talk in the KWL and LRD lessons to assist in further understanding the effects of the treatment.

Discussion of Findings

This section presents a discussion of the results of five research questions that were explored through examining four sets of data: fidelity of implementation observations, GMRT-4 pretest and posttests, quizzes assessing students' comprehension of texts after each lesson, and field notes from observations of two focal classes. The first section explores the interaction between the text and the activity by discussing results of two-way ANCOVA tests, which investigated an interaction between text difficulty and the comprehension teaching strategy on readers' comprehension. The second section examines the factor of the text in the comprehension process, which includes a discussion of the results of ANCOVA tests exploring main effects for text difficulty. The third section examines the factor of the activity, which includes discussing main effects for the comprehension teaching strategy as well as the discussion of analysis of qualitative data, which explored differences in student and teacher talk between KWL and LRD lessons. The last section addresses the factor of the reader, which includes examining differences in students' responses to the intervention and includes discussion of analyses of both qualitative and quantitative data.

The Interaction Between The Text And The Activity

The present study explored two potential interactions between text difficulty and comprehension teaching strategy. I first examined whether or not an interaction existed between text difficulty and the comprehension teaching strategy on students' comprehension ability by comparing students' comprehension before and after the intervention across treatment groups. I then examined the possibility of an interaction between text difficulty and the comprehension teaching strategy on students' comprehension of texts by comparing students' average comprehension quiz scores across treatment groups. In this section I discuss the results and relate them to previous literature addressing an interaction between students' knowledge and text difficulty.

Comprehension Ability. The first question I explored was whether or not there was an interaction between text difficulty and the comprehension teaching strategy on students' comprehension ability as a result of the intervention. Results of a two-way ANCOVA test revealed no significant interaction between the two factors. No previous studies have investigated the interaction of text level and comprehension teaching strategy on reader's overall comprehension ability. However, results of previous research suggested that students were able to answer more inference level questions correctly when they had background knowledge before reading (McNamara et al., 1996; McNamara, Oruzu, & Floyd, 2011; Sinatra, Beck, & McKeown, 1993) or when knowledge was built before reading (McKeown et al., 1992). These results indicate the potential that building background knowledge prior to reading combined with reading challenging texts may improve students' comprehension in the long term. However, an interaction was not observed in the present study.

There are several possible reasons why an interaction was not detected. First, it is possible that the short length of the intervention did not allow time for students' comprehension to improve enough to note differences between groups. Twelve weeks is a short period of time to influence comprehension ability outcome measures and researchers who have conducted longer interventions with adolescents have similarly struggled to find differences in students' comprehension ability as a result of an intervention (e.g., Vaughn et al, 2015; Wanzek et al., 2013). Secondly, it is possible that the challenging texts were not difficult enough for students who read on or above grade level and likewise, the easy texts may not have been easy for some students who read far below grade level. An interaction may not have been detected as a result of the difficulty level of the texts varying between students.

Comprehension of Texts. The second question I examined was whether or not there was an interaction between text difficulty and comprehension strategy on students' quiz performance. A two-way ANCOVA test compared students' average quiz scores and revealed no significant interaction between the factors, suggesting that the difficulty level of the text and comprehension instructional strategy may make separate contributions to students' comprehension of a text.

Previous literature has explored whether or not there is an interaction between students' background knowledge and text difficulty. Studies that have investigated interactions between students' existing background knowledge and text difficulty – with the latter operationalized as text cohesion – have found that high levels of background knowledge about a topic assisted students in reading more difficult texts (Arya, Pearson, & Hiebert, 2011; McNamara et al., 1996; McNamara, Oruzu, & Floyd, 2011; Sinatra,

Beck, & McKeown, 1993). However, other studies, which examined the interaction between text difficulty and comprehension instruction, which included building knowledge before reading, failed to detect an interaction (McKeown et al., 1992; Stahl et al., 1989; Stahl & Jacobson, 1986). Similarly, the goal of the present study was to investigate the interaction between text difficulty and comprehension teaching strategy, which included either building new knowledge or activating students' existing knowledge prior to reading. The findings of the present study are similar to those of previous research that failed to find an interaction between text difficulty and building or activating knowledge on students' comprehension of texts. As discussed previously, it is possible that the potential lack of difficulty of the challenging texts for students who read on or above grade level interfered with the possibility of detecting an interaction. It is also possible that both methods of addressing knowledge, KWL and LRD, assisted students in supporting background knowledge relevant to understanding the text and thus mediated differences in difficulty level.

The Text

I next explored main effects for text difficulty (easy or challenging) on both readers' comprehension ability and comprehension of texts. In this section I relate findings to previous research related to the influence of aspects of text difficulty on a reader's comprehension.

Comprehension Ability. Results of the ANCOVA test revealed no main effect associated with the influence of text difficulty on students' comprehension ability over the twelve-week intervention. The results are unsurprising given the short length of the intervention. Further, findings from previous research have failed to reliably show an

association between text level and students' comprehension ability. For example, Fisher and Frey (2014) saw a greater increase in below grade level students' comprehension when they read above grade level texts when compared to below grade level students who read instructional level texts for a year. However, the authors did not use a reliable measure of students' comprehension ability nor did they control for instruction to isolate the impact of text difficulty. The results of the present study are similar to those of O'Connor et al. (2002) who found that when controlling for instruction both students who read easy and challenging texts made growth. The results of O'Connor et al.'s study signify the importance of instruction on readers' comprehension growth relative to the level of text. Therefore, it is also feasible that both KWL and LRD mediated differences in text difficulty thus assisting students in reading both easy and challenging texts.

Comprehension of Texts. Results revealed no main effect associated with text difficulty on students' comprehension quiz performance. One possibility for the lack of difference in comprehension performance on quizzes, as discussed previously, is that both KWL and LRD strategies may have assisted students in developing the knowledge necessary to comprehend the challenging level text, thus mediating differences in text difficulty. Therefore, findings suggest that the instruction provided by the teacher may assist students in accessing a more difficult text, a notion that has been suggested in previous studies (e.g., Arya, Pearson, & Hiebert, 2011; O'Connor et al., 2002; McNamara, Oruzu, & Floyd, 2011).

When considering the implications of the results for the practice of matching students with instructional level texts, several limitations for the present study must be addressed. First, students were not matched with instructional level texts for this study;

instead students were randomly assigned to read either easy or challenging texts regardless of reading ability. Therefore, the challenging texts, which were defined as texts at the ninth through twelfth grade level, may have been easy for many of the students whose reading level on the GMRT-4 pretest fell in the upper high school through college level range. Further, the easy level of text was defined as texts at the fifth or sixth grade level; therefore, students who scored below the fifth grade level on the GMRT-4 may have found the easy texts to be challenging to read.

Further, it is possible that the difficulty level of the texts in the present study did not vary. Texts can vary in difficulty in many ways, including lexical difficulty, text cohesion, or syntactic difficulty. Previous research has indicated that manipulating the lexical difficulty of the text (e.g., Stahl et al., 1989; Stahl & Jacobson, 1989) or aspects of text cohesion (McKeown, et al., 1992; McNamara et al., 1996) are associated with differences in students' comprehension of texts. Alternatively, others have argued that reducing the syntactic complexity may make a text more difficult for a reader because simplifying sentences and reducing the amount of text removes connective cues that may signify how ideas are related to each other, making it more difficult for the reader to interpret the text (Hiebert & Pearson, 2014; Pearson, 1974).

Newsela's method of simplifying the texts appears to include three main factors: shortening the passage, reducing the syntactic complexity by providing shorter sentences, and providing easier vocabulary. Therefore, one explanation for the lack of difference in students' comprehension of easier and more difficult texts in the present study is that the simplified Newsela texts may have increased the inferential burden for students and masked the differences in difficulty level. Newsela's formula resembles, in part,

readability formulas, which have been long since criticized for a lack of attention to qualitative factors of text difficulty (e.g., Anderson et al., 1985).

The Activity

I next explored main effects for the comprehension teaching strategy (KWL or LRD) on students' comprehension ability and comprehension of texts. In this section I discuss how the findings relate to the research on methods of addressing background knowledge in reading comprehension lessons. I also discuss differences in student and teacher talk between KWL and LRD lessons.

Comprehension Ability. The ANCOVA test results did not reveal a main effect associated with the influence of the comprehension teaching strategy on students' comprehension ability over the twelve-week intervention. In the present study of ninth graders, instructional changes included increased reading of nonfiction texts and increased comprehension instruction focused on building, activating, and integrating knowledge. The literature suggests that these elements represent changes from the "business as usual" approach that might lead to comprehension growth. For example, Swanson et al.'s recent observational study (2016) reported that ninth grade students spent on average 8% of the language arts block reading texts and little of that time was spent reading nonfiction texts or reading independently. Instead, students primarily listened to fiction being read aloud. Further, only 62.5% of the language arts classes observed in Swanson et al.'s study included any kind of comprehension instruction during the lesson and the authors rarely observed students engaging in any text-related discussions.

On the contrary, in the present study students read silently and independently for an average of 21% of the lesson in KWL classes and 15% of the lesson in LRD lessons, both over twice the amount of time reported in Swanson et al.'s 2016 study. Additionally, comprehension instruction using nonfiction texts dominated the English block for the twelve weeks of the study. It is feasible that comprehension instruction combined with an increase in reading of nonfiction texts improved all students' comprehension over the span of the treatment, although not to the level that could be detected on the comprehension ability measured used in the study.

Comprehension of Texts. Although there was no main effect for text difficulty, analyses revealed a main effect for comprehension strategy favoring the KWL treatment method. In order to better understand why students performed better on quizzes after participating in the KWL treatment, I explored two important components of KWL and LRD instruction: background knowledge and classroom discussion.

Background Knowledge. An important distinction between the KWL and LRD pedagogical approaches is evident in how each strategy approaches knowledge. KWL takes the stance that students bring a great deal of knowledge to the lesson and teachers must simply activate that knowledge before reading to enable students to engage with the text (Ogle, 1986). LRD, on the other hand, takes the opposing view that students lack the knowledge necessary to make sense of a text and therefore, the teacher should explicitly build knowledge before reading.

The positive outcome for the KWL treatment contradicted some of the literature about methods of building background knowledge that favored teacher-guided approaches to building specific knowledge over student-led methods of activating

knowledge (Dole et al., 1991; Marr & Gormley, 1982; Stahl, 2008; Watkins et al., 1994). Additionally, the findings of this study contradicted implications of Recht and Leslie's 1988 study that indicated that background knowledge of a topic related to the reading might level the playing field for struggling readers. In the present study, students with more specific knowledge of a topic did not perform better on a comprehension assessment.

The findings of the present study supported Alvermann and Eakle's (2003) notion that participatory approaches to comprehension instruction are more beneficial for adolescents than transmission approaches. Participatory approaches to comprehension instruction encourage students to actively engage and interact with the text and situate the text as a tool for learning with the onus of comprehension on the student. Given the interactive nature of comprehension, it is unsurprising that an approach to comprehension that encourages students to actively read, such as KWL, is effective.

Further, the findings of the present study support Mercer and Littleton's (2007) notion of the value of dialogue in learning, in particular, student-to-student interactions to build background knowledge. Although KWL emphasizes what students already know about a topic, the groups' collective knowledge is far greater than any one student's individual knowledge. Knowledge is built in KWL lessons prior to reading in a student-centered and student-led manner. Through the powerful interactions in which students shared their knowledge before reading during KWLs, talk was used as a tool to create new knowledge, which well prepared students to comprehend a text.

The teachers' interpretation and resulting implementation of LRD in the present study may have led to differences in comprehension outcomes. Teachers in the LRD

treatment spent an average of 33.5 minutes building knowledge prior to reading, and in some lessons spent as long as 60 minutes, which was longer than the lesson plan suggested. Teacher's lack of time management may have occurred because all of the teachers in the present study had little prior teaching experience. It is possible that the volume of information presented to students served as a distractor to comprehension, rather than an aid. The results of previous studies speak to these effects. For example, Stahl et al.'s (1989) study activated students' knowledge related to the main idea of the text in one group, while the other group had knowledge activated that was related to unimportant details. The first group outperformed the second group, possibly because the irrelevant knowledge led them to focus on the wrong information while reading. It is possible that the LRD approach, which attempts to fill in gaps in knowledge necessary to understanding the text, may have acted as a distractor and caused students to focus on irrelevant details rather than details related to the main idea of the passage. Further, the volume of knowledge shared, evidenced in the length of the before reading lesson segment in LRD, may have magnified this issue.

On the other hand, the before reading segment of the KWL lessons averaged 17.5 minutes and never went longer than 25 minutes in any lesson. Although students did not receive specific knowledge building related to the topics prior to reading, both schema theory (Anderson, 2013; Freebody & Anderson, 1983) and Pressley and Afflerbach's research (1995) suggest that a readers' incorrect, incomplete, or inaccurate schema will be corrected while reading. Therefore, having precise background knowledge about a topic related to the reading, as LRD provides, may not improve students' comprehension of the text, a finding that is supported by the present study.

One caveat to the conclusions drawn about the importance of background knowledge on comprehension is related to the instrument used to assess students' comprehension after reading. It is important to note that the researcher created quizzes were comprised of questions that assessed students' understanding of the main ideas of the texts. This was intentional in order to allow questions to be answered regardless of which text level (easy or challenging) students read, as the different versions of texts varied the level of detail provided. For example, questions might have asked, "Which of the following sentences best describes the main idea of the passage?" or "How does the above sentence contribute to the main idea of the article?" However, findings from Pressley and Afflerbach's research (1995) suggest that had this study assessed comprehension differently, the outcome may have varied. The authors found that although students' comprehension of the main idea of the passage was not influenced by background knowledge, low background knowledge readers overly trusted the author. A lack of understanding of whether or not the author or the information was reliable has the potential to influence the inferences that a reader draws. It is possible that had the questions been different in nature, for example, focused on integrating knowledge in order to make inferences about details in the text based on background knowledge of a topic, that the outcome of the comprehension quizzes may have been different.

Further, it is possible that teachers' beliefs about students influenced their implementation of the LRD treatment. The outcome of the present study surprised the teachers in the study, who unanimously felt that the LRD treatment was both similar to their usual approach and was favored due to its perceived ability to mitigate issues of background knowledge. In particular, several teachers named specific groups of students

they felt would benefit from LRD, including ELLs, students who have diagnosed learning disabilities, and students who read below grade level. It is possible that teachers' assumptions that particular students lack knowledge necessary to understand the text may have led them to over-emphasize before reading activities in the LRD lessons. In one instance, when I suggested to a teacher to spend less time before reading in order to allow for more time for discussion after reading, she stated that she felt that students needed a great deal of time before reading building knowledge in order to counter their low knowledge base.

The opinions expressed by teachers in this study are common beliefs often expressed by teachers who work with adolescents who are labeled at risk of failure, according to Lee and Anderson (2009). Further, the authors contend that teachers and schools have accepted certain misconceptions about students and families who are at risk for failure as facts. For example, lack of ability to read independently or to engage in classroom discussions are common misconceptions that teachers have about students who perform below grade level on cognitive reading assessments, despite evidence that students can perform these tasks when provided high quality instruction (Dressman, Wilder, & Connor, 2005). Applebee et al. (2003) similarly found that teachers were less likely to engage in particular types of beneficial literacy instruction in classrooms where students have lower reading abilities. However, quiz scores favoring the KWL treatment contradict the view that the students who read below grade level lack knowledge that impedes their comprehension of academic texts or their ability to engage in student-driven discussions. This indicates the need to reevaluate beliefs about what students are capable of and how much knowledge they have.

Differences in Classroom Talk. The fourth question in this study examined how the features of teacher and student talk during background building before reading and text discussions after reading differed between KWL and LRD comprehension strategies. The results of the analysis of classroom talk has the potential to identify key aspects of the treatments that were helpful as well as a hindrance to comprehension and provide some insight as to why students in the KWL treatment outperformed students in the LRD treatment.

As identified in chapter two, classroom talk has a tremendous influence on the literacy learning in a classroom (e.g., Kucan & Palinscar, 2013; Nystrand, 1996) and provides insights into differences in how students and teachers build, activate, and integrate knowledge before and after reading between the two contrasting comprehension strategies, KWL and LRD. In this section I first discuss the findings about the features of teacher talk, in particular, teacher questioning techniques. Next, I address the findings of features of student talk, including differences in students' exploratory talk and how students shared and discussed background knowledge and knowledge presented by the teacher. Because of the lesson design of both KWL and LRD, very little talk occurred during reading (1-1.5%), so I focused my analyses on before and after reading talk to better understand the differences between the two contrasting approaches to comprehension instruction.

Teacher Talk. The teacher's critical role in the literacy discourse of the classroom includes engaging students in talk to promote learning. Dialogic talk, which can produce better literacy outcomes for secondary students (e.g., Applebee et al., 2003) is thought to promote student thinking by viewing teachers and students as co-collaborators in the

development of knowledge in the classroom. In order to promote dialogic talk, teachers use questioning techniques and take up responses of students (Nystrand, 1996) in order to assist students in producing more in-depth answers and extend student talk (Juzwik et al., 2013). Although I did not measure the length or complexity of students' responses to teachers' questions, scholars argue that asking open-ended questions, which elicit longer responses from students than known answer questions, is likely to produce more in depth responses (e.g., Juzwik et al., 2013; Mehan, 1979). The findings of the present study, which are discussed below, indicate that the KWL treatment may have produced more teacher questions that promote longer and more elaborate student talk. This in turn may have influenced the positive outcomes that students who participated in KWL experienced on the comprehension quizzes.

In KWL lessons, although the teachers asked fewer open-ended questions and more fact-based questions than in LRD lessons, there were two important distinctions in the questioning techniques that demonstrated more beneficial talk may have occurred in KWL lessons. First, examination of the function behind teachers' questioning indicated that teachers used questions that supported the theory behind each of the treatments. In KWL lessons, fact-based questions were used to assist students in activating knowledge, relating new knowledge to prior knowledge, and elaborating and evaluating their own responses. In contrast, in LRD lessons, fact-based questioning, which occurred less often in LRD lessons but was still the most popular type of question, was most often used to discuss the knowledge that the teacher had just presented.

The second important distinction between questioning techniques in LRD and KWL lessons related to timing. The teacher asked more open-ended questions in LRD

lessons (71 questions) than in KWL lessons (46 questions). However, the majority of these questions were asked before reading rather than after reading, where benefits to students' text interpretations may have been slight because students had not yet read the text.

The teacher's non-question related talk also revealed some important benefits for talk in KWL lessons. In KWL lessons, the teacher's non-question related talk often consisted of first restating what a student said and then adding her own explanation. This is an example of taking up a student's response, which gives importance to a student's ideas, a key component of dialogic talk. In contrast, the teacher's primary use of non-question related talk in LRD lessons was to share information with students, which does not encourage teachers to recognize or collaboratively build knowledge with students.

Student Talk. An examination of research reveals students have positive literacy outcomes when teachers and students collaborate in the meaning making process (e.g., Reznitskaya, 2012). Important distinctions were found between KWL and LRD lessons when exploring specific types of student talk that influenced the teacher and students' collaboration of ideas, including students' exploratory talk and knowledge related talk.

Exploratory Talk and Questions. In the present study, two important types of talk were compared across both treatments: questions and exploratory talk, which included talk about the text, vocabulary, making speculations or analogies, sharing stories or opinions, and connecting to other texts. Exploratory talk and questions are thought to be associated with opportunities to collaborate in the meaning making process with other students and the teacher. Analysis of student talk noted more examples of exploratory talk and students asking more questions in KWL than in LRD lessons. Further, the

majority of the exploratory talk and student questioning occurred before reading in LRD lessons with few examples observed after reading. Because the ultimate goal of the comprehension lesson is for students to form a mental representation of the text, benefits of exploratory talk and student questioning on a reader's comprehension would occur after reading. Therefore, much of the talk in LRD lessons was spent developing students' ideas about topics, rather than assisting them in developing ideas about the text.

However, a limitation to the conclusions that can be drawn about the LRD method in this study is that the "D" portion of LRD, the after reading discussion, did not get the time it deserved or that Manzo and Casale (1985) recommended. In LRD lessons, teachers often ran out of time and shortened or skipped the after reading discussion. As discussed above, teachers may have been inclined to over-emphasize before reading tasks. Further, misconceptions about students' abilities to engage in after reading discussions, as suggested by Dressman, Wilder, and Connor (2005), may have prevented teachers from engaging in discussions about texts. Additionally, as Mercer and Littleton (2007) suggested, teachers' lack of discussion in schools may stem from a misunderstanding about the impact of student talk on learning. Similar to the conclusions drawn by Applebee et al. (2003), findings from the present study suggest benefits of talk after reading to assist students in developing an interpretation of the text.

Talking About Knowledge. Students discussed factual knowledge in both KWL and LRD lessons with similar frequency, although three important differences were found between how students discussed knowledge between the two treatments. First, unsurprisingly, students' background knowledge was shared more frequently in KWL lessons than LRD lessons, while discussing facts presented by the teacher made up

approximately half of the fact-based talk in LRD lessons. Second, analysis of the differences between the fact-based knowledge that students shared during the lessons revealed that the knowledge shared during KWL lessons was broader, while more specific knowledge of the topics was shared in the LRD lessons. Third, although students shared irrelevant knowledge with similar frequency in KWL and LRD lessons, students shared more incorrect knowledge in KWL lessons than in LRD lessons. This difference is germane to the nature of eliciting what students know about a topic. Given that students' performance on the comprehension quizzes favored the KWL treatment, it is necessary to investigate whether any of the three differences in how students discussed knowledge may have influenced students' comprehension of texts.

The literature on the importance of student talk favors students' sharing their own background knowledge before reading (e.g., Juzwik et al., 2013). However, a common concern expressed by teachers about the use of the KWL strategy is that the knowledge that students share is not specific enough or is incorrect (e.g., Finders & Balcerzak, 2013; McKenna & Robinson, 2014). However, the specificity or correctness of the knowledge built prior to reading in the present study may have had a minimal impact on the reading outcome. For example, Pressley and Afflerbach (1995) found that what readers know predicts their processing of the text; however, inaccuracies in background knowledge are corrected through reading. Further, the authors found that the presence of inaccurate predictions or lack of accurate or specific background knowledge did not have a negative impact on comprehension of a text, a finding also implied in the present study.

Moreover, sharing incorrect knowledge before reading may be beneficial. The process of becoming a skilled reader includes learning to recognize and correct

mismatches between background knowledge and contradictions to this knowledge found in a text (Freebody & Anderson, 1983). Consequently, previous research suggests that opportunities for students to correct inaccurate knowledge while reading may lead to improvement in reading skill (Pressley & Afflerbach, 1995). It should be noted that the present study did not examine students' thought processes during reading or whether or not students were able to correct inaccuracies in background knowledge while reading. However, comprehension outcomes did not reveal any hindrance to the amount of incorrect knowledge shared prior to reading. Therefore, it is possible that in the present study students were able to correct their misconceptions either while reading or through discussion after reading.

The Reader

The last question I explored was whether or not there were differences between treatment effects for students based on English language proficiency status, disability status, and reading ability. I compared difference scores calculated from the GMRT-4 pretest and posttest to evaluate the influence of the treatment on growth in comprehension ability using one-way nonparametric tests. Similarly, I used one-way nonparametric tests to compare differences in students' comprehension performance on the quizzes. In this section I discuss the results of analyses as well as explore student and teacher talk in order to understand how students' talk differed based on English language proficiency, disability status, and reading ability between the KWL and LRD treatments.

By Language Proficiency. Similar to the findings for the entire data set, no significant interaction or main effects were reported on comprehension ability outcomes for students regardless of English language proficiency status. However, further analysis

of the differences between the pretest and posttest revealed that students who are designated as ELLs made significantly more growth in comprehension than students who are not designated as ELLs, regardless of the treatment. This finding was further stratified by proficiency level, revealing that ELLs with lower English proficiency made significant gains in comprehension ability regardless of treatment. However, ELLs with higher English proficiency made more gains in comprehension ability when participating in KWLs or when reading challenging texts. In contrast, non-designated ELLs made no gains in comprehension in any treatment condition. One possible explanation that influenced the results is that ELLs are acquiring English skills alongside participating in this treatment, therefore, their increased comprehension growth across all treatment groups may be due to increased language proficiency, rather than gained as a result of their participation in this treatment. However, twelve weeks is not long enough for significant gains in language proficiency, which suggests that the treatment influenced ELLs' comprehension abilities. It is possible that ELLs are not provided many opportunities to engage in independent reading of academic texts in other classes. The increased exposure to nonfiction texts and the increase of reading challenging texts combined with comprehension instruction are factors that may be associated with ELLs' gains in comprehension ability throughout the treatment.

Additionally, a significant main effect for text level favoring easy texts was found for lower proficiency ELLs, a difference not noted for any other students. An important consideration is the difference in text length between the easy and challenging level texts. The easy passages were significantly shorter, averaging 662 words, compared to the challenging passages, which averaged 879 words. Hiebert and Pearson (2014) suggest

that reducing the length of the passage does not necessarily make the passage easier to understand, and in some cases, may make the passage more difficult. However, it is possible that students with lower levels of English proficiency may benefit from a shorter text. For example, Verhoeven (2011) suggests that working memory is taxed when readers engage in reading comprehension in a second language. While reading, ELLs draw upon different linguistic systems to process texts and build ideas, and as a result, reading comprehension may be compromised. Therefore, it is feasible that the increased cognitive load of a longer passage for language learners made the text more difficult and influenced the outcome of the quizzes.

Additionally, analysis of the comprehension quizzes revealed a main effect for treatment favoring KWL for all groups, regardless of English proficiency level. The results of the efficacy of KWL with students of lower English proficiency is notable given that prior to the study the teachers voiced concern that ELLs did not have the necessary background knowledge or discussion skills to complete the KWL. Teachers felt unanimously that LRD was a better method for ELLs. Further, not only did ELLs benefit from KWL, comparison of mean quiz scores revealed that ELLs might have benefited more from KWL than other students. ELLs in the KWL treatment scored on average eight to twelve points higher on quizzes than ELLs in the LRD treatment. On the other hand, students who were not classified as ELLs on average scored only six points higher when participating in the KWL treatment.

There are several reasons why ELLs may have benefited from the KWL approach. The first reason is related to teachers' implementation of the LRD treatment. It is possible that the extended length of the "L" portion of LRD that occurred in this study increased

the cognitive load prior to reading. This notion is supported by Verhoeven's suggestion that ELLs' working memory is more taxed when reading, which may impede comprehension. The long "L" portion of the LRD lessons may have been tiresome for ELLs who were listening in a second language, and thus contributed to lower performance on quizzes.

Second, it is possible that ELLs benefited from the type of talk that occurred in the KWL lessons. Analysis of classroom talk revealed that ELLs spoke infrequently in both KWL and LRD lessons, and fewer occurrences of talk occurred in the KWL treatment for ELLs than in the LRD treatment. However, it should be noted that the analysis of the classroom talk occurred in classrooms that contained lower proficiency ELLs. It is feasible that higher proficiency ELLs spoke as frequently as students who were not identified as ELLs during the KWL lessons. Therefore, it is possible that as students gain proficiency in the English language, they engage in more classroom discussions and are more willing to share knowledge. Further, lower proficiency ELLs may have benefited from listening to other students talk, as evidenced by their higher performance on quizzes after participating in the KWL treatment. This assertion is in keeping with the argument to keep ELLs in mainstream literacy classrooms where they can listen and converse with native English speakers (e.g., Lesaux et al., 2010; van Lier & Walqui, 2012).

Further, there may be a teacher factor in talk that was not explored in this study. For example, although teachers in this study proposed that ELLs did not have the knowledge or conversational skills to engage in a KWL, the findings of the present study indicate that ELLs may be more capable than teachers assumed. The teachers' beliefs

about ELLs in the present study are common across schools in the U.S., which often take a deficit view of language learning (see O'Connor, Hill, & Robinson, 2009 or Rex et al., 2010). However, the findings from the present study indicate that ELLs can benefit from participatory approaches to comprehension instruction that may yield more successful literacy outcomes.

By Diagnosed Learning Needs. Analyses of the findings for students' with and without diagnosed disabilities revealed no significant interaction or main effects associated with students' comprehension ability or comprehension of texts. However, comparison of mean difference scores revealed that students with disabilities had slightly higher gain scores when participating in the LRD treatment and when reading easy texts compared to students who did not have disabilities.

Further, analysis of comprehension quizzes revealed that students with disabilities performed similarly on quizzes after participating in both the KWL and LRD treatments. This performance varied from students without disabilities who had higher quiz scores after participating in the KWL treatment.

Qualitative analyses of classroom talk were explored to better understand the difference in outcome for students with disabilities. Results indicated that students with disabilities spoke with similar frequency in KWL and LRD lessons and there were no noted differences in the features of talk between the treatments. Therefore, students' similar performance on LRD and KWL quizzes may be attributed to benefits from both treatments on students' comprehension of texts. For example, Gersten et al. (2006) found that interactive comprehension strategies assisted students in reading texts. In the present study, students' with disabilities spoke a similar amount regardless of treatment

compared to their non-disabled peers, which suggests that they may have benefited equally from both treatments.

Another possible explanation is that students with disabilities received some benefits from KWL and from LRD. Although the interactive approach to knowledge building may have assisted students with disabilities in activating knowledge, there may have been benefits to building knowledge in the LRD approach that mediated differences in quiz performance. Gersten et al. (2001) suggests that background knowledge influences students' comprehension by directing students towards relevant details related to the main idea. Further, building knowledge may assist students in understanding the text structure, which aids in comprehension of the main idea of a text (Bos & Anders, 1990; Williams, 1991).

Another surprising finding, given the field's preference towards providing more accessible texts for students with disabilities (i.e., Gersten et al., 2006; O'Connor et al., 2015; Wharton-McDonald, 2011), was the lack of significant differences between students with disabilities' comprehension of texts when reading easy or challenging texts. This finding is similar for students who do not have designated disabilities. However, analyses of mean quiz scores revealed that students with disabilities scored higher on quizzes when they read easy texts ($M = 49.97$) than they did on quizzes when they read challenging texts ($M = 44.41$), which differed from students without disabilities' performance on quizzes. Supporting this notion was students' slightly higher gains in comprehension ability favoring reading easy texts.

One possible reason for the lack of significant differences on quiz performance related to text difficulty is the heterogeneity of the group. It should be noted that students

with disabilities includes ELLs and below grade level readers as well as high achieving readers and students who are not identified as ELLs. Further, students with a designated disability may exhibit difficulties in learning that may or may not relate directly to reading. As a result, we must be careful in assuming that all students with disabilities respond similarly to a particular treatment or instruction. It is feasible that had this study differentiated the results between students with reading disabilities and students who have disabilities unrelated to reading, significant differences may have been found favoring the use of easy texts with students with reading related disabilities. Lastly, the small sample size (n = 37) may have influenced the results.

By Reading Ability. Results of analyses of difference scores, comprehension quizzes, and classroom talk revealed differences in the treatment impact for students who read far below grade level, near grade level, and on/above grade level. Results of the one-way nonparametric tests comparing difference scores on the GMRT-4 indicated no main effect for either text level or comprehension teaching strategy on students' comprehension ability for all students regardless of reading ability. However, further exploration of differences revealed that students who read three or more grade levels below the ninth grade level improved comprehension during the treatment significantly more than near or on/above grade level groups, regardless of which treatment they received. Further, gain scores for students who read far below grade level were slightly higher for the LRD group than the KWL group, but similar for students who read easy and challenging texts. In contrast, near grade level students showed higher gain scores when reading challenging texts and no gains for any other treatment whereas on/above grade level readers showed no gains for any treatment.

Confounding this finding, analyses of comprehension quizzes revealed significantly higher performance when participating in the KWL treatment for all reading ability groups, with the highest differences exhibited for students who read at/above grade level. No significant differences were found between students' performance on quizzes when reading easy or challenging texts for any reading ability group. However, for students who read far below grade level, mean quiz scores were slightly higher for easy texts (50.16) than challenging texts (46.21).

Analysis of the classroom talk, which did not include students who read on/above grade level, revealed that students who read far below grade level talked more frequently in LRD lessons than KWL lessons whereas near grade level students talked frequently in both treatments. Further exploration of talk revealed that far below grade level students often spoke during small group activities in LRD lessons and most frequently discussed information that was presented by the teacher. Since small group activities did not occur in KWL lessons, it is possible that the less risky setting of small group discussion in LRD lessons (e.g., Zwiers, O'Hara, & Pritchard, 2014) combined with providing a common knowledge base for students through building explicit knowledge, encouraged students who read far below grade level to talk more frequently.

Reviewing the literature about the interaction between knowledge and text difficulty provides some insight into the potential long-term benefits of LRD and text difficulty on below grade level readers' comprehension. The interaction literature revealed that students answered more inference questions correctly when they both read challenging texts and had high amounts of background knowledge (McNamara et al., 1996; McNamara, Oruzu, & Floyd, 2011, Sinatra, Beck, & McKeown, 1993). The

differences noted in comprehension performance for near grade level students favoring the use of challenging texts further advances the argument that there may be benefits to students' comprehension ability from repeated exposures to challenging texts.

Further, benefits to increased classroom talk for students who read far below grade level in the LRD treatment may be associated with the higher gains in comprehension ability. This notion is supported by the findings in Applebee et al. (2003) that suggest improved literacy outcomes as a result of students engaging in particular types of classroom talk. However, it is possible that the short period of time for the intervention in the present study (12 weeks) may not have allowed for enough time for significant differences to develop between treatments. Therefore, it is feasible that over time, exposing students to challenging texts and building background knowledge before reading combined with interactive lessons may increase students' comprehension ability. However, the results of the present study point to, but do not confirm, this assertion.

The gains in comprehension ability across all treatments for far below grade level readers is of notable interest, given that previous research has reported that it is difficult to move the comprehension needle for below grade level readers (e.g., Wanzek et al., 2013). For example, Vaughn et al.'s 2015 study cites that older students, even after three years of intensive intervention, made very small gains. As a result, my findings can be interpreted to suggest that the instruction provided in this study may have been different than the instruction normally provided for students who read below grade level. Swanson et al.'s (2016) analysis of classroom instruction reveals a lack of key elements that benefit students' comprehension in ninth grade English classes, including a lack of reading comprehension instruction and little time spent reading or discussing texts, in

particular, nonfiction texts. Further, Dressman, Wilder, and Connor's research (2005) indicated that these activities occur even less frequently for students who read below grade level because of teachers' perceptions of students with lower reading abilities.

However, the present study incorporated frequent comprehension instruction, independent reading of nonfiction texts, and classroom discussions about texts. Teachers in the present study agreed that their regular classroom instruction for students who read below grade level varied from the present treatment and in particular, included fewer overall reading encounters. Additionally, the teachers agreed that they often read aloud to below grade level readers. Further, the teachers who also taught on/above grade level students stated that they provided more opportunities for students to read independently and discuss the text than they do for students who read below grade level. It is feasible that all of the treatments in the present study provided elements of good comprehension instruction that below grade level readers do not normally receive and henceforth, resulted in higher gains.

Along these lines, the results of the present study contradicted teachers' beliefs about what students who read below grade level are capable of and their beliefs about what type of reading instruction they most benefit from. Teachers in the present study expressed reservations both about doing KWLs and providing challenging texts to students who read below grade level. For example, Lucy shared that "most of [the students] don't have the background knowledge necessary to fill out a KWL chart productively" and Carl expressed that "the students I teach have little prior knowledge", both in references to non-honors classes. Lisa and Clara, who both implemented the KWL treatment, expressed similar reservations and felt that the LRD approach would

boost confidence and provide necessary visuals for students who read below grade level. Although these opinions are common (e.g., Lee and Anderson, 2009), they are not always accurate (e.g., Dressman, Wilder, & Connor, 2005). Further, teachers' concerns about below grade level readers' abilities to read challenging texts were not supported by the results of the comprehension quizzes or the differences in students' pretest and posttest on the GMRT-4. The results of the present study reveal that teachers may need to reevaluate beliefs about what below grade level students are capable of and what elements of comprehension instruction are associated with gains in comprehension ability.

Limitations

There are several important limitations of the present study related to the design of the study. The decisions about the design of the study allowed for exploration of specific aspects of comprehension for adolescents; however, they influenced which conclusions can be drawn and generalizability of the results.

Assessment

Although the researcher created comprehension quizzes were piloted and internal consistency established, this assessment lacks both reliability and validity and therefore limits the conclusions that can be drawn about students' performance across treatments. Similarly, as discussed previously, the questions on the quizzes emphasized students' understanding of the main idea rather than analysis of details from the passage, which may have influenced the findings.

Additionally, the GMRT-4 was used to assess students' comprehension, despite the fact that some cultural bias may be present in this instrument. Further, ELL-classified students were assessed in a language in which they are not yet proficient. This limits

conclusions that can be drawn about students from non-dominant cultural and linguistic communities.

Texts

In the present study, students were not matched with instructional level texts, but instead randomly assigned to read easy or challenging texts. This decision allowed for comparison of students' performance on the same text, which aids in drawing conclusions between students about their performance. However, as previously noted, the level of ease or difficulty of the text varied for students within the "easy" and "challenging" text groups. Therefore, conclusions about the benefits or drawbacks of matching students with instructional level texts are limited in the present study.

The use of Newsela texts for the study presents some limitations. Throughout the study, students read only one type of text, current news articles, which limits conclusions that can be drawn about how students may read easy or challenging texts of differing genres. Although science and history topics were selected, Newsela texts varied from the type of texts that students often encounter in their content area classrooms. Further the simplification process of the texts employed by Newsela presented challenges to the conclusions that can be drawn about students' performance with easy or more difficult texts. As discussed previously in this chapter, Newsela texts vary in Lexile difficulty based on word frequency, sentence length, and overall length of the passage. However, more frequent words, shorter sentences, and shorter passages do not always make a text easier to read (e.g., Hiebert & Pearson, 2014). Therefore, the conclusions that can be drawn about students reading easy or more difficult texts in the present study are limited.

Additionally, in an effort to counter classroom effects of text difficulty, students were randomly assigned to read easy or challenging texts within each classroom. This decision allowed for the isolation of the influence of text difficulty but prevented me from tying features of the teacher talk to specific class-level test scores in order to draw conclusions about students' experience with easy or challenging texts related to classroom talk.

Comprehension Strategies

In order to isolate the influence of specific aspects of comprehension instruction such as background knowledge and classroom talk, two comprehension strategies were selected that focused on before and after reading activities. As a result, several important aspects of reading, such as during reading supports, were not addressed in the present study. The effectiveness of each strategy may have been limited as a result.

Further, the goal of the present study was to isolate the influence of specific aspects of comprehension instruction on students' comprehension, such as the influence of activating or building background knowledge and different approaches to classroom discussion using nonfiction texts. In order to accomplish this goal, teachers should engage in the same strategy with the same types of texts over many encounters. As a result, a longer study, for example, over the course of the school year, would have been difficult to achieve because teachers have other aspects of their curriculum that need to be addressed. However, longer interventions are necessary for adolescents in order to provide enough time to distinguish differences in students' comprehension (e.g., Wanzek et al, 2013). The short length of time for the intervention allowed me to establish differences for specific aspects of comprehension but did not allow me to look at the

long-term impact of comprehension instruction. In order to allow for a longer intervention, curriculum could be developed that incorporate findings of the present study as well as other relevant findings about growing adolescents' comprehension ability. Future research could utilize the curriculum and incorporate a more comprehensive approach to literacy in order to allow for a longer intervention.

This study aimed to compare two comprehension strategies, KWL and LRD. A control group was not used for this study because the goal was to contrast different aspects of building and activating background knowledge, engaging in talk, and text difficulty. However, conclusions about how the treatment in the present study compares to the type of instruction that high school teachers normally engage in during literacy lessons are limited. Further, ELLs and students who read far below grade level benefited from participating in the treatment significantly more than other students. However, a lack of control group prevented me from establishing whether or not these gains were a result of the treatment or from factors outside of analysis in the present study.

Teachers

The teachers were randomly assigned to teach either KWL or LRD in order to prevent treatment contamination, with one exception. Lisa was the only teacher who taught remedial reading classes, as opposed to regular or honors English, so she was asked to teach both KWL and LRD in order to ensure that variances of students' abilities within each treatment were evenly dispersed. However, this design led to two issues that could have influenced the results, a small number of teachers participating in each treatment and the potential for a teacher effect. Analyses of quiz and post tests results between teachers across both treatments revealed that there was not a teacher effect on

students' comprehension outcomes in the present study. Further, fidelity of implementation results demonstrated that although there was variance in each teacher's approach, teachers implemented the components of both treatments with similar fidelity. However, the current study design presents limitations to the conclusions that can be drawn about students' performance.

Students

The student participants represented a variety of linguistic, racial, and academic backgrounds. This allowed for examination of treatment effects across different subgroups of students, including by English proficiency, disability status, and reading ability. Further, block randomization was used to ensure that subgroups were relatively balanced across treatment groups. However, analyses of students' performance in smaller subgroups created small cell sizes, thus limiting the conclusions that can be drawn for specific groups of students. Further, the population of the present study may vary from adolescent populations in other parts of the U.S. or the world, and therefore limits the generalizability of the results.

Lastly, the students in this study represented a range of backgrounds and reading abilities; however, the focal classes selected for this study were comprised of all students who read below grade level. As a result, there are limitations to conclusions and generalizability of the findings related to classroom talk that can be drawn between KWL and LRD because the population analyzed differed from the population of the entire study. This is a significant limitation given that the findings of this study indicate potential differences in students' performance based on reading ability as well as teachers'

beliefs and practices for literacy instruction related to classroom talk for students who read on/above and below grade level.

Further, the lack of information about ELLs' home language practices did not allow for interpretation of findings based on differences in literacy in students' first language. Similarly, lack of information about students' specific disabilities prevented me from examining how the findings differed for students with reading disabilities and students without reading-related disabilities.

The high attrition rate, although not uncommon in adolescent intervention studies (e.g., Fisher & Frey, 2014), was a limitation of this study. However, it should be noted that the students who dropped out of the study were not different from the students who stayed, minimizing the impact of this limitation. Additionally, the reason for students' inability to continue participation in this study was related to the teachers' classroom management skills, a factor independent of the intervention.

Implications for Instructional Practice

The present study adds to the existing literature about how to improve comprehension for adolescents with implications for instruction related to building or activating knowledge, text difficulty, and the importance of classroom talk. In this section, I present five suggestions for instruction related to improving adolescents' comprehension as a result of the findings in the present study.

First, findings of the present study suggest that students may benefit from activating relevant knowledge and generating interest in what they would like to learn from a text before reading, particularly through an interactive approach. Further, the results of this study indicate that despite teachers' beliefs, students who read below grade

level and ELLs have successful literacy outcomes when they direct their own learning through a KWL approach.

Second, findings from the present study have important implications for teachers in regards to text difficulty. First, findings support the previous assertion that assessing the difficulty level of texts solely based on sentence length, text length, word frequency, and passage length may not provide an accurate assessment of the difficulty of a text (e.g., Hiebert & Pearson, 2014). Therefore, the present study presents questions about whether or not differentiating reading through the use of popular sites such as Newsela will improve students' reading comprehension. Instead, results of the present study suggest that considering instruction to support students in reading texts may yield more successful reading outcomes than providing students who read below grade level simplified versions of texts. Further, comprehension instruction may assist students in comprehending more difficult texts, although the results of this study point to, but do not confirm, this assertion.

One suggestion from recent literature has indicated that pairing easier and more challenging texts during literacy or content area instruction may have benefits for adolescents, particularly those who read below grade level (Lewis & Walpole, 2016; Lewis, Walpole, & McKenna, 2014; Lupo, 2017; O'Connor et al., 2015). The reasons behind this suggestion include the notion that increasing reading volume of nonfiction texts and building background knowledge before reading challenging texts may improve reading outcomes. Findings from the present study suggest that increasing the amount of reading of nonfiction texts combined with activating background knowledge may improve below grade level readers' comprehension. Further, in the present study,

students who read far below grade level were more likely to engage in knowledge related talk when they had read something related to the topic or when the teacher presented specific knowledge related to the text. Lastly, the present study points to the notion that students who read below grade level may benefit from reading more difficult texts. Combined, the findings of the present study support the notion of pairing easier and more challenging texts for students who read below grade level to improve comprehension outcomes.

Fourth, the present study has implications for differentiating comprehension instruction based on different students' needs. Matching students with instructional level texts is often suggested as a way to differentiate comprehension instruction for secondary students (e.g., Allington, 2002, 2007). Results of the present study indicate that students may be able to read more challenging texts than teachers previously thought. In fact, students who read near grade level and ELLs with higher levels of English proficiency made more growth in comprehension when they read on or above grade level texts. However, language learners may benefit from shorter texts. Thus, findings of the present study suggest that teachers should provide grade level or above grade level texts, especially for students who read near grade level and higher proficiency ELLs. On the other hand, teachers should provide lower proficiency ELLs with shorter texts.

Further, the present study indicates that teachers' efforts to differentiate literacy instruction should not limit comprehension instruction, classroom discussion about texts, and opportunities to read independently, especially nonfiction texts, during literacy instruction. Students benefited from interactive, student-centered instruction in which their own knowledge was valued and used to help make sense of a text. Below grade

level readers and ELLs made significantly more growth when participating in instruction that teachers often avoid for students whose academic abilities may be limited (e.g., Dressman, Wilder, & Connor, 2005; Swanson et al., 2016). This instruction included time for students to independently read grade level texts, discuss texts, and share their own knowledge related to the texts.

Lastly, the findings from this study suggest that teacher development is an area of need. In particular, developing a teacher's ability to engage in talk that supports students' literacy may improve literacy outcomes for all students. Further, professional development may assist teachers in interrupting assumptions that they are making about students. For example research may assist teachers in recognizing that ELLs, below grade level readers, and students with disabilities have the ability read challenging texts, engage in academic discussions, and bring a great deal of knowledge to literacy lessons.

Future Directions

Future research might further explore the influence of reading texts at varying difficulty levels on adolescents' comprehension. Specifically, examining different aspects of what makes a text difficult, such as different types of cohesion or concreteness of ideas alongside the influence on students' comprehension is of utmost importance. Further, longitudinal studies are required to establish differences in comprehension ability over time as a result of matching students with instructional level texts. Lastly, examining the interaction between text difficulty and different types of during reading supports, such as DR-TA or Reading Guides, is necessary to further establish how students can best access and engage with increasingly difficult texts.

Additionally, further exploration of the influence of different types of comprehension instruction on different aspects of students' comprehension is necessary. For example, future research should examine how different levels of texts and scaffolding influences students' ability to answer inferential questions that require background knowledge or students' ability to interpret specific details of the passage. Examining the influence of the comprehension teaching strategy in conjunction with the text difficulty using different types of questions is necessary to establish the best combination of factors to improve adolescents' literacy.

Lastly, future research may explore ways to assist teachers in engaging in interactive comprehension instruction that encourages exploratory talk amongst students. Further, research that investigates ways of providing support for teachers to assist students of all ability levels and backgrounds to engage in exploratory talk about texts is an area of need. For example, exploring professional development and supports to assist teachers in implementing talk techniques to extend student talk about the text and deepen students' analyses may improve literacy outcomes for students of varying ability levels.

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Appendix A

Sample Lessons

KWL Lesson Plan: Lesson 16 Cement

Materials:

- Copies of the articles:
  - *Scientists see the light: It comes from cement (C) retrieved from: https://newsela.com/articles/glowing-cement/id/18708/*
  - *A brilliant idea: Cement that glows in the dark (E) retrieved from: https://newsela.com/articles/glowing-cement/id/18706/*
- Three column KWL graphic organizer for students
- Board or smart board with three column organizer for the class to see

General timeline:

- Before Reading discussion and chart completion: 20 minutes
- During Reading: 10 minutes
- After Reading Discussion and Activity: 15 minutes

A: Elicit what students Know

Teacher:

- Introduce topic of cement and share that this material is used around the world to construct buildings, roads, and sidewalks.
- Ask students to discuss what they know about cement with a partner for one min.
- Walk around the room and listen for responses that can be shared with the class.
  - Responses that are relevant to the topic of cement as a mixture of sand, gravel, and … and how cement is used should be shared with the class.
- Elicit responses from students and write their responses on the board or SMARTboard in the "K" column of a three column graphic organizer.

The teacher may use the following guiding questions to further the discussion. Additional questions may be added as necessary to further students' considerations about their own knowledge.

- Why is cement used so often?
- Does cement have any special properties? (For example, does it stay relatively cool or warm?)
- What other materials can be used to replace cement?

Students may bring up information that is not relevant to the topic. In these instances you should acknowledge the information shared by the student but guide the student back to the topic. For example, you could say in response to a student sharing about construction on Route 29, "That construction project has used a lot of cement, but we're going to talk about cement as it applies to sidewalks today. Have you noticed any new sidewalks being built along 29?"

Teacher:

- Review the responses written on the board with the class.
- Introduce the next topic that relates to the article, glow-in-the-dark materials.
- Share that certain chemicals can make materials or organisms glow long after they're exposed to light. This is because the material absorbs the energy from light and then releases it once the light is turned off (or the sun sets.)
- Ask students to discuss what they know about glow-in-the-dark materials for one min with a partner.
- Walk around the room and listen for responses that can be shared with the class.
    - Responses that are relevant to the topic of glow-in-the-dark materials and organisms should be shared with the class.
- Elicit responses from students and write their responses on the board or SMARTboard in the "K" column of a three column graphic organizer.

The teacher may use the following guiding questions to further the discussion. Additional questions may be added as necessary to further students' considerations about their own knowledge.

- What materials or objects can glow-in-the-dark?
- How long can something glow once a light is turned off? What about something that blinks, such as a firefly?

After eliciting some responses from students, including asking students to share relevant responses heard during the think pair share, review the responses written on the board with the class.

B: Elicit what students Want to learn

Teacher:

- Give students a min to complete K on chart, including looking at the board and adding more responses.
- Ask students to spend two minutes generating a couple of questions that they would like answered when reading this article and in the "W" column of chart.
- Elicit responses for the W column from class.
- Add responses to the W column on the board.

Students can add questions that the teacher writes on board on their W column.

Part C: Reading

Teacher:

- Pass out articles.
    - Make sure that students get the correct article. Students must always read the same level of text.
- Circulate and answer questions that students have while reading.

When all students are finished reading, the teacher continue the lesson.

Part D: Elicit what students Learned

Teacher:

- Asks students how they liked the article and what they learned.
- Review the questions in the W column and elicit responses from students about what they learned.
- Discuss any questions that didn't get answered while reading.
- Ask students to share any questions that came up while reading.

Students complete the L column of the chart during the discussion, or give students a few minutes after the discussion to complete the L column.

Part E: Title Writing and Multiple Choice Questions

Teacher:

- Tell students they will take a short quiz to gauge their understanding of the texts.
- Following the quiz, students will write a title.
- Before students begin, review title-writing procedures (must be a sentence, must have a subject and verb, must include main idea).
- Review examples/non examples.

Students answer multiple choice questions and write a title for the article. After collecting the quizzes, the teacher shares with the class the article titles and answers to the quizzes:

C- Scientists see the light: It comes from cement

E- A brilliant idea: Cement that glows in the dark

Quiz answers: 1-D & 2-B

LRD Lesson Plan: Lesson 16 Cement

Materials:

- Copies of the articles:
  - *Scientists see the light: It comes from cement (C) retrieved from: https://newsela.com/articles/glowing-cement/id/18708/*
  - *A brilliant idea: Cement that glows in the dark (E) retrieved from: https://newsela.com/articles/glowing-cement/id/18706/*
- Student handout- copies for all students
- PowerPoint accompanying lesson
- Video One: Fantastic Phosphorescence https://www.youtube.com/watch?v=is1VH1yht2w
- Video Two: Glow-in-the-Dark Bike Path in the Netherlands *https://www.youtube.com/watch?v=5ZjXVe3gAD0*

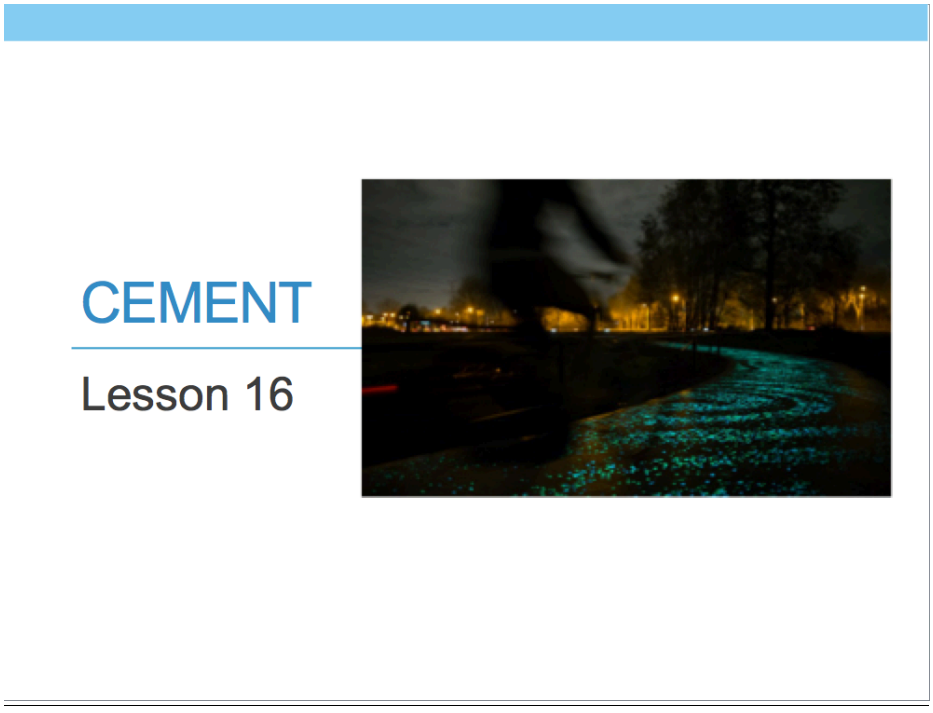
General timeline:

- Before reading activities and discussion: 20 minutes
- During Reading: 10 minutes
- After Reading Discussion and Activity: 15 minutes

Part A: Before Reading:

PowerPoint and lesson activities are used to build background knowledge before reading. The following plan is organized by PowerPoint slide.

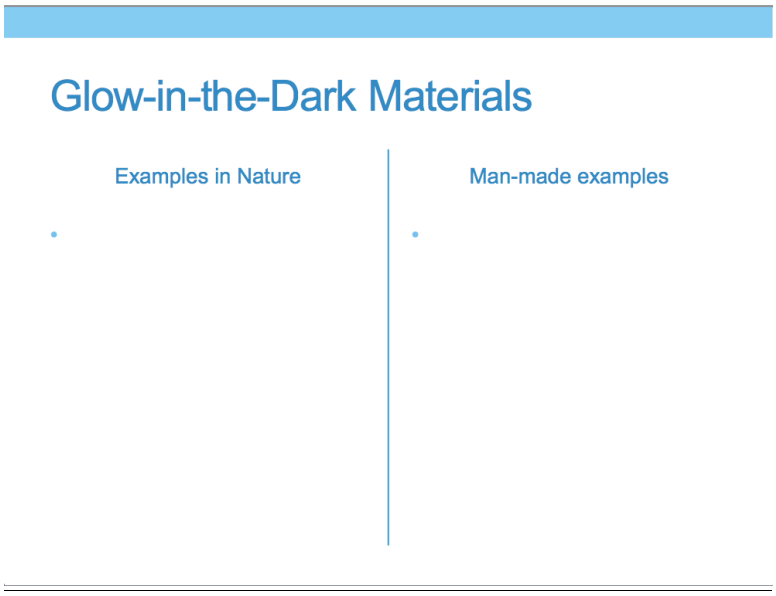
Slide One:



Teacher:

- Introduce topic of article- cement that glows.
- Explain to students that this article provides information about how scientists have created a cheap alternative to streetlights through creating glow-in-the-dark sidewalks and roads.

Slide Two:



Teacher:

- Introduce topic with the following information for students:
  - "Let's talk about things that glow-in-the dark. What examples can you guys think of?"
  - Populate slide with student responses. (EA: lightening bugs, glow sticks, bioluminescence in the ocean, glow-in-the-dark paint, clothing, etc.)
  - Explain that there are different reasons materials glow-in-the-dark. The article is going to describe compounds that are phosphorescent, just like glow-in-the-dark pain.

Slide Three:

Anticipation Guide

Before (Yes/No)	**Question**	**After Reading** (Yes/No)
	Phosphorescence occurs when materials absorb light and then glow in the dark.	
	Scientists have created glow-in-the-dark pathways which use electricity to glow.	
	Chemicals can be added to materials to make them glow-in-the-dark.	

Teacher:

- Ask students to complete the anticipation guide.
- Remind students that they will come back to the anticipation guide after reading.

Slide Four:

Video 1: Fantastic Phosphorescence

Question	Your Response
What makes phosphorescent materials unique?	
How are phosphorescent materials made?	
What is one of the difficulties associated with man-made phosphorescence?	

Teacher:

- Tell students they will watch a short (2 min) video clip about phosphorescence.
- Show students the questions and responses that they should complete while watching.
- Review the questions so students know what to look for.
- Show video, starting at 0:15 and ending at 2:13.
- May pause and rewind video to assist students in answering questions.

Slide Five:

Video 1: Fantastic Phosphorescence

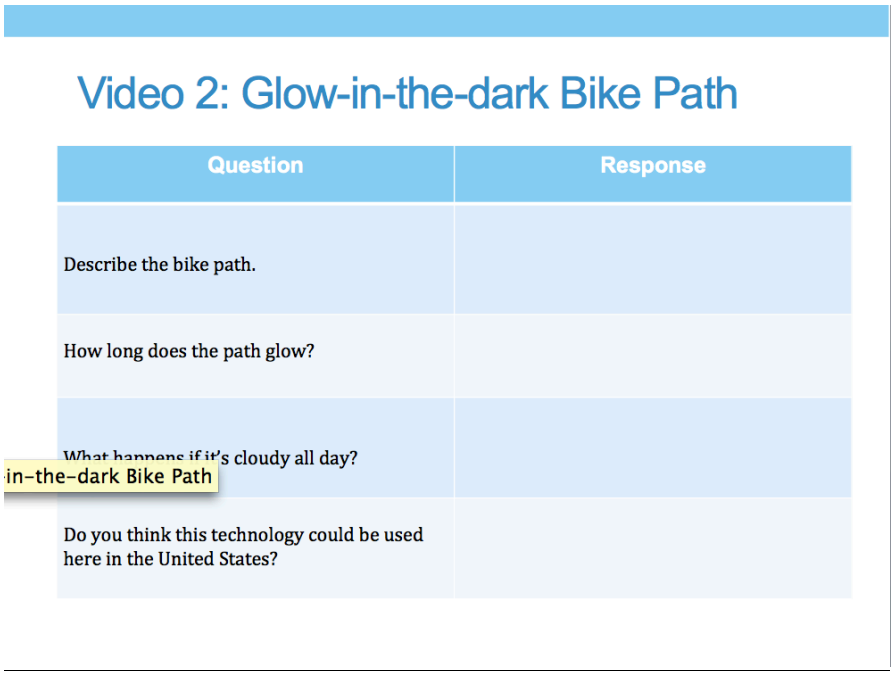
Question	Your Response
What makes phosphorescent materials unique?	Phosphorescent materials glow-in-the-dark after exposure to light.
How are phosphorescent materials made?	Different chemicals can be added to materials to make them glow.
What is one of the difficulties associated with man-made phosphorescence?	Some chemicals are expensive, especially the ones that phosphoresce for a long amount of time.

Teacher:

- Review concepts from video and tell students to make sure they have their answers right to the questions about the video.
- Review the following information either through eliciting responses from students or sharing points on the PowerPoint. Interactive is better for relaying information.
    - What makes phosphorescent materials unique? They continue to glow after exposure to light. Some materials can glow for a few seconds, others will continue glowing in the dark for hours. This glow occurs because the material absorbs energy from the sun or UV light sources, and then releases the energy once the light is gone.
    - How are phosphorescent materials created? Different chemicals can be added to materials to make them phosphorescent. Zinc and copper

sulfide are the least expensive materials, but they also don't glow as long.
    - One of the difficulties associated with phosphorescence is the cost. The most expensive materials glow for the longest amount of time after exposure to light.
- Stop and check students understanding throughout.

Slide Six:



Teacher:

- Tell students they will watch another short (3 min) video about a glow-in-the-dark bike path in the Netherlands.
- Show students the graphic organizer that they will use.
- Review the organizer so students know what to look for.
- Show video.
- May pause and rewind video to assist students in capturing responses.

Slide Seven:

Teacher:

- Review concepts from video to make sure students grasped the right info.
- Review the following information either through eliciting responses from students or sharing points on the PowerPoint. Interactive is better for relaying information.
    - The bike path is in the Netherlands, a European country located between Belgium and Germany.
    - The scientists decided to mimic Van Gough's famous painting, Starry Night. The phosphorescent materials are arranged in swirls to honor the famous painter.
- Stop and check students understanding throughout.

Slide Eight:

Video 2: Glow-in-the-dark Bike Path

Question	Response
n-the-dark Bike Path e path.	The bike path is in the Netherlands, and is designed to look like Van Gough's Starry Night.
How long does the path glow?	The path glows for up to 8 hours after exposure to sunlight
What happens if it's cloudy all day?	The material can actually be "charged" with a small amount of electricity. The goal is for the path to be self-sufficient.
Do you think this technology could be used here in the United States? In Charlottesville?	*Yes:* *No:*

Teacher:

- Continue reviewing concepts from video and tell students to make sure they have their answers right to the questions about the video.
- Review the following information either through eliciting responses from students or sharing points on the PowerPoint. Interactive is better for relaying information.
    - The path can glow up to 8 hours after exposure to sunlight. It was designed to light the way for people commuting home from work, so few people would need to ride the path 8 hours after the sun has set.
    - When the weather is bad or the path is not exposed to sunlight for several days, a small amount of electricity can be used to charge the materials. Unfortunately, they don't explain this very thoroughly in the video. The goal of the path was for it to be self sufficient, so it will not glow at night on its own unless it has been exposed to light.
    - What do you guys think about this technology? Could it be implemented here in the United States and here in Charlottesville? (Ask students to vote and explain their reasons. Populate the slide with the tally of votes.)
- Ask students to answer the next three questions on their handout:
    - Okay, now we're going to shift gears and talk about cement. Take a minute to jot down your ideas about how it's made, how it can glow, and what might be a few of the problems or difficulties associated

with making cement glow. After a few minutes, we'll discuss these questions.

- Stop and check students understanding throughout.

Slide Nine:

Cement 101

- *How is it made?*
  - Limestone and clay are heated to 1450*C
  - The high heat removes carbon dioxide from the mixture, making a dry powder
- *How can it glow?*
  - After the mixture is heated, phosphorescent chemicals can be added to the cement
- *What are some of the problems?*
  - Chemicals make the cement less durable
  - Need to find the perfect ratio

Teacher:

- Review how cement is made to help students better understand the article.
- Review the following information either through eliciting responses from students or sharing points on the PowerPoint. Interactive is better for relaying information.
  - Cement is a building material used to bind structures and other materials. For example, it's used between bricks as mortar and also used to make concrete for sidewalks. It's made by heating limestone and clay to very high temperatures, at least 1,450*C! The high heat removes carbon dioxide from the mixture, making a powder. You can then buy a bag of cement and mix it with water when you're ready to use it.
  - Scientists believe that they'll be able to make cement glow by adding chemicals while the mixture is hot. Think about the toy frogs we saw in the first video; they glowed because certain chemicals were added to their toy molds.
  - There are some problems with phosphorescent cement though. Any additive makes cement less sturdy, so scientists need to find the perfect ratio of chemical to cement. Some believe the best way to

create a glowing sidewalk will be by just only placing the phosphorescent cement as the top layer of sidewalks.

- Stop and check students understanding throughout.

Slide Ten:

Anticipation Guide

Before (Yes/No)	**Question**	**After Reading** (Yes/No)
	Phosphorescence occurs when materials absorb light and then glow in the dark.	Yes
	Scientists have created glow-in-the-dark pathways which use electricity to glow.	No
	Chemicals can be added to materials to make them glow-in-the-dark.	Yes

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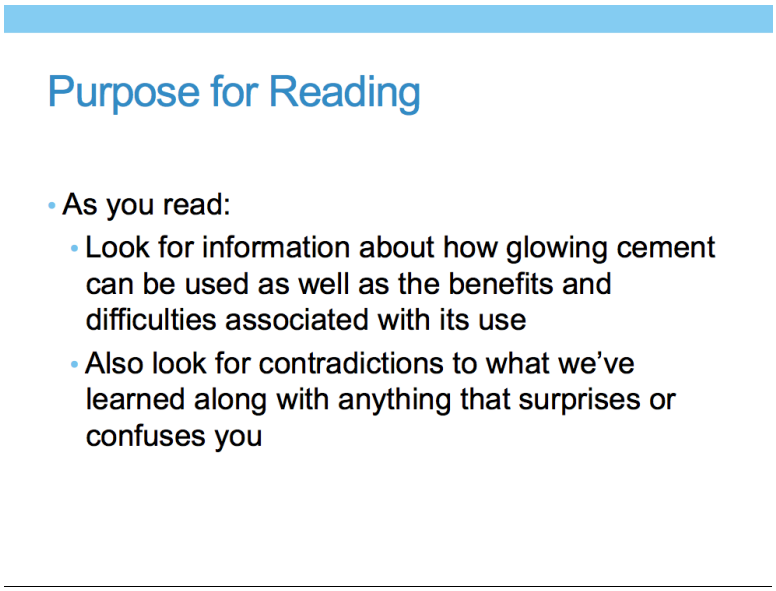
Teacher:

- Ask students to review anticipation guide, take a few minutes to change answers and make comments.
- Ask students if they have any questions about what has been discussed so far.
- Review answers from the anticipation guide.
    - Phosphorescence does occur when materials absorb the energy from light and the glow in the dark.
    - Scientists have created glow-in-the-dark pathways, but they do NOT require any additional electricity. They glow after exposure to light.
    - Chemicals can be added to a variety of materials to make them glow-in-the-dark, ranging from toys to building materials.
- Can elicit responses and share this slowly.
- Ask students to share disagreements or misconceptions.
- Correct understandings before reading.

Slide Eleven:



Teacher:

- Explain to students their purpose for reading:
  - To look for examples that demonstrate what we discussed about how glowing cement can be used as well as the benefits and difficulties associated with its use
  - To look for contradictory information or things which do not make sense.
- Discuss what a contradiction is and why this might occur. Provide an example to students. For example, if they read that phosphorescent paths required electrical wiring, this would contradict what we learned about the paths glowing on their own.
- Show graphic organizer and review how to complete.

Part B: During Reading:

Teacher:

- Pass out articles.
  - Make sure that students get the correct article. Students must always read the same level of text.
- Circulate and answer questions that students have while reading.

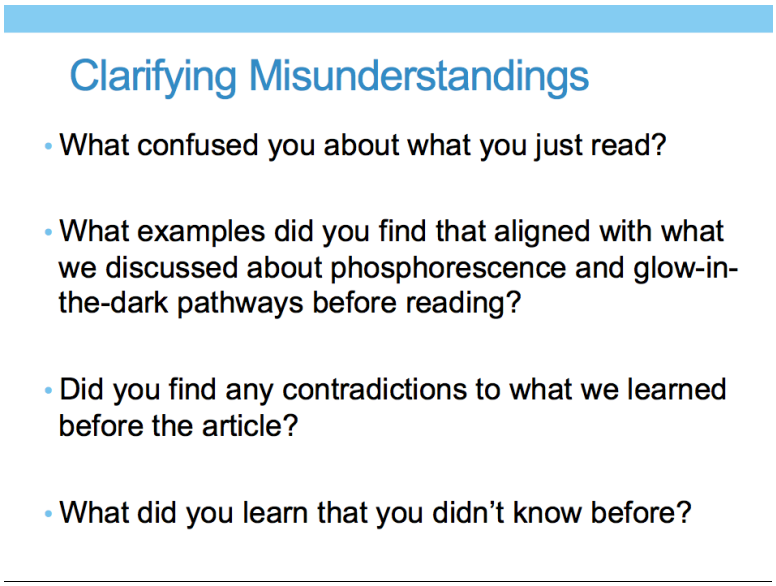
When all students are finished reading, the teacher continue the lesson.

Part C: After Reading Discussion to Clarify Misunderstandings

When all students are finished reading, the teacher begins the post-reading discussion. The following discussion will have two parts.

The first will emphasize the knowledge they learned and had and how this matched up the article and clarify any misunderstandings. It is also appropriate for you to share any misunderstandings that you experienced while reading and demonstrate for students how you overcame these misunderstandings.

Slide Twelve:



Part One, Clarifying Misconceptions and Knowledge:

- What did you not understand about what you have just read?
- What examples did you find that demonstrated the knowledge we discussed about phosphorescence and glow-in-the-dark pathways before reading?
- What contradictions did you find? (Review what a contradiction is)
- What did you learn that you didn't know before?

Part D: After Reading Discussion to Analyze Content

The second part will use guiding questions to prompt students' thinking about the article and to help students incorporate knowledge from the lecture into knowledge acquired while reading. The teacher may ask follow up questions. It is important that the teacher correct any misunderstandings that students may have when students provide incorrect answers. When students provide incomplete answers the teacher should prompt students for more information.

Part Two- Furthering Knowledge:

- How does phosphorescence make something glow?
- Where have scientists created phosphorescent materials?
- How close are scientists to making glow-in-the-dark cement?
- What are some of the advantages of this technology? What are some of the disadvantages?

The teacher should ask follow up questions as necessary to help students process the article and clear up misunderstandings and misconceptions.

Part E: Title Writing and Multiple Choice Questions

Teacher:

- Tell students they will take a short quiz to gauge their understanding of the texts.
- Following the quiz, students will write a title.
- Before students begin, review title-writing procedures (must be a sentence, must have a subject and verb, must include main idea).
- Review examples/non examples.

Students answer multiple choice questions and write a title for the article. After collecting the quizzes, the teacher shares with the class the article titles and answers to the quizzes:

D- Scientists see the light: It comes from cement

F- A brilliant idea: Cement that glows in the dark

Quiz answers: 1- D, 2- B

Lesson 16 Student Handout

A. Anticipation Guide:

Before (Yes/No)	**Question**	**After** (Yes/No)
	Phosphorescence occurs when materials absorb light and then glow in the dark.	
	Scientists have created glow-in-the-dark pathways that use electricity to glow.	
	Chemicals can be added to materials to make them glow.	

B. Video 1: *Fantastic Phosphorescence*

Question	**Your Response**
What makes phosphorescent materials unique?	
How are phosphorescent materials made?	
What is one of the difficulties associated with man-made phosphorescence?	

C. Video 2: *Glow-in-the-dark Bike Path in the Netherlands*

Question	**Your Response**
Describe the bike path.	
How long does the bike path glow?	
What happens if it's cloudy or raining all day?	
Do you think this technology could be used in the United States? Here in Charlottesville?	

D. Cement 101:

Question	***Your Ideas***	***Notes***
How is cement made?		
How can it glow?		
What are some possible problems with glowing cement?		

E. Notes While Reading:

Examples that demonstrate what you learned about cement	**Examples that contradict what you learned about cement**	**Information that doesn't make sense or contradicts something you thought before this lesson**

Appendix B

KWL Lesson Implementation Checklist and Notes

Teacher: _____ Period: _____ Date: _____
# of Students present: _____ Lesson title and # _____
Time lesson began: _____ and ended: _____ Observer: _____

Lesson components	Yes/No	Notes
1. Did the teacher use the correct articles?		
2. Did the teacher use all the materials associated with the lesson?		
3. Was the entire lesson implemented?		
4. Did the teacher implement the K portion of the lesson using class discussion and sufficiently activate knowledge for the articles? **Time spent on K portion of lesson: _____**		
5. Did the teacher implement the W portion of the lesson and sufficiently engage students to ask questions about what they wanted to learn? **Time spent on W portion of the lesson**: _____		
6. Did the teacher sufficiently help students set a purpose for reading using the questions in the W column of chart?		
7. Were students provided adequate time to read the article? **Time spent reading: ____**		
8. Was the teacher responsive to students' questions during reading?		
9. Did the teacher engage students after reading to encourage students to reflect on what they learned? **Time spent on after reading discussion: _____**		
10. Were students provided adequate time to answer comprehension questions and write a title? **Time spent assessment: _____**		

Total Fidelity Score: _____/10

LRD Lesson Implementation Checklist and Notes

Teacher: _____ Period: _____ Date: _____
# of Students present: _____ Lesson title and # _____
Time lesson began: _____ and ended: _____ Observer: _____

Lesson components	Yes/No	Notes
1. Did the teacher use the correct articles?		
2. Did the teacher use all the materials associated with the lesson?		
3. Was the entire lesson implemented?		
4. Did the teacher provide interactive activities to build background knowledge before reading? **Time spent on L portion of the lesson: ____**		
5. Did the teacher provide an opportunity for students to demonstrate that they learned the knowledge and ask questions to clarify information before reading?		
6. Did the teacher explicitly set a purpose for reading before students read?		
7. Were students provided adequate time to read the article? **Time spent reading: _____**		
8. Was the teacher responsive to students' questions during reading?		
9. Did the teacher engage students in a discussion after reading to help students clarify misunderstandings and		

analyze and understand the text by integrating knowledge? **Time spent on after reading portion of lesson: _____**		
10. Were students provided adequate time to answer comprehension questions and write a title? **Time spent assessment: _____**		

Total Fidelity Score: _____/10

Appendix C

Log for Teachers

Teacher: _____ Class Period_____
Number of Students enrolled in the class: _____
Comprehension Strategies (circle one): LRD KWL

Date	**Lesson #**	**Minutes Spent on Lesson**	**Names of absent students**	**Lesson successfully implemented (Yes or No)**	**Notes about implementation (if you answered no in previous column, please explain why).**
8/1/16	*Example*	*47*	*Jane Doe César Chavez*	*Yes*	*Fire drill occurred during the lesson but we were able to complete lesson upon return*
	1				
	2				
	3				
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	23				
	24				

Appendix D

Sample Quiz

Lesson 16 Cement Quiz

Name: _____ Teacher: _____ Date: _____

Which text did you read? (circle one) E C

Part 1: Comprehension Quiz

1) According to the article, how does phosphorescent cement glow at night?
    a. It changes the color and brightness of the materials that make the cement
    b. It is covered with a special phosphorescent paint that glows at night
    c. It uses dense crystals that allow light to enter into the cement
    d. It absorbs light from the sun during the day and releases it during the night

2) Why is glowing cement an important invention?
    a. It can be used to make sidewalks works of art
    b. It is practical, inexpensive, and can glow on its own
    c. It uses chemicals that are rarely used
    d. It can only be used to light bike paths, especially in sunny locations

Appendix E

Codebook

Code Name	Description	Examples	Non-Example
		Questions	
Asking Questions	*Subcodes:* 1. Fact-Based Questions 2. Open-ended Questions 3. Text-Based Questions: Participant asks a question that requires use of the text to answer	1. How long can it take for symptoms to appear? 2. What were some things that we learned in the article? 3. Lisa asks students, "In the article what two things were breeding?"	
		Exploratory Talk	
Discussing the Text	Participant discusses facts from the text	Kate says that the article stated that a Blue Tang fish would need an 180 gallon tank.	Facts from another text not used in this lesson
Supporting Vocabulary	*Subcodes:* 1. Eliciting Definitions: Participant asks for a definition of a word. 2. Sharing Definitions: Participant provides a definition for a vocabulary word	1. Lisa asks students what fission is. 2. Teacher shows slide with word nuclear, definition, and explains the root nuc, with a few example words that students may know, such as nucleus, explaining that the atomic bomb has a nucleus, which is the charged atom at the heart of it.	
Making Connections to Other Texts	Participant makes connections to other texts	Jessica brings up that she read the book The boy in striped pajamas. Kate suggests that they read this book as a class because she loved this book and it ties into this lesson (while reading an article about the Holocaust).	
Sharing Opinions	Participants shares their opinion about a topic	Alfonso says that no one should be allowed to have a gun.	
Sharing Stories	Participant shares a story related to the topic	Alfonso shares a story with his partner about someone with Ebola and says it's a true story	

Speculating	Student speculates about something	Students then speculate how the person (in the famous Hiroshima shadow) died, such as Alex who thinks that the man melted.	
Making Analogies	Participant uses an analogy to explain a concept related to the lesson	Teacher: That's pretty fast, right? When you put it in terms of that. When you're running your mile in gym, think about ... Wow, the entire area completely wiped out in that time. (relating to how fast Hiroshima was wiped out by the atomic bomb)	
Knowledge Related Talk			
Sharing Background Knowledge	Participant brings up non-text related factual background knowledge	Alfonso explains an experiment he performed in another class, explaining how paper is affected by the sun and fades, something he learned in a previous class.	Facts from the lesson Yes or no responses
Sharing New Knowledge	Participant brings up facts from the lesson (video, PowerPoint, etc.)	Brock: basically the people who aren't being treated who don't know they have it yet and they are going to other countries and it's spreading worldwide. (after watching video)	Participant discusses facts from background knowledge
Sharing Irrelevant Knowledge	Participant shares knowledge that is irrelevant to the topic	Billy: Do you turn into a Zombie (if you get Ebola)?	Participant shares knowledge that is not true
Sharing Incorrect Knowledge	Participant shares knowledge that is incorrect	Elena shouts out that (Ebola) makes your eyes bleed.	Participant shares knowledge that is true but related to the topic

All excerpts will also be coded for:
Teacher or student initiated
Lesson Segment (Before, During After)
Student Subgroups: English language proficiency status, disability status, reading ability

Appendix F

Observation Protocol

Teacher: _____ Date: _____ Time: _____
School: _____ Select One: KWL LRD

Class list: (*please cross out all absent students and attach or include a diagram of the seating chart)*

Summary: *(complete after reviewing notes, include key concepts observed)*

Initial Observations or Thoughts:

Lesson Observations:

Post Observation Reflection:

- What needs to be followed up on in subsequent observations?
- What did you notice about reader's comprehension process?
- Are there any issues with text complexity or KWL/LRD?