Why Ask the Question?: A Study of Teacher Questioning During Discussion of Text

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Abstract

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This study examined the effects of professional development in the form of a teacher study group and a particular discussion approach, Collaborative Reasoning (CR) (Anderson, et al., 2001) upon teachers' questioning and students' levels of thinking during discussion of text. The study explored how five middle school teachers achieved a deeper understanding of teachers' authentic questioning and the facilitation of CR discussion. The Formative and Design Experiment (F&DE) framework was used in this investigation. Both qualitative and quantitative data were collected. Teachers coded transcripts of one baseline and four CR discussions for each teacher. Transcripts were coded for teachers' CR instructional moves, CR features incorporated by the students in discussion, and the levels of thinking supporting students' responses. Data indicated that the nature of discussions progressed from recitation to more dialogical discussion patterns. Teachers implemented more authentic questioning, and students were observed to use more higher-order thinking in the responses. Students discourse showed a higher incidence of exploratory talk and uptake. Students used multiple kinds of evidence from personal experience, texts, and knowledge from previous reading/lecture/discussion to support their arguments. The data suggest that the implementation of a specific discussion model may enhance teachers' questioning and encourage students to engage in higher-order thinking and reasoning when discussing text.

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Chapter 1: Introduction to the Study

In the 21st century, literacy skills are necessary for academic achievement as well as a means of sustaining a livelihood in an ever-changing global economy. In today's world children and adults are bombarded by print and imagery that they must constantly process and interpret. Printed text, television, websites, computer screens, games, billboards, —these are the landscape of our current lives. Literacy has come to mean much more than the ability to read; it is now necessary to be able to decode and understand many different types of information, from media-based to visual to technological. Becoming literate is an ongoing learning process in which we use reading, writing, thinking, listening, speaking, analyzing, and evaluating in order to communicate and construct meaning.

A set of learning standards has been developed that aligns the demands of the real world and deep learning that children in the United States would need to thrive in a globally competitive economy. That set of standards entitled The Common Core State Standards (CCSS) is based upon scholarly research, as well as surveys on what skills are required of students entering higher education and workforce training programs. Based on comparisons to standards from "higher-performing' states and nations, the CCSS are validated by assessment data identifying "college- and career-ready performance," National Assessment of Educational Progress (NAEP) frameworks in reading and writing, and the findings from Trends in International Mathematics and Science (TIMSS). To date 45 states and the District of Columbia have voluntarily adopted the Common Core State Standards (Common Core State Standards Initiative, 2012).

The Common Core State Standards (2012) depict a vision of what it means to be a literate person in the twenty-first century. Students are expected to demonstrate wide applicability outside the classroom or workplace. Those who meet the Standards demonstrate attentive reading that supports understanding and enjoyment of complex works of literature. Students who meet the Standards are able to perform the critical reading required to "pick through" the "over abundant" print and digital information available today. They are expected to seek "deep engagement" with literary and informational text, and "reflexively" demonstrate well-argued reasoning and use of evidence that is "essential to both private deliberation and responsible citizenship in a democratic republic" (Common Core State Standards Initiative, English

Language Arts Standards, 2012, p. 1). The nation's teachers are confronting a daunting challenge in helping our children to become literate.

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

The 2011 NAEP Report in Reading Grades Four and Eight

In their 2011 News Release for the National Assessment of Educational Progress (NAEP), the National Assessment Governing Board stated that achievement in reading comprehension scores for 4th and 8th grade students had risen modestly but steadily from 1992 to 2011. Achievement level results showed that students at "fourth- and eighth-grade levels across all income levels posted the highest scores to date" (National Center for Educational Statistics, Nation's Report Card, Reading, p. 1). At grade 4, the average score of 221 (on a scale of 0-500) was no higher than in 2009, but four points higher than in 1992. A majority (67%) of American fourth graders were reported as reading and comprehending at or above the Basic level, 34% at or above Proficient level, and 8% at the Advanced level.

The fourth graders who performed at or above the Basic level (67%) were perceived as being competent at gleaning the overall meaning of what they read from developmentally appropriate literary and informational texts, making simple inferences, and using their understanding of text to identify supporting details of a given interpretation or conclusion. Those at the Proficient level (34%) were assessed as being able to integrate and interpret texts, apply their understanding of text, draw conclusions, and make evaluations. Further analysis revealed that the fourth graders who were assessed at the Advanced level (8%) were able to "judge texts critically . . . explain their judgments . . . make generalizations about the point of a story and extend its meaning by integrating personal experiences and other readings" (NCES: National Assessment Governing Board, 2011, p. 29). Additional information provided by the NAEP dealt with the "reading for fun" habits of 4th graders. It was reported that 38% of the 4th graders who scored in the 25th percentile read for fun as compared to 60% of those who scored above the 75th percentile.

Eighth-grade students who participated in the 2011 NAEP Assessment achieved an average score of 265 which was 1 point higher than the 2009 scores and 5 points higher than the 1992 results. Achievement level results for eighth graders showed that the percentage of students at or above Basic (76%) was higher than in 2009 and 1992. Student performance at the Proficient level (34%) was higher in 2011 than in 2009 or 1992. Those students scoring at the Advanced

level (3%) remained the same as 2009 and 1992. The eighth graders performing at or above the Basic level (76%) were able to locate information, identify main idea, theme, author's purpose, and make simple inferences from text. They were successful at interpreting words in context, state judgments, and give support about "content and presentation." Students at the Proficient level (34%) were expected to provide relevant information and summarize main ideas and themes, as well as make and support inferences about a text, connect parts of a text and analyze text features. They were also expected to "fully" substantiate judgments about content and give support. Students who scored at the Advanced level (3%) were assumed to be able to make connections across text to explain causal relations. They were expected to evaluate and justify the strength of their supporting evidence and the quality of an author's work. Students were also expected to state, explain, and justify their analyses and evaluations of text.

Additional data about the 2011 outcomes of the NAEP were not explicit in the News Release, nor were they mentioned in the text accompanying the various graphs in the National Report Card. To glean this data, the reader has to look closely at the graphics and interpret data that is not specifically addressed in the narrative. First, with 67% of fourth graders scoring at or above the Basic level, it bares mentioning that approximately 33% scored below Basic level. Of the eighth graders tested, 75% were at or above the basic level which left 24% of the eighth graders scoring below Basic level. The percentage of fourth graders achieving Advanced level has remained at 8% since 2003, the highest percentage since 1992. For eighth graders, the percentage of students scoring at the Advanced level has remained at 3% since the first administration of the NAEP in 1992.

As I read the 2011 Nation's Reading Report Card several questions came to mind based on the writings of Allington (2001) and Murphy et al., (2009). Allington (2001) explained that to acquire the Basic level on the NAEP assessment students had to demonstrate "literal comprehension of grade-appropriate texts" (p.8) while the Proficient level indicated that a student must be able to go beyond the literal meaning of text and draw conclusions, make inferences, and make connections between their prior knowledge and information from the text. Murphy, et al., (2009) argued that comprehending uncomplicated texts such as those represented by the Basic level was "insufficient in light of the increasing need for high-level literacy associated with rapid technological changes in the 21st century" (p. 741). If those students scoring at the Basic level are considered to exhibit "insufficient" strategies for the 21st century,

how would Murphy et al., describe the fate of the 33% of fourth graders and the 24% of eighth graders who did not achieve the Basic level reading competencies?

It was not surprising that students who scored in the 75th percentile (60%) read for fun more than those in the 25th percentile (38%). Of course, there could be many contributing factors to this gap in reading for pleasure in or outside of school. How did the approaches used to teach comprehension strategies or the levels of student engagement during instruction impact the students' willingness to read beyond that which was required?

I found one additional reporting category for eighth graders very applicable to this study, the percentage of class discussions among 8th grade English classes. Information in the NAEP framework stated, "background variables [were] selected to be of topical interest, timely, and directly related to academic achievement…[and] may reflect current trends in the field, such as the use of technology in reading instruction….." (NCES, Reading Framework, p. 47). The NAEP data revealed that the average achievement score for students who reported having discussions "at least once a week" was higher than for those who did so "once or twice a month." The lowest scoring students reported "never or hardly ever" having discussions (10%). The percentage of those students who reported having class discussions at least once a week in 2011 was the highest percentage reported for the previous 5 NAEP test administrations. There was no further explanation offered in the NAEP testing framework in regard to the connection between discussion and students' achievement.

My review of the NAEP report prompted many questions. How would students who scored at the basic and proficient levels meet the Common Core of State Standards or comparable standards adopted by the remaining states in our nation? How could those students meet the critical reading and deeper engagement criteria of those standards? How could teachers prepare students to provide evidence and the well-argued reasoning required of them to be a literate person in the 21st century?

<div align="center">Theoretical Perspective</div>

Defining Critical Reading, Critical Thinking, and Higher-Order Thinking

As Overturf and Shanahan (2012) explain, "The Common Core State Standards stress that "students must learn to engage independently in critical reading, determining what a text says explicitly, making logical inferences, and analyzing a text's craft and structure to determine how those affect the text's meaning and tone, evaluating the effectiveness or value of the text,

and using the information and ideas drawn from texts (often referred to as evidence) as the basis of one's own arguments, presentations, and claims (p.2). Students who possess critical reading skills are able to read "beyond the information given…by asking questions, making hypotheses, seeking evidence, and validating assumptions" (Langer, 1990, p. 815). Reading theorists and researchers recognize a strong relationship between reading comprehension and critical thinking. Readers are believed to consider alternate interpretations in light of prior experience and world knowledge while delaying decisions until further information can be gleaned (Anderson & Pearson, 1984; Norris & Phillips, 1987; Rumelhart, 1980). The resulting decisions reflect a reader's acceptance or rejection of the alternate interpretations presented. Grabe (1991) discloses that cognitive skills employed in reading comprehension include inference, synthesis, analysis, and evaluation. In turn, critical thinking as defined by Ennis (1987) is a "reasonable, reflective process that focuses on deciding what to believe or do" (p.10). Paul and Elder (2004) explain the critical thinking process as "conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from or generated by observation, reflection, experience, communication, or reason" (p.1). Reading comprehension is dependent upon the reader's cognitive skills of inferring, synthesizing, analyzing, and evaluating.

Critical thinking is often interchanged with the terms, *critical literacy* or *higher-order thinking* within reading research literature (Graves, Juel, & Graves, 2001; Murphy et al., 2009). Many educators who share the concern about basic or minimal comprehension skills exhibited by our students have concentrated efforts on teaching critical literacy skills extending beyond decoding of words and determining basic meanings of text (Graves, Juel, & Graves, 2001). Much of the research incorporating the study of critical thinking can be found under the auspices of critical literacy. However, critical literacy is viewed from different perspectives among reading researchers. Some theorists view critical literacy from the perspective of critical theory that is associated with power relations and positioning (Freebody & Luke, 1990; Norris, Lucas, & Prudhoe, 2012). Critical literacy, in this respect, deals with changing traditional roles of the teacher and student to encourage students to share more about their experiences, knowledge, and opinions through speech or writing. Murphy et al., (2009) interpreted critical literacy in relation to "higher-order thinking and critical-reflection on text and discourse" (p. 741). This interpretation of critical literacy befits this research on teacher questioning during the discussion of text in that it encompasses the "reasonable" and "reflective" processes described by Ennis

(1987), and the structures of the critical thinking process (e.g., understanding, applying, analyzing, synthesizing, and/or evaluating) outlined by Paul and Elder (2004).

The terms, critical thinking and higher-order thinking are used interchangeably in this study for two reasons. First, literacy theorists tend to use the term, critical thinking in their research, whereas cognitive theorists use the term, high-order thinking. Since reading comprehension research is comprised of work from both disciplines, both terms appear. Secondly, the teachers participating in the current study were more familiar with the term, higher-order thinking, especially those who taught content areas other than English language arts.

Higher-order Thinking and Teacher Questioning

Thinking is driven by questions. To think through or rethink a task, problem, or issue, one must ask questions that motivate thought. Through questioning one can discover his opinions, pursue appealing aspects of a topic, and obtain evidence to defend his beliefs. Almost every text or research article about teacher questioning and student thinking includes explanations of question types or a hierarchy of question types. One way of classifying teachers' questions is in terms of the epistemic role they provide to students. Teachers' *authentic* questions are those questions that support students in controlling their learning while teachers' questions that give students little control over their learning are known-answer or "prescribed" questions that require only one possible correct answer (Applebee, Langer, Nystrand, & Gamoran, 2003; Nystrand, 1997).

Another key feature of teacher questions that fosters more student control of their thinking is *uptake*, which is defined as a question or statement a speaker uses that is based on what another person has said previously in the conversation (Collins, 1982; Cazden, 2001). Teacher questions that incorporate ideas from recent student responses during discussions provide opportunities for students to build on other students' contributions. Authentic questions incorporated with appropriate uptake are more likely to elicit higher-level cognitive processes (Nystrand, 2003). A study conducted in 2003 by Applebee and his colleagues confirmed the role of authentic questions and uptake, in combination with discussion-based approaches, as contributors to increased student learning.

Talking and Thinking

Talk as a tool to develop thinking has long been established (Vygotsky, 1978). Talk enables children to be initiated into the knowledge of their existing culture and provides the opportunity to generate new understanding (Alexander, 2004; Edwards and Mercer, 1987). A theoretical case for talking about text is supported by numerous studies (Almasi, 1995; Beck et al., 1997; Norman, 1992; Nystrand, Wu, Gamoran, Zeisner, & Long, 2003; Rosenshine & Meister, 1984). Research is revealing the relevance of discussion to promote comprehension and higher-order thinking skills (Kamil, Borman, Dole, Kral, Salinger, & Torgeson, 2008). Kamil et al., emphasize that "good discussions give students opportunities to identify specific text material that supports their position and to listen as other students do the same" (p 22). Collaborative talk allows students to internalize thinking processes as they express their points of view and listen to those of others.

The use of collaborative dialogue during reading comprehension lessons is positively associated with students' increased knowledge and comprehension (Brown et al., 1993). Multiple discussion approaches have been developed that acknowledge reading comprehension as a collaborative process (Beck, McKeown, Hamilton, & Kucan, 1997; Chinn & Anderson, 1998; Brown & Palinscar, 1984). The common attributes of these approaches are that teachers model interactions with a focus on supporting students' discourse and thinking processes as the students learn to lead dialogue and become independent readers (Wolf, Crossnon, & Resnick, 2005). In his socio-cultural studies exploring children's talk, Mercer (2007) identifies different modes of dialogue. He describes *exploratory* talk as a state where *interthinking* between speakers is apparent and ideas are co-constructed between two or more speakers.

Built on the work of Barnes and Todd (1995), Mercer (2007) describes exploratory talk as "tentative and questioning" as it invites children to surmise meaning and modify their thinking. Wegerif (2011) expounds the theory of exploratory talk in his study of what happens between speakers as they co-construct meaning. He describes a "dialogical space" between speech and response wherein meaning is constructed and re-constructed. In this space between speakers, meanings are provisional and hypothetical as they rely on the response of another speaker for further development of meaning. The ideas of exploratory talk and dialogic space suggest an opportunity for questioning and exploration of meaning fostered by critical thinking.

Statement of the Problem

In her book, *Controversy in the Classroom: The Democratic Power of Discussion,* Hess (2009) contends that the teaching of discussion skills is essential for living in a democratic society. She believes that teachers should teach <u>for</u> and <u>with</u> discussion. Teachers who teach <u>for discussion</u> help students learn how to engage in discussion about authentic problems as they provide direct instruction and coaching in how to interact with others. They teach <u>with discussion</u> when they use dialogical discourse as a pedagogical tool to teach content, critical thinking, and communication skills. While teachers use discussion as a tool, they model and label the behaviors, attitudes, and interactions considered to be critical to authentic discussion.

The topic of teacher questioning provides a point of entry into exploring classroom discussion about text. Although research has revealed that discussion about text can be a critical meaning-making event when teachers allow students to process various interpretations, many teachers are uncomfortable with implementing discussion and prefer to default to the familiar teacher to student exchange in which the teacher <u>I</u>nitiates a question, waits for the student <u>R</u>esponse, and then <u>E</u>valuates that response (IRE, Cazden, 2001). These verbal exchanges are related to limited opportunities for developing deeper comprehension of text (Skidmore, Perez-Parent, & Arnfield, 2003; Nystrand, 2006).

Numerous books, journal articles, and professional development initiatives have centered upon the development of effective teacher questioning (Hunkins, 1995; Morgan & Saxton, 1991; Nystrand, et al., 1997; Walsh & Sattes, 2005). In spite of abundant resources, the research involving teacher questioning reveals that teachers are not using effective practices aimed at helping students to develop and refine their thinking (Dantonio & Beisenherz, 2001; Myhill & Dunkin, 2002; Wilson & Smetana, 2009). Studies of teacher questioning behavior conducted over the past four decades demonstrates an overabundance of fact-oriented or recall questions and a reliance upon recitational approaches to discussion throughout language arts and content area instruction (Nystrand, Gamoran, Kachur, & Pendergast, 1997; Nystrand, Gamoran, Zeiser & Long, 2003; Redfield & Rousseau, 1981; Winne, 1979).

The Pilot Study

During the earlier part of my investigation of teacher questioning during discussion, I conducted a pilot study to gain more information about teacher questioning during reading comprehension in the context of small group or whole class discussion. I piloted the study over a

period of four months during the fall and spring semesters of the 2009-10 school years in a PK-5 elementary school located in rural southeastern United States.

Two research questions were formulated for the pilot study:

1. What reasons do three fourth grade teachers and one fifth grade teacher provide in explaining their purposes for asking questions during literature discussion?

2. What types of teacher questioning are evident in literature discussions across three fourth grade teachers and one fifth grade teacher?

A phenomenological framework was used in this qualitative study. Four teachers and 87 students across four classrooms were observed. Teachers and students in each of the classrooms were video recorded during four different discussions for a total of 16 sessions. Each teacher participated in video-stimulated recall of her respective classroom discussions. Transcripts of the video-stimulated recall sessions were prepared by the researcher and member checked by each teacher. The researcher coded the question events and corresponding recalls of the teachers using an adapted coding matrix (Kucan, 2007) to compile the data.

The pilot study yielded both positive and negative results that prompted changes to be made in the full-scale study. In addition to some logistical problems that arose, after compiling the data, I realized that an overwhelming majority of the discussion was comprehension strategy instruction resembling the IRE pattern. Teachers dominated the discussion, asked the questions – many to which they already knew the answers. Teachers decided who would speak and in most situations lead the students to a restatement of the teachers' interpretation of the text. Authentic discussion (Applebee, 1996; Nystrand, 2006; Nystrand, et al., 2003) for the most part did not exist. A more detailed account of the pilot study is provided in Chapter 3.

The Revised Research Questions

Results revealed in the pilot study impelled further examination of the literature, and a change in the goal of my research. I had hoped that the pilot study would reveal teacher questioning that elicited deeper thinking that more resembled those of critical or higher-order thinking required in critical reading. The outcomes of the pilot study showed a preponderance of students' lower-order thinking (retrieving, relating, explaining, inferring, and predicting). On the other hand, limited higher-order thinking (analyzing, evaluating, or creating) was evident in the student responses. The results of the pilot study led to many questions. Why were there limited teacher questions that elicited the thinking associated with the deeper, higher-order thinking

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required for critical reading? Was there a relationship between the types of discussion mostly used in the teachers' practice? Was there a discussion method that would enable teachers' higher-order thinking questioning? It was obvious to the researcher that further study was needed and that it would be necessary to revise the research questions to include an intervention. The revised research questions for this investigation were as follows.

- How will professional development in the form of a teacher study group impact the nature of discussions held in five classrooms?
- How will a specific model of discussion affect teacher questioning to elicit higher-order thinking during discussion?
- How will professional development in the form of a teacher study group affect the quality of teacher questioning during discussion?

Chapter 2: A Review of the Literature

This chapter is a review of literature that supports the connectivity between reading comprehension, teachers' questioning, and discussion. The first section is organized as a history that weaves descriptions of prominent learning and reading theories, research, and instructional approaches that influenced reading comprehension over the past five decades. The second section of this review describes a current view of reading comprehension within the context of dialogical discussion. The third section relates the research about teachers' questioning within reading comprehension. The last section of this chapter describes a particular structure of professional development as a means to promote a collaborative culture and collective knowledge among teachers which may ensure valuable research into classroom practice.

As my review of the research progressed, there were certain research studies which served as lenses through which I could view the progression or classroom practice of that time. These pivotal studies were essential to my research and in many cases they were studies which represented major movements or paradigms within the reading research community. The pivotal studies served as the anchors for the explanations of learning and reading theory, supporting constructs, and instructional approaches which remain prevalent today.

This literature review served two purposes during this research study. First, it provided a synthesis of the theory and research that served as background for the readers of this study. Secondly, this review served as a reference for the researcher in regard to reading comprehension instruction and the underlying paradigms she encountered within the instructional practice of the participating teachers.

Reading Comprehension Instruction Emerges

Comprehension of text is something that can only be observed indirectly. When a teacher wants to know if a reader has "understood" a text, she has to rely on quizzing them on the major details, asking questions, requiring an interpretation, or persisting on a critique of the information derived from the text (Pearson, 2009). Prior to the late 1970s, explicit comprehension text instruction was seldom taught in the context of formal reading instruction (National Reading Panel, 2000). It is difficult to pinpoint exactly when the research to intentionally design approaches to improve the comprehension of text began. Pearson and Fielding (1991) site several possible sources that could have begun this tradition including the publishing of Pearson and Johnson's book, *Teaching Reading Comprehension* (1978), the 1981 publication of the Santa and

Hayes monograph for the International Reading Association, *Children's Prose Comprehension: Research and Practice* (Levin & Pressley)*,* or Durkin's (1979) article in *Reading Research Quarterly* about the lack of reading comprehension instruction in classrooms. The following description of Durkin's highly cited observational studies of reading instruction in grade 4 provided insight into comprehension instruction at that time.

A Pivotal Study: "What Classroom Observations Reveal about Reading Comprehension"

Durkin (1979) conducted observational studies to investigate whether or not elementary schools provided comprehension instruction. Her investigation involved three sub-studies; the first in which Durkin and her two assistants observed 24 fourth grade teachers for a total of 4,469 minutes during reading instruction and 2,775 minutes of social studies instruction. She and her co-workers found that less than 9% (28 minutes) went to comprehension instruction whereas 17.65% of the time was devoted to comprehension assessment during the reading instruction periods. During the social studies periods, it was revealed that no comprehension instruction was observed, yet 1.73% of the time was recorded as comprehension: preparation for reading. Questions posed for assessment purposes were more common as reflected in 8.25% which Durkin described as questions focused on facts.

The second sub-study focused on three schools, grades 3-6, and 12 teachers. This study was done to determine whether attention to reading comprehension varied from school to school. Reading, social studies, and science instruction were observed for a total of 2,174 minutes in reading, and 1,119 minutes for social studies and science. Durkin revealed that two schools gave no time to comprehension instruction while the third school spent a total of four minutes of instruction that occurred in a fourth grade classroom on two different days. She noted that the procedures used were "shallow" and generally focused on cloze exercises or on questions that focused on the content of short paragraphs of text or workbook pages. Observations made of social studies instruction revealed no observations of reading comprehension instruction. In three of the twelve classrooms, science was being taught rather than social studies; however, the science observations took place when science time was spent in scientific experiments followed by discussion. These findings were not reported because no reading activities were involved.

The third sub-study examined three individual children to learn whether time was spent on reading comprehension instruction activities during classroom instruction. The participants, one third grade girl, one sixth grade girl, and one boy from a fourth/fifth grade classroom, were

selected arbitrarily from reported average readers. The observers collected their data within a whole class setting without revealing the identity of the targeted students to the teacher. Each child's classroom was visited every three weeks on three successive days during reading or social studies class periods. As a result of the study, Durkin (1979) reported that "very little reading" occurred except to complete written assignments in both content areas. As in the previous sub-studies, comprehension assessment occupied the larger portion of reading and social studies instruction while insignificant time was spent in comprehension instruction.

In summary, Durkin presented a disquieting report in her major findings of this research. She pointed out that "practically no comprehension instruction was seen" (p. 520) and comprehension assessment was conducted through interrogation and teachers' responses of right or wrong. The emphases of teachers' reading instruction, according to Durkin, were in the areas of phonics, structural analysis, or word meanings. She commented that a large part of the observable instruction was spent on giving, completing, and checking assignments, while a considerable amount of time was spent in transition and non-transition type activities. Coverage of content and memorization of facts appeared to be the major foci of social studies instruction.

Durkin observed that there was nothing in the instruction that could help students master comprehension skills directly, nor how, when, or why they should apply the skills. Instead teachers were said to have been "mentioning" the skills students were supposed to be applying and practicing comprehension skills on workbook pages. Durkin recognized several limitations of her overall study; nevertheless, she emphasized that her experience as a consultant in varied locations supported her contention that the sites of her research study were indicative of classrooms across the country. This research raised three serious questions:

- Was reading comprehension teachable?
- How did good readers learn to comprehend text?
- How could teachers instruct poorer readers to better comprehend text?

Contributing Reading Theory of the 1970s

Behaviorism and skills-based learning. With the influence of behavioristic theory in educational research and practice, the act of reading was considered to be conditioned behavior, and therefore susceptible to programming (Alexander & Fox, 2004). Philosophical grounds for this view of reading were attributed to David Hume (1777/1963) and his stance that knowledge was a result of habituated association. Researchers identified desired behaviors and determined

what training might produce those behaviors within readers. These reading behaviors were interpreted as *skills.* These skills, as used in the field of psychology, referred to routine habits and activities that were less mindful and more automatic (Afflerbach, Pearson, & Paris, 2008).

Clymer (1968) stressed the differentiation among processes required to read, the skills and abilities required in reading, and the procedures to teach reading. Clymer's synthesis of definitions and models at that time listed four goals of reading programs: (1) decoding, (2) determining the author's meaning or literal interpretation, (3) "testing" and "recombining" the author's message with the reader's understanding and "background", and (4) the reader's application of ideas and values to his decisions, actions, and new settings. Also prevalent during this time was the emphasis on detailed skill taxonomies (e.g., Robinson, 1968) embedded within specialized instructional methods of reading. The combination of skill taxonomies and the principles of behavioristic learning provided an instructional design for two general methods of teaching reading skills, *self-instruction* (also referred to as programmed instruction) and *direct instruction*.

Early Reading Comprehension Models of Instruction

Self-instruction. The hallmark of self-instruction was the immediate feedback provided to the learner by using individualized units. Programmed instruction was derived from the principles of stimulus-response theory popularized by Skinner (1954) in which learning was believed to be the result of shaping student behavior by providing reinforcement during a stimulus-response cycle. The hallmark of programmed instruction was the immediate feedback provided to the learner by using individualized self-instruction. Material to be learned was broken into discrete, sequential steps (Smith, 1965). An example of one of the better known individualized programs of reading was Individually Guided Education (IGE) which provided a framework for organizing instruction that emphasized five components: (1) identifying essential skills, (2) stating the objectives, (3) examining individual skill development, (4) identifying and implementing appropriate teaching/learning activities, and (5) evaluating the results. Essential reading skills were outlined in a scope and sequence array. The skills were grouped into six main areas: word attack skills, study skills, comprehension skills, self-directed reading skills, interpretive reading skills, and creative reading skills. As in the word attack and study skills areas, the comprehension skills units contained a behavioral objective that prescribed "the behavior necessary to demonstrate mastery of the skill" (Paris, Wixson, & Palinscar, 1986, p.

97). Assessment of students' progress consisted of pretesting and post-testing with criterion-referenced tests for each objective.

Also known as skill-management systems, advocates believed that sequentially organized objectives and continuous monitoring of students' skill development enabled teachers to focus instruction on specific needs of individual students (Otto, Wolf, Eldridge, 1984). The management components of the programs included guidelines for teacher planning, grouping the students, organizing schedules, and record keeping. Kamm (1978) conducted a study among 80 K-6 schools that implemented an objective-based program of reading instruction entitled the Wisconsin Design for Reading Skill Development (Design) which was built on the principles of IGE. Kamm reported that after a 5-year program of Design implementation, fourth and sixth grade students scored above the norm and the median percentiles as evidenced by a standardized, norm-referenced test administered at the beginning and end of the program. However, no comparison was made with an alternative approach or control group in this study.

Direct instruction. The term "direct instruction" emerged from the Direct Instruction System of Teaching and Remediation (DISTAR) developed by Becker and Engelmann for disadvantaged students (Becker & Gersten, 1982) and from studies of teacher effects (Anderson, Evertson, & Brophy, 1979; Rosenshine, 1979). Students' incorrect responses were addressed as the teacher levied negative feedback and repetition of the stimulus until the students gave the correct responses. Students' correct responses were reinforced through positive feedback and repetition. Reading was conceptualized as a list of skills on which students were tested, and reinforced in accordance with their progress until each skill was mastered. Skills approaches like direct instruction provided scripted formats for content and presentation of skills. Accountability for mastery was emphasized as teachers and students strove for mastery of skills listed in scope and sequence charts. Although these skills included important cognitive components of reading, there was little emphasis on how students could learn to regulate their thinking about text (Paris, Wixson, & Palinscar, 1986).

A fundamental tenet of direct instruction was to make the strategy overt and observable by demonstrating, explaining, and modeling it. Direct instruction included sequenced steps of instruction through the use of scripts. The direct instruction advocated by Rosenshine and Stevens (1984) had three classic characteristics: (1) demonstration, (2) guided practice with feedback, and (3) independent practice with feedback. Once teachers explained and modeled the

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strategies, students participated in designated error correction procedures. Teachers' support gradually faded during monitored practice.

Reading Comprehension Strategies Instruction Emerges

The response to Durkin's 1979 studies was a widespread application of principles of direct instruction. In one study conducted by Adams, Carnine, and Gersten (1982), students were taught six steps to extract and remember information from content area texts. The researchers reported significantly higher comprehension test scores compared to a group of students who were instructed to read the text and received only corrective feedback for their answers. Another study (Patching, Kameenui, Carnine, Gersten, and Colvin, 1983) taught fifth graders rules to detect false generalization, false causality, and invalid testimony in critical reading. Post-test results were compared to one group who completed workbook pages and another group receiving corrective feedback from a teacher. The group receiving Direct Instruction scored significantly higher than students in the other two groups.

A major criticism of the aforementioned instructional models in respect to comprehension was that students were taught skills, but they were not informed about the usefulness of the particular activities in other contexts. The self-instruction and direct instruction models did not emphasize student's understanding of how the skills they were practicing helped them to understand the meaning within text. This traditional "blind training" failed to establish lasting strategies that readers could transfer to other contexts (Brown, Bransford, Ferrara, & Campione, 1983). Researchers soon began to realize the importance of the reader's cognitive awareness and self-regulation that should accompany skills instruction.

A Pivotal Study: "Reciprocal Teaching of Comprehension-fostering and Monitoring Activities"

In their review of traditional reading education literature and the teaching of explicit comprehension skills, Palinscar and Brown (1984) identified four concrete activities that learners could employ to foster comprehension of text. These were: *summarizing* (self-review)*, questioning, clarifying,* and *predicting.* Summarizing text required the students to identify and integrate the most important information in the text. Questioning required students to generate questions based on the main ideas or significant information of the text. Questioning also involved self-testing in which the students had to be able to answer their own questions thereby checking "on the state" of their individual understanding. Clarifying required students to

critically evaluate what they read. The students' attention was centered on what could cause the text to be difficult to understand (e.g., new vocabulary, ambiguous words, or difficult concepts). The fourth activity, predicting, called for students to hypothesize what an author would write next in the text. To be successful in their predictions, the students had to activate their prior knowledge relevant to the topic, and read for the purpose of confirming or disproving their hypothesis. Predicting allotted the opportunity for students to link prior knowledge to new information gleaned from the text. Predicting also facilitated text structure (e.g., headings and subheadings) as a means of anticipating what might occur next in the text.

Palinscar and Brown (1984) set out to design an intervention that would mimic naturally guided learning interactions wherein the teacher would model comprehension-fostering activities while simultaneously guiding the student to participate at an increasing level of competence. The researchers embedded the four activities of summarizing, questioning, clarifying, and predicting in the context of a dialogue between students and the teacher during actual reading tasks. Their intervention, *reciprocal teaching,* was a procedure in which the teacher and student took turns leading a dialogue centered upon sections of text. The authors noted that reciprocal teaching differed from the reciprocal questioning intervention used by Manzo (1969) in that in addition to questioning, the teacher and students generated summaries, predicted, and clarified complex sections of text.

The reciprocal teaching procedure entailed the following steps:

- An adult teacher, working with an individual student, assigned a segment of text to be read. The teacher indicated whether the teacher or students would "teach" the segment.
- The segment was read silently.
- After the text was read, a student assigned as the "teacher" asked a question, summarized the content, discussed or clarified any difficulties, and made a prediction about future content.

During their pilot study, Palinscar and Brown noted that the students had "great difficulty assuming the role of dialogic leader when their turn came" (p. 125). The teacher had to assume a greater role in modeling and facilitating by constructing paraphrases and questions for the students. The students gradually assumed the role of dialogic leader at the end of ten sessions. As

the sessions progressed students' questions became clearer and their summary statements captured main ideas of the text.

Following the pilot study, two studies were conducted implementing the reciprocal teaching intervention model. Study 1 included a group of six students who received reciprocal teaching intervention compared to a group of six who received a *locating information* intervention, a control group of six who received no intervention, but took daily assessment tests *(text only group)*, and a group of six who received pretests *(baseline group)* and posttests *(control group).* The baseline and control groups received their normal classroom instruction. The first author served as the teacher of the reciprocal teaching group. The six participating students were assigned to three groups of two who met each day with the teacher/researcher. Throughout the intervention the teacher provided specific praise and feedback to students' participation (e.g., "Excellent prediction! Let's see if you're right."). Students were told that these activities were general strategies to help them read, and they were encouraged to use the strategies when they read silently.

The *locating information* group participated in locating information in text as test taking strategies. With the teacher as demonstrator, the students were shown where in the text an answer to a text-specific question might be found. The teacher demonstrated how to answer a text-implicit question by combining information across segments of text and how to use prior knowledge to answer script-implicit questions. After reading assessment questions independently, the teacher and student answered questions together from the text. Once the student responded, the teacher praised a correct response and if the response was incorrect the teacher pointed out where in the text the correct answer could be found. The answers to questions were mutually agreed upon by the teacher and the student.

In Study 1, the transcriptions of all dialogues of the reciprocal teaching groups revealed that early sessions contained students' unclear questions and overly detailed summaries whereas later sessions were dominated by main idea questions (an increase from 54% to 70%) and main idea summaries (an increase from 52% to 85%). The authors reported that over time the students began to form inventive questions using their own words as opposed to selective questions which would have been taken verbatim from the text. In addition to the students' increased participation in the reciprocal teaching sessions, the students improved on their daily assessment passages. Five of the six students achieved 70% to 80% correct, comparable to accuracy attained by the

average comprehenders in the control group. The one student who did not reach the "normal level" improved from 10% to 50%. All students maintained their respective levels for at least eight weeks.

Palinscar and Brown's (1984) second full-scale study replicated the pilot investigation and Study 1 with the exceptions that "real" teachers trained their existing student reading groups. Though similar improvement in the quality of the dialogue during reciprocal teaching was noted, the results were less significant. Unclear or incomplete questions decreased from 20% to 4% and main idea questions increased from 57% to 70% across the sessions. Main idea summaries increased from 68% to 85%. The authors attributed these "less than dramatic" effects of the intervention (as compared to the previous studies) to the teachers' tendencies to call upon the "better students" in the initial sessions and gradually introducing the "poorer" readers into the dialogue. This resulted in a group level of student response that was higher initially than in the previous studies, thus masking individual student learning. An advantage of the larger group setting was that students were able to provide modeling and feedback for each other. As the sessions progressed, the teachers were able to relinquish some of the work to students and serve as coaches to others.

In summary, Palinscar and Brown (1984) attributed the success of the reciprocal teaching intervention to the particular strategies trained, to the reciprocal procedure, or to a combination of the two. The instruction provided involved extensive modeling and practice. In contrast to typical training studies that entailed only one training session, the reciprocal teaching sessions involved 20 days of lessons that continued over a four-week period. Perhaps one of the prime factors for the success of the reciprocal teaching intervention was the method itself. The method involved modeled comprehension-fostering and comprehension-monitoring activities that good readers execute covertly. Reciprocal teaching provided the teacher an opportunity to engage in comprehension activities while modeling her thinking overtly. "The teacher did not instruct students and then leave them to work unaided; she entered into an interaction where the students and the teacher were mutually responsible for the task done" (p. 169). Another factor contributing to the success of reciprocal teaching was the sensitivity to individual student's progress or *on-line diagnosis* required of the teacher as students participated in the discussion.

Contributing Learning Theory: Cognitive Learning

By the mid-1970s a theoretical transformation was beginning to occur that was centered on the structure and processes of the human mind. Research published between 1976 and 1985 attested to a dominance of the cognitive learning paradigm, specifically the information-processing theory (Anderson, 1977), that was characterized by research about the knowledge organized and stored by the individual mind. The brain was believed to store knowledge through input, interpretation, organization, retention, and output of information gleaned from the individual's environment (Samuels & Kamil, 1984). The emphasis on meaning making as a thinking process attracted theorists and researchers whose work was primarily in cognitive psychology along with those individuals who worked in reading-related fields of English literature, communications, and writing (Alexander & Fox, 2004). This view of learning and the concept of a learner as an active participant and constructor of meaning fostered a text-based view of a reader as one who used various forms of information to make meaning of what was read.

The theory of information processing with its emphasis upon organization, coherence, and connectedness represented learning as the movement of information from short- to long-term memory. This information was referenced and stored in organized ways; therefore, the focus of this cognitive model was centered upon "organization of knowledge" and not "memory of knowledge" (Roehler & Duffy, 1991). Several influential constructs related to the organization of knowledge as it is represented in memory proved essential to the learning process of literacy.

Schema theory. According to schema theorists, knowledge was contained in units called schemata, and packaged with each unit of knowledge was information on how that specific knowledge was to be used (Rumelhart, 1980). Described as the "building blocks of cognition," each schema represented knowledge of a particular concept along with specifications for connecting to other components that relate to that concept.

Schema theory in reading comprehension proposed that as a reader attempted to comprehend incoming information from text, he surveyed his mind for schemata that would help him make sense of the new information. When the reader located appropriate schemata, links were made between the new and old information. As a result of the "linkage" process, the reader was continually updating and changing schemata – a process known as "instantiation"

(Rumelhart & Ortony, 1977). Through the process of instantiation a reader constructed meaning by integrating previously learned personal or *prior* knowledge with perceived ideas from text.

Prior knowledge. Schema theorists (Bransford, 1984; Norris & Phillips, 1994) advanced the understanding of reading comprehension by showing how prior knowledge can enhance a reader's interaction with the text. Anderson and Pearson (1984) found that readers' background knowledge strongly influenced their ability to understand text. Wong (1985) further emphasized the importance of prior or background knowledge when he discovered that even when a reader had background knowledge, comprehension might not occur if the reader did not activate that knowledge. To help readers relate new information encountered in text to the old information stored in prior knowledge, instructional practices involving pre-reading strategies were developed. These pre-organizers, to name a few, included graphic organizers (Alvermann, 1981), previews (Graves, Cooke, & LaBerge, 1983), concept maps (Novak & Gowin, 1984), and thematic organizers (Alvarez, 1983).

Hansen (1981) investigated comprehension among 24 second-grade students by employing an intervention that incorporated prereading experiences that required students to predict events in the upcoming reading. A second intervention was provided in which students were required to answer questions by inferring information from their prior knowledge and the text being read. Following the interventions, the students' in both treatment groups outperformed the two control groups. Standardized test scores for the two treatment groups were also higher, especially for the group receiving practice in answering questions requiring students to infer answers. Free-recalls of a given story passage did not reveal any significant differences between the four groups.

Metacognition. The ability of readers to monitor their comprehension was linked to *metacognition* (Flavell, 1976). Metacognitive awareness consisted of knowledge about ourselves, tasks we face, and the strategies we use (Garner, 1980; Wagoner, 1983). The construct of metacognition was important in comprehension instruction because it called attention to the necessity of readers' understanding of the purposes, tasks, and strategies of reading. Metacognitive strategies were the reader's mental mechanisms aimed at checking, planning, monitoring, testing, revising, and evaluating the strategies that were employed while reading (Baker & Brown; 1984). During the reading process, readers might encounter discrepancies between their schemata and the text. Readers were able to monitor, evaluate, and repair their

comprehension as they noticed the incongruities between schemata and text. They attempted to correct those incongruities by readjusting their reading strategies and schemata to accommodate changes in their understanding of what was read (Paris, Cross, & Lipson, 1984; Baker & Brown, 1984; Garner, 1980, 1987; Markman, 1977).

Instructional Models Supporting Strategy Instruction

Early research in comprehension strategies focused on training students in strategies that served a single purpose with the focus on whether a student could use an individual strategy. However, researchers soon began to study whether the teaching of combinations of different strategies would lead to students' acquisition of metacognitive strategies and improvement of text comprehension. Methods of teaching individual and multiple strategies led to various models of strategies instruction that incorporated varying degrees of explicit teacher-controlled instruction and students' independent use of comprehension strategies.

Direct explanation. Similar to direct instruction, Direct Explanation featured teacher-modeled strategies, guided practice, and feedback, accompanied by gradually released teacher-controlled activities to foster independent student reading (Duffy et al., 1987). Using the model of Direct Explanation, Duffy and his colleagues conducted a study of 20 third-grade teachers and their students in low reading groups. Ten teachers were taught how to make decisions about the "when" and "how" of explaining mental processing associated with reading strategies during six two-hour training sessions. The interventions included one-on-one coaching, collaborative sharing between the teachers, specific feedback regarding observed lessons, and videos of model lessons. The ten remaining teachers served as the control group. Results showed that the treatment teachers were more explicit in their strategy instruction, and their students were more aware of lesson content as well as the need to use strategies when reading. Students of the treatment groups scored better on nontraditional, standardized, and formative measures of reading assessment. The fundamental strengths of Direct Explanation as reported by the researchers were the provisions of (1) explicit information about reasoning that readers used when strategies were employed, and (2) assistance and support given by the teachers.

Reciprocal teaching. As explained in the earlier description of their studies, Palinscar and Brown (1984) identified four activities that aided in comprehension-fostering and comprehension-monitoring activities. These activities in the forms of self-questioning, summarizing, clarifying, and predicting comprised what Palinscar and Brown termed Reciprocal

teaching. Reciprocal teaching provided instruction in four strategies: (1) generating questions from text, (2) summarizing, (3) clarifying portions of text, and (4) predicting upcoming content based on the content and structure of text (Palinscar & Brown, 1984).

Informed Strategies for Learning. Incorporating constructivist principles, Informed Strategies for Learning (ISL) (Paris, Cross, & Lipson, 1984; Paris & Jacobs, 1984) addressed four comprehension processes; planning for reading, identifying meaning, reasoning while reading, and monitoring comprehension. The central tenet of ISL was that students would use strategies in subsequent reading if they perceived such strategies to be sensible and useful. The instructional cycle consisted of three lessons. Lessons 1 and 2 introduced a metaphor, described a strategy, explained how to use it, and provided group practice, feedback, and individual practice. The third lesson was a "bridging" lesson to other curricular areas. Emphasis was on the teacher giving information through explanation and modeling of each prescribed module. The instructional techniques used in ISL addressed three comprehension processes: constructing meaning, monitoring comprehension, and identifying meaning as in making inferences and finding main ideas. The strategies were arranged sequentially and organized in whole-group lessons. ISL focused on scaffolded instruction and student self-monitoring. The teacher required students to select strategies independently as teacher support faded. ISL lessons also featured group discussions during which students shared their thoughts and feelings about the strategies and their usefulness. In a study involving approximately 800 third- and 800 fifth-grade students, Paris and his colleagues reported significant improvements in students' awareness and use of strategies following ISL training.

Transactional Strategies Instruction. A third dialectical model of comprehension instruction, Transactional Strategies Instruction (TSI) involved some of the same goals as reciprocal teaching. However, more emphasis was placed on teachers and students jointly constructing meaning as they brought individual interpretations and understandings to the text (Pressley, Eldinary et al., 1992). Influenced by the transactional aspect (Rosenblatt, 1978) of reading that considered the readers' stance in regard to individual backgrounds, experiences, and interpretations, TSI implied that there was no single "correct" set of strategies to arrive at one "correct" interpretation of text. TSI was based on the characteristics of expert/novice reader research studies that explored the reading behaviors of readers to learn about interpretive thinking and strategic actions of both successful and less successful readers (Davey & McBride,

1986; Gambrell, Pfeiffer, & Wilson, 1985; Recht & Leslie, 1988). In a study of adolescents in grades 6-11, Anderson (1992) found that low achieving students who received TSI made greater gains on the comprehension subtest of the Stanford Achievement Text than those students in classes who did not receive TSI. In their study of low-achieving second graders (Brown, Pressley, Van Meter, & Schuder, 1996) found that a group of students participating in TSI instruction demonstrated greater strategy awareness and use, better comprehension, and superior performance on standardized tests than a similar group that received traditional reading instruction.

The constructs of cognitive learning supported the premise that interpretation of text was relative to the reader's prior knowledge and experience; therefore, readers, in the absence of correct interpretation should strive to arrive at a "coherent" representation of text (Lewis, 1991). Schema theory provided a strong theoretical support for teaching comprehension within a more constructive, interactive context that supported shared inquiry that would enhance coherence.

Contributing Learning Theory: Social Constructivism

Perhaps the most important development during the 1980s was the prominence of social perspectives on reading and learning. In conjunction with cognitive learning theory, social constructivism provided a forum for shared inquiry in which construction of meaning from text could occur among students and/or adults within the influence of their "personal values, beliefs, and experiences" (Walker & Lambert, 1995, p. 9; Bean, 2000). Social constructivist theories were embedded in the work of Piaget (1970) who identified four factors necessary for a theory of cognitive development: maturation, experience with the physical environment, social experiences, and "equilibration" or self-regulation. Piaget cited the importance of peer interaction within social experiences and their influence upon equilibration through cognitive conflict. His perspective on the role of social factors was useful in understanding the significance of peer interaction in overt situations such as argumentation.

Vygotksian (1934/1978) theory was helpful in furthering the understanding of how peer interaction complemented situations wherein evidence was generated, managerial skills were required, and problem-solving roles were needed to perform tasks. Peers, as well as adults, could provide "scaffolding" in teaching and learning contexts prior to the learner's attempt to solve problems alone. Most members of the literacy research community recognized that what is taken into the minds of readers is socially and culturally supported. Walker and Lambert (1995)

identified seven principles of the social constructivist theory. These principals were reflected in the following description:

- To build knowledge, learners assimilated new information to prior knowledge.
- Learners actively built knowledge through personal schema and interaction with others.
- Learning activities were expected to promote critical examination of learners' preexisting experiences, knowledge, and beliefs in order to build new knowledge.
- Learning was a social activity that was enhanced by shared inquiry within peer groups where students were allowed to share ideas, points of view, and support others' thinking.
- Students' reflection and metacognition were essential aspects of constructing knowledge and meaning.
- Students played a critical role in assessing their progress in learning while providing insight for teachers to view students' growth.
- The teacher became a participant-observer during the learning process rather than the controller of the process and possible outcomes of the learning.

As a result of strategies instruction, schema theory, the concept of prior knowledge, and social constructivism, a more transactive model of reading comprehension emerged. Reading comprehension was no longer viewed as a passive process in which readers absorbed meaning from text. Instead, researchers viewed reading as an interactive process between the reader and the text in which meaning was shared between teacher and students as well as among students.

A sociocognitive approach to reading comprehension instruction. Two bodies of research, one that centered on higher levels of cognitive manipulation (Langer & Applebee, 1987) and the other on student engagement (Guthrie & Alvermann, 1999) were merging to form a sociocognitive orientation that supported working peer groups (Slavin, 1983). A variety of approaches to classroom organization had been proposed to provide students with opportunities to learn through interaction with teachers and peers including collaborative (Barnes, 1976), and cooperative groups (Slavin, 1983). Even though reading researchers were developing instructional procedures that created optimal social interchanges in the classroom (Bereiter & Scardamalia, 1987; Brown & Palinscar, 1984), I found very few external studies which actually investigated classrooms to determine the progress of integrating various models into daily

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classroom practice. The following research study conducted at the end of the 1980s was one snapshot that represented instructional practice during that time.

A Pivotal Study: "What Teachers Do When They Say They're Having Discussions of Content Area Reading Assignments: A Qualitative Analysis"

In their study of middle school teachers' discussions of written text within a variety of content areas, Alvermann, O'Brien, and Dillon (1990) observed 24 volunteer teachers. Five of the 24 were interviewed by the researchers as they viewed their respective discussions on videotape. Alvermann and her colleagues first asked the 24 teachers to define and describe a good discussion. Qualitative data revealed that teachers described effective discussion as: a) active participation from students, b) thoughtful sharing of information, c) communication between discussants, and d) "avoidance of final solutions to every discussion" (p. 306).

At a more specific level, the researchers sought to identify characteristics of teacher-to-student and student-to-student interactions during discussion. Prior to classroom observations, the participating teachers defined effective discussions as opportunities in which students actively shared information. Teachers stated that discussions provided a) an opportunity for teachers to moderate and students to actively participate, b) time for teachers and students to share factual information, opinions, or ideas related to the assignment, and c) a chance to discover that there are no final solutions in some situations. The teachers' definitions served as a secondary data source for determining teachers' purposes and interpretation of the discussions.

Twenty-four observations were conducted among six social studies, nine English/language arts, six science, one LD/EMH, and two health and human development classes. Examination of the data revealed that eleven of the student-teacher interactions were recitations while six were lecture/recitations. Open-forum discussions were observed in seven of the classroom interactions. When the results were analyzed by content areas and types of student-teacher interactions, it was found that the largest percent of recitation and lecture/recitation combined occurred in science classes (50% in each) with 44% of English/language arts being recitation and 11% observed as lecture/recitation. Open-forum discussions occurred in two of the social studies, four English language arts, and one LD/EMH class.

The microanalyses of purpose for discussions revealed that teachers used this activity to review content (eight classes), comprehend materials (eight classes), and define terms, label

parts, or fill in missing information (eight classes). Recitation was most commonly used to review content (50%), and least used in comprehending text (17%). Recitations typically focused on review of information and assessments. Lecture/recitation was most commonly employed for the purpose of learning definitions, labeling parts, or filling in missing information (50%) and least used for the purpose of reviewing content or comprehending text (20% each). The largest percentage of open forum discussions (74%) was employed by students and teachers in the comprehension of text.

Further analysis of the observations' transcripts illustrated that during lecture/recitation the teachers were concerned with controlling content and language used about the topic. Teachers talked and answered their own questions, and presented teacher-identified pertinent information. During recitations, the researchers observed rapid-fire questioning designed to assess students' reading and completion of assignments. Alvermann and her co-researchers noted that teachers in open-forum discussions were willing to allow for students' questions, concerns, and interests and were more likely to relinquish control of the student talk.

As a result of this study, Alvermann et al. found an interesting paradox. Even though the teachers' definitions of discussions were compatible with the limited open-forum discussions observed, the observations of discussions in the teachers' classrooms were mostly lecture/recitations or recitations. The researchers sited several possible reasons for this discrepancy. Teachers' definitions revealed their perception of open forum discussion as being associated with exploration of topics – particularly controversial topics. Interview comments reflected demands for content coverage, effective use of time, and consistent classroom management as obstacles to the more free exchanges of classroom talk associated with open forum discussions.

A Contributing Learning Theory: Collaboratively Constructed Meaning

Bakhtin's (1981) notion of *heteroglossia* suggested that all learning was dialogic in that learners relied on constructing meaning from the past and present relevant voices within dialogues. When readers participated in dialogic groups, they shared personal, cultural, and academic knowledge. They played multiple roles as learners and teachers affording themselves the opportunity to consider multiple perspectives of an issue. Within the context of dialogue or discussion while reading or problem solving, "more- and less- expert knowers" of particular

content and those more and less familiar with the task to be completed share expertise, feedback, and learn from each other (Langer, 2001).

One group of instructional models shared characteristics of implicit instruction in which readers gradually internalized comprehension strategies through discovery and scaffolding from more knowledgeable others (Vygotsky, 1978). During implicit strategy instruction, readers had the opportunity to interact with peers as well as the teacher. Following the reading of text, students might engage in peer discussions of text in which they initiated topics of discussion and worked collaboratively to construct understanding of a text (Almasi, 1995; Almasi, O'Flahavan & Arya, 2001; Gambrell & Almasi, 1996).

Instructional Models Supporting Collaboratively Constructed Meaning

Collaborative Problem Solving. One model, Collaborative Problem Solving (Palinscar, David, Winn, & Stevens, 1991), was an approach in which readers were introduced to strategies through vignettes about fictional students who were trying to complete a reading task. Readers discussed the strategic processing of the fictional students and compiled a list of identified strategies. Readers were then expected to use strategies from their generated lists of strategies in their reading and discuss which strategies would be the most helpful for particular texts (Almasi, 2003).

Questioning the Author. Another model of comprehension instruction focused meaningful talk about text in more student-centered, interpretive situations that fostered more critical thinking (Beck, McKeown, & Sandora, 1996). The Questioning the Author (QtA) approach focused on teachers' responses that fostered movement away from information retrieval to discourse which encouraged collaborative querying and elaborating on ideas represented in text. QtA was a discussion technique that addressed text as a product of a fallible author. Readers were encouraged to probe the text for the author's meaning by questioning the text during the reading process. Questioning the Author also encouraged collaborative dialogue with the teacher or fellow readers to aid construction of meaning. Teachers prompted the readers by asking "Initiating Queries" to begin discussion and "Follow-up Queries" to encourage students to probe deeper into the text. Data presented by Beck, McKeown, Hamilton, and Kucan (1997) were encouraging. Three positive outcomes of the QtA model were noted. First, students appeared to have assumed a greater role in the discussions. Second, students were more

successful in formulating higher-order comprehension questions and their individual comprehension-monitoring.

Sandora, Beck, and McKeown (1999) conducted a study to compare discussion strategies associated with the Junior Great Books series and QtA. Beck and her colleagues contended that Great Books discussions focused on fact, interpretation, and evaluation of text while QtA involved the reader in querying the text to ascertain meaning from the author's words and connecting ideas within the text. The researchers identified five themes that described the nature of the teacher's task in assisting students to build understanding. The first theme, *Anticipating*, referred to the teacher's preparation for discussion of text by locating points where students might have difficulty focusing and the possible connections students might draw from the text. *Signaling the Purpose* involved the teacher's showing students that the primary goal of discussion in QtA was to monitor and prompt developing meaning. *Analyzing/Diagnosing What Students Are Doing,* the third theme, focused on the premise that student responses were not evaluated for correctness, but considered for their contribution to thinking and coherence of text. The theme of *Building Ideas Rather Than Finding Answers* placed emphasis on building mental representations in sequential parts. *Balancing Competing Needs* represented the dilemma that teachers faced in balancing the need for letting cognitive processing "play out" and wanting to make that process more efficient within time constraints (McKeown & Beck, 2004). With the support from a professional community of educators, teachers were observed to be transforming discussions about text from recitational dialogues between teachers and students into more interactive discussions

Collaborative Reasoning. An approach to literature discussion intended to stimulate critical reading, critical thinking, and student engagement was developed by Anderson and his colleagues (Anderson, Chinn, Waggoner, & Nguyen-Jahiel, 1998; Chinn & Anderson, 1998). After reading a story silently, students were organized in small groups of five to ten students. The teacher began the discussion with a single central question about a significant issue faced by the story characters. After the teacher asked the central question, students indicated their initial positions with reasons and supporting evidence for their positions. They were encouraged to use textual evidence as well as their own personal experience. Students were expected to listen carefully and evaluate each other's arguments. When they disagreed, they were encouraged to challenge with counterarguments. As the discussion proceeded, the students were supposed to

weigh the reasons, offer evidence, and then decide whether to maintain or change their original positions.

Open participation was encouraged in Collaborative Reasoning. Students spoke without being nominated by the teacher. Teachers also tried to reduce their own talk, so that students could speak more. Chinn and Anderson (1998) showed that teachers who conducted Collaborative Reasoning discussions were generally successful in achieving an open participation structure and in boosting the amount of student talk. The instructional role of the teacher in Collaborative Reasoning discussions was to provide scaffolding that fostered the development of students' reasoning. The most frequent scaffolding methods used by the teachers were 1) asking for clarification, 2) prompting for reasons or for evidence, and 3) modeling the articulation of clear arguments and counterarguments. Teachers were active participants in Collaborative Reasoning discussions, but their goal was to assist in the growth of students' reasoning rather than to cover story content, and they aimed to give students much more control over what to say and when to say it (Clarke, Anderson, Kuo, Kim, Archodidou, Nguyen-Jahiel, 2003).

The Conversational Discussion Group. Designed for small groups, the Conservational Discussion Group (O'Flahavan, Stein, Weincek, & Marks, 1992) incorporated groups of five to six students who met for 30-minute sessions. Each session consisted of three phases: opening, discussion, and debriefing. Each group read different texts and one day before members engaged in discussion they prepared individual responses which became the foci of the group during discussion. Groups had two-column charts, one column for rules governing interaction and the other column for reader and text-based interpretations. The teacher reviewed rules, introduced, or reinforced ways to interpret literature. Near the close of discussion the teacher debriefed the students and elicited interpretations and the students' evaluations of their performance. The group set goals for each succeeding group session. Following the analysis of videotaped discussions of students, O'Flahavan (1995) described three types of scaffolding used by teachers in this approach. Teachers *elicited* a group's thinking and assisted students in elaborating their ideas. They *framed* students "perspective on their thinking", and *monitored* group interaction.

Grand Conversations. Another approach, Grand Conversations (Eeds & Wells, 1989; Peterson & Eeds, 2007), shared a common focus with the above approaches. Literature was presented to readers as they considered issues or problems within text. As readers were

encouraged to take a position on issues or solve a problem, they were expected to articulate and find evidence in the text to support their position. Students learned to read the text more closely to build coherence among ideas presented in the text. They were allowed some personal choice in selection of readings and were encouraged to recount personal stories as background knowledge. Eeds and Wells (1989) noted that students within Grand Conversations shared problems, recounted personal stories, and evaluated texts during their reading discussions.

Book Clubs and Literature Circles. Book Clubs (McMahon & Raphael, 1997) and Literature Circles (Daniels, 1994) used literature response groups or literature study groups as vehicles to provide regular opportunities for students to react to texts. Students raised questions, clarified information, and related texts to their own experiences. Responses were expected to go beyond recounting story elements and literary devices (e.g., plot, characters, setting, symbolism, etc.). Elicited responses reflected an aesthetic stance whereby students interpreted the author's words through their life experiences.

A Pivotal Study: "Beating the odds: Teaching Middle and High School Students to Read and Write Well"

Langer (2000) conducted a five-year study focusing on characteristics of *high literacy* in middle and high school English classrooms. She defined high literacy as literacy gained from a well-developed middle and high school curriculum which went beyond basic reading and writing skills to include use of language, content, and reasoning in ways that were "appropriate for particular situations and disciplines" (p. 1040). The study focused on how the English programs differed in schools where students scored higher on high-stakes tests than those students in schools with comparable demographics. Data was gathered across four states (Florida, New York, California, and Texas) and among 25 schools, 44 teachers, and 88 classes. Each teacher and school was studied for two consecutive years. Fourteen of the schools were performing better on high-stakes tests. Six themes were at the center of the qualitative and quantitative data: (1) approaches to skills instruction, (2) approaches to test preparation, (3) connected learnings, (4) enabling strategies, (5) conceptions of learning, and (6) classroom organization.

The more successful teachers were more likely to use three approaches to skills instruction in the form of direct instruction, *simulated instruction* that involved actual application of concepts within a targeted unit of reading, writing, or oral language, and *integrated instruction* within embedded context of an extended, purposeful activity. The more typical schools'

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approaches were more restricted and separated from the ongoing activities of the higher-performing schools.

Test preparation in the typical schools involved test practice and testing-taking instruction while the high-performing schools integrated test preparation with the regular curriculum. In fact, 80% of the successful teachers in both kinds of schools integrated the skills and knowledge to be tested into their ongoing curriculum. Test items were deconstructed and analyzed which led to an understanding of the literacy skills, strategies, and knowledge needed for students to achieve higher levels of literacy performance. Formative assessments such as rubrics were used throughout the school year to gain insight into reading and writing performance. Overall, the high-performing schools focused on students' literacy learning being improved within the curriculum and instruction as they were informed by test data.

Test preparation was different in the more typically performing schools. Tests were treated "as an additional hurdle" that existed separate from the curriculum. The primary mode of test preparation consisted of state, district, or commercial test-taking practice materials which were practiced one or two weeks before testing dates. Sometimes professional services or programs were purchased to prepare students for tests; however, they were not integrated into the ongoing program.

In their approach to connecting learnings, teachers in high-performing schools overtly pointed out connections among three different kinds of student learnings: connections within lessons; connections across lessons, classes, and grade levels; and connections between in-school and out-of-school experiences. At least 88% of successful teachers in both types of schools made all three types of connections with mostly equal focus as opposed to none of the more typical teachers.

In regard to teaching students strategies to engage in reading and writing activities while reflecting and monitoring their performance, high-performing students were overtly taught strategies for thinking and doing. These teachers segmented new or difficult tasks, modeled, and sometimes provided rubrics as evaluation or "reminder" sheets to help students work through tasks. In typical schools, teachers focused on teaching the content or skills, but did not provide procedural or metacognitive strategies for students.

Teachers' conceptions of learning also differed between the two types of schools. The more successful teachers exhibited a generative approach to student learning as they taught

beyond students' acquisition of skills or knowledge to encourage deeper understandings. More typical teachers tended to move on to other skills and activities once students showed evidence that targeted skills or knowledge had been learned. Typical teachers appeared to be content with "pseudo concepts" (Vygotsky, 1978) which were more superficial and based on recall of definitions and facts.

Classroom organization for learning in high-performing schools supported a variety of opportunities to learn through "substantive interaction" with one another and the teacher. At least 96% of the teachers encouraged students to engage in thoughtful dialogue which Langer called *shared cognition.* Atypical teachers focused on individual thinking and though students were given opportunities to work together, the thinking was described by Langer as parallel rather than dialogic. High performing students were observed engaging in literary dialogue in collaborative groups as they discussed "big" questions. The teachers were observed moving from group to group, modeling questions and comments. Students in typical classrooms were observed working independently to complete tasks and then coming together to discuss final products. Typical teachers emphasized individual thinking with the assumption that student interaction might diminish an individual's thinking, or disrupt discipline in the classroom.

Langer (2000) emphasized that the six features worked in conjunction with one another to support higher literacy learning. The adoption of any one of the features without the others could diminish the effect achieved by the higher-performing schools. Teachers and students in the high-performing schools credited the school environment along with related and important learnings as the keys to their success.

Comprehension Within a Current View of Discussion

Discussion is important in all academic disciplines because it provides opportunities for learners to process information rather than simply receive it. Classroom discussions can be an environment wherein learners can communicate with one another, share perspectives, and gain insights. Authentic classroom discussions are focused interactions that require leaners to go beyond initial reactions and belief systems to utilize higher order thinking and increase critical reasoning skills. As individual learners collaboratively participate in a meaningful exchange of information during discussion, the knowledge produced is more likely "to go beyond that of any individual in the group" (Wertsch, Del Rio, and Alvarez, 1995).

As peer collaboration and discussion continued to emerge in models of comprehension instruction, my review of the literature turned to research studies about dialogic discussion in the context of literature. Much of the research surrounding discussion drew from Vygotsky's (1978) sociocultural theory that served as the framework for substantiating a sociocognitive context for learning. His theory of sociogenesis claimed that cognitive growth is "more likely when one is required to explain, elaborate, or defend one's position to others, as well as to oneself; striving for an explanation often makes a learner integrate and elaborate knowledge in new ways" (Vygotsky, 1978, p. 158). Dialogue in the form of discussion was therefore considered to be a primary medium of instruction and the key to "socializing intelligence" in classroom settings (Edwards & Westgate, 1994; Resnick & Nelson-LeGall, 1999). Researchers supported the importance of classroom discourse in teaching and learning (Cazden, 2001), and emphasized "talk" as a "metalanguage" that facilitated reflection upon written text (Almasi, 1994; Olson, 1991; Wells, 1999). Numerous studies documented the effects of discussion upon literacy among small groups (Sweigart, 1991), and whole-classes of students (Van den Branden, 2000). Sweigart found that student-led small group discussions of nonfiction enabled students to be successful in recalling and comprehending essays than in both lecture and whole-class discussion of the same material. Van den Branden (2000) studied reading comprehension among fourth and fifth graders who read problematic and difficult passages of text. He found stronger effects for students who participated in larger negotiation groups than for those in negotiation pairs. Van den Branden concluded that discussion was helpful when "the learners themselves are actively involved in signaling their problems and trying to solve them" (p. 438). Research on the relationship of discussion to reading comprehension revealed meaningful conclusions:

- Participation in group discussion allowed students to generalize and transfer their knowledge of classroom learning and build a strong foundation for communicating ideas orally (Reznitskaya, Anderson & Kuo, 2007).
- Discussion played a vital role in increasing students' abilities to test their ideas, synthesize the ideas of others, and build deeper understanding of what they were learning (Corden, 2001; Nystrand, 2006).
- Large and small group discussion afforded students opportunities to exercise self-regulation, self-determination, and a desire to persevere with tasks (Corden, 2001; Matsumara, Slater & Crosson, 2008).

- Discussion increased student motivation, collaborative skills, and the ability to problem solve (Dyson, 2004; Matsumara, Slater & Crosson, 2008; Nystrand, 2006).
- Increasing students' opportunity to talk with one another and discuss their ideas increased their ability to support their thinking, develop reasoning skills, and to argue their opinions persuasively and respectfully (Reznitskaya, Anderson & Kuo, 2007).
- The feeling of community and collaboration in classrooms increased through offering more chances for students to talk together (Barab, Dodge, Thomas, Jackson, & Tuzun, 2007; Hale & City, 2002; Weber, Maher, Powell & Lee, 2008).

Given the benefits of interactive discussion, it was surprising that this medium was not used more in classroom instruction. Studies found that most students did not participate in discussion (Nystrand & Gamoran, 1991; Nystrand, Gamoran, Kachur, & Pendergast, 1997). Nystrand (2006) argued that teachers rarely chose classroom discussion as an instructional format. The results of a three year study focusing on 2400 eighth and ninth grade students in 60 different classrooms indicated that the typical classroom teacher spent under three minutes an hour allowing students to talk about ideas with one another and the teacher (Nystrand, 2006). The study revealed that open-ended discussion accounted for less than 50 seconds per lesson for eighth graders and less than 15 seconds for ninth graders. A large portion of the teacher questions were asked using procedural recitation.

In a multicase study of adolescents at five research sites, Alvermann, et al. (1996) studied discussions of assigned readings in content area classes. The themes that emerged from the students' interactions suggested that students were aware of the conditions conducive to good discussions. The students were knowledgeable about the different tasks and the topics that impacted their participation. Students were also cognizant of how classroom discussion helped them comprehend what they read. Alvermann et al. concluded that the students were focused on their relationships with peers and their commitment to understanding what they read more than on their teachers' actions. Students appeared to be centered more upon mutually exploring ideas from the text than on following teachers' guidelines. The researchers observed students who ignored teacher-generated discussion questions when they perceived their own questions about the text more engaging.

Questioning within Reading Comprehension Instruction

One of the most pervasive traditions in comprehension instruction was teachers' questioning of students about their reading (Duke & Pearson, 2002). Over the past five decades the effects of asking different types of questions about readers' understanding and recall of text had been a topic among researchers. By the late 1970s, teacher-generated questions had long been acknowledged as a major tool for developing reading comprehension (Anderson & Biddle, 1975). The overall findings about the effects of asking questions were that students' understanding and recall could be readily shaped by the types of questions teachers asked. If students became accustomed to a preponderance of factual detail questions, they tended to focus on factual details in future reading. If, by contrast, students were exposed to a steady diet of teachers' questions that required them to connect information from prior knowledge and employ inferential understanding, then the students were more apt to focus on more integrative comprehension behavior during future reading (Duke & Pearson, 2002; Hansen, 1981).

A Pivotal Study: "Why Do Teachers Ask Questions?: Analyzing Responses from 1967, 1987, and 2007"

Wallace and Hurst (2007) examined results of studies from 1967, 1987, and 2007 in which researchers asked teachers what they thought were "the most important purposes of asking students questions" (p. 39). In 1967, questioning taxonomies were the focus of questioning. The *Handbook of Educational Objectives: Cognitive Domain* (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956) assisted teachers in structuring questions that required high-level thinking. Results of a research review conducted by Gall (1970) revealed that approximately 60% of teachers' questions required students to recall facts; about 20% required students to think; and the remaining 20% of questions were procedural. Gall also noted that a drawback of relying on taxonomies was that "it diminished the use of questions for other important purposes, such as to probe a student's weak response, to create discussion, to stimulate thinking, and to guide students in learning problem-solving skills" (p. 710, 1970).

Wallace and Hurst (2009) reported that Pate and Bremer (1967) had conducted a study of 190 sixth grade teachers in 1967. They asked the teachers, "What are three important purposes of teachers' questions of pupils?" (p. 417). The teachers' responses were placed in 14 categories. Teachers reported that they used questions to : (1) check students' progress to gauge effectiveness in teaching, (2) diagnose (3) check students' recall of facts and details, (4) meet

individual needs, (5) determine grades, (6) require students to use information to infer and generalize, (7) check on students' progress, (8) provide a means for students to check their own learning, (9) motivate students, (10) determine student placement in materials, (11) acquaint students to different kinds of questions, (12) discover interests of students, (13) check students' proficiency in expression, and (14) assist students to retain knowledge. The results of Pate and Bremer's study indicated that the three most common purposes for teacher questioning cited were to: (1) check for effectiveness of their teaching (68%), (2) diagnose reading difficulties (54%), and (3) test students' recall of specific facts and details (47%). Only eight teachers proposed questions as a means for students to check their learning and 7% indicated questions could be used to motivate students.

Wallace (1987) conducted a study of elementary school teachers who viewed the purposes of asking students questions differently than their counterparts of 20 years earlier. Teachers from 1987 appeared to be more aware of the use of questions to elicit diverse thinking processes from students than teachers in 1967. For example, elementary teachers from 1987 more frequently suggested the following purposes for questioning students: (a) require pupils to use facts for generalizing and asking inferences (10% in 1967; 45% in 1987), (b) motivation (7% in 1967; 45% in 1987), (c) acquaint pupils with different kinds of questions (4% in 1967; 40% in 1987), (d) discover pupils interests (17% in 1967; 75% in 1987), and (e) help retain knowledge (1% in 1967; 35% in 1987). Like the elementary teachers of 1967, the 1987 teachers continued to emphasize the value of the use of questions to check pupils' recall of facts.

Wallace (1987) posited that the purposes for teachers' questions in 1987 differed from the purposes in 1967 for two primary reasons. One reason was that information-processing theory had popularized an interactive definition of reading. In 1987, the reading process was thought to be dependent on the individual's use of prior knowledge and context to reconstruct the writer's intended meaning. A second reason was that a number of metacognitive process-oriented comprehension strategies had been developed where questioning became a dialogic process between teachers and their students. During each of the time periods examined the research focuses differed in ways to help teachers improve their questioning skills.

In Wallace and Hurst's 2007 study, the first research question asked: Are there apparent differences among the responses of experienced elementary teachers in 1967, 1987, and 2007? Experienced elementary school teachers responded that the major purpose for asking students

questions was to assess students in ways related to diagnosis and checking student progress (53% in 1967; 45% in 1987; and 44% in 2007). However, the order of the other three aggregated categories of motivation, thinking, and teaching differed in 1987 and 2007 from those of 1967. In 1967, the second most frequent purpose given was to help teachers enhance their teaching, but in 1987 and 2007, that category was the least reported (29% of the responses in 1967 versus 9% in1987 and 10% in 2007). In 1987 and 2007, the second and third most frequent purposes given were helping students by motivating them (28% in 1987 and 24% in 2007 versus 10% in 1967).

The results of this study indicated that after 40 years, the most frequently reported purpose for asking students questions was still assessment. In an historical review of the literature on questioning from 1920 to 1970, Gall (1970) stated there had been little change in the types of questions emphasized in the classroom: "About 60% of the teachers' questions required students to recall facts; about 20% required students to think; and the remaining 20% were procedural" (p. 713). Gambrell (1983) referred to a number of studies on questioning where the actual types of questions used by teachers were consistently 75% literal recall and 25% scripturally implicit. Gambrell concluded, "The results of this study suggest elementary students are rarely allowed the opportunity to engage in higher-level thinking during reading instruction" (p. 80).

It seemed that the importance of questioning, the purposes of asking questions, and the ways to use questions to improve instruction were important parts of a teacher's pedagogic repertoire. Understanding the different purposes for asking questions and specific features of questions helped teachers to assess and motivate students, enhance student thinking, and reflect on their teaching effectiveness.

Teacher-generated Questions

Applebee (1996) and Nystrand (2006) argued that what counted as knowledge and understanding in any given classroom was largely shaped by the questions teachers asked, how they responded to their students, and how they structured small group and other pedagogical activities. Morgan and Saxton (1991) recommended that teachers invest time and thought into planning their questions while considering two questions to ask themselves: (1) "What kind of thinking is this question generating?" and (2) "How will the question help students engage in and with the material?" (p. 11). Dantonio & Beizenherz (2001) recommended that teachers query their thinking about questions as they asked: (1) How is core content expressed in the question,

(2) how is the thinking operation expressed in the question, (3) what are possible student responses to the question, and (4) what are some possible teacher follow-ups or uptakes that can be used with these questions?

Since teachers asked questions to evaluate what students knew and how students were thinking, the teacher had be able to judge the quality of student responses quickly. These differences had implications for (1) how teachers structured questioning sequences; (2) to what extent they made adjustments in responding to student remarks and queries; (3) how they acknowledged student contributions; and (4) how much authority they claimed for judging what students said (van Zee & Mitchell, 1997).

One way to engage students in taking more responsibility for thinking was to ask more open-ended questions and to acknowledge student contributions in a neutral rather than evaluative manner. Baird and Northfield (1992), for example, documented such shifts in working with groups of teachers over many years. They reported that many of these teachers initially used traditional questioning techniques that (a) asked closed questions requiring a predetermined short answer, (b) judged all student answers, (c) corrected all "wrong" answers, (d) praised correct answers only, or (e) treated a challenge to the teacher's answers as a threat. Baird and Northfield reported that after extensive experience in a training program, some teachers had shifted to more reflective questioning behaviors. Teachers were found to ask more open-ended questions that called for one or two sentence answers. Questions did not have predetermined "correct" answers. The teachers appeared less judgmental in their responses and often accepted answers neutrally. The researchers observed more incidents of teachers praising students who challenged teachers' ideas.

Richardson, Morgan, and Fleener (2011) provided suggestions for generating relevant questions. Teachers were advised to:

- ask simple questions,
- identify the purpose of each question,
- share with students the reasons for each question,
- encourage students to ask questions about the teachers' inquiries as well as ask their own questions,
- provide opportunities for students to practice answering questions at various levels of comprehension,

- provide opportunities for discussions in which students could practice constructing and responding to questions.

Student-Generated Questions

Though the impact of teacher-generated questions in comprehension was important, perhaps the more important issue was whether students could learn to generate their own questions about text and what impact the generative behavior of forming their own questions would have on subsequent comprehension (Duke & Pearson, 2002). The process of students generating questions about text was studied extensively by Raphael and her colleagues (Raphael & McKinney, 1983; Raphael & Pearson, 1985; Raphael & Wonnacott, 1985). Using a technique called Question-Answer-Relationships (QARs), these researchers modeled different types of questions they could ask the written text. The students learned to distinguish between three types of questions: (1) *Right There QARs* in which answers could be found explicitly in text, (2) *Think and Search QARs* had answers that could be found in the text, but entailed some searching and inferential connecting, and (3) *On My Own QARs* which required answers that were suggested by topics in the text and generated from the reader's prior knowledge. In addition to relinquishing responsibility for question generation to students, Raphael and her colleagues were also pleased to note the students' increased sense of efficacy and confidence as they learned to generate their own questions.

Research showed that students who generated their own questions improved their comprehension in comparison to those who merely answered the teachers' questions (Harris & Sipay, 1990; Pressley, 2000). Expert readers asked questions of themselves at different stages during the reading process: before, during and after they read (Harvey & Goudvis, 2000; Miller, 2000; Tabaoda & Guthrie, 2006). Researchers also recognized an interrelationship between students' questioning patterns and their prior knowledge (Tabaoda & Guthrie, 2006). When readers were asked to search for information in the text, they were observed using prior knowledge which had been accessed through pre-reading questioning.

The key to teaching students to generate questions was to offer direct, explicit instruction in questioning and comprehension strategies within the context of meaningful reading. It was important that teachers remain mindful that in using questioning to scaffold students' engagement with texts the essential goal was that students ask and answer their own questions. When students asked their own questions, they were more motivated to seek new knowledge.

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Student-generated questions could offer insights into the students' thought processes which could provide a point from which teaching and learning could begin.

One consistent finding from the research was that classroom teachers who employed higher order questioning during discussions promoted greater rates of active participation among their students (Murphy et al., 2009). Another consistent finding was that discussion also promoted higher levels of reading comprehension (Applebee, Langer, Nystrand & Gamoran, 2003; McKeown, et al., 2009; Taylor, Pearson, Peterson, & Rodriguez, 2003). Research indicated that discussion in which students exhibited understanding of text and critical thinking about text, often included three activities: (1) listening and linking to others' ideas, (2) providing evidence from text to support one's thinking, and (3) consistent student participation (Wolf, Crosson, & Resnick, 2005).

Learning to Put Research into Practice

My review of the research to this point indicated that a great deal is known about fostering and teaching reading comprehension; however, studies continued to indicate that comprehension instruction remained rare (Connor, Morrison, & Petrella, 2004) and often poorly implemented (Dewitz, Jones, & Leahy, 2009). Researchers and teacher educators appeared to know far less about how to assist teachers in learning how to orchestrate the varied practices for improving comprehension instruction (Duke, Pearson, Strachan, & Billman, 2011). To understand how "great" teachers of comprehension became great and how to help more teachers become great, it was recommended that researchers: (1) examine the knowledge that teachers need to engage in supportive practices of comprehension, (2) develop innovative approaches for pre-service and in-service teacher education, (3) and conduct studies on the impact of specific professional development models on students' comprehension growth (Garcia, et al., 2006; Pearson, Taylor, & Tam, 2005; Taylor, Pearson, Peterson, & Rodriguez, 2005).

A Pivotal Study: "The Teacher Research Movement: A Decade Later"

The renewal of interest in teacher research and practitioner inquiry has been supported by several different traditions and educational projects. In their article, *The teacher research movement: A decade later*, Cochran-Smith & Lytle (1990) credited a number of American and British influential articles, papers, and books with this movement. Near the turn of this century writings published by the National Council of Teachers of English and American presses such as Heinemann and Boynton/Cook specialized in research about language and literacy. These

publishers became grounded in a paradigm shift away from the traditional notion that teachers were passive recipients of university theorists to that of teachers as active researchers. These publishers disseminated works written by and for teachers who were committed to improving curriculum and practice (Atwell, 1987; Mohr, 1987; Wells, 1994). Encouraged by works like Goswami and Stilmann's (1987) collection of articles on teacher research as an "agency of change", teachers were ready to dialogue with other practitioners who grounded theory into instructional practice (Cochran-Smith & Lytle, 1990). Other groups of writings such as those published by Falmer Press advocated a view of educational research that was grounded in critical and democratic social theory. This view rejected the authority of professional experts who accumulated knowledge in "scientific" research settings and passed such knowledge on to those who were expected to put it to use in practical settings (Stenhouse, 1983).

Another impetus for the current teacher research movement involved teacher educators and researchers, including Cochran-Smith and Lytle, who were involved with the day-to-day communities of teachers, student teachers, and university-based teacher educators. Teacher educators began to re-configure their "dialectic of writing and theorizing" roles to that of teacher educators who developed relationships with teachers, schools, and school districts. Cochran-Smith and Lytle (1990) credited teachers as "the knower and the agent in the classroom and in larger educational contexts" because they were "the technicians, consumers, receivers, transmitters, and implementers of other people's knowledge" (p.16).

According to the authors there were five major trends that characterized U.S. teacher research over the last decade (1990s). These trends included:

- the prominence of teacher research in teacher education, professional development, and school reform. Teachers were actively initiating and conducting research in their respective schools and classrooms in coordination with programs of professional development and school restructuring initiatives.
- the development of conceptual frameworks. These conceptual frameworks were described as teacher research as social inquiry, teacher research as ways of knowing in communities, and teacher research as practical inquiry.
- dissemination of teacher research at and beyond the local level. Many prominent educational journals and yearbooks regularly publish research by teachers, and teacher groups.

- an emergence of critique of the teacher research movement. Criticism of the movement was grouped into three perspectives: knowledge critique, methods critique, and the ends critique. Those who used knowledge as a premise argued that the formal, theoretical, or scientific form of knowledge and consequently more generalizable, was distinguishable from practical knowledge that is bound more to context. Those who criticized methods of teacher research considered it as more interpretive research and less reliable. Critics who supported the "ends critique" described teacher research as risky because of its potential to pose more problems than it solves, and to be a venue for some educators to advocate their perceptions rather than a viable new best practice.

- the transformative possibilities of teacher research on university culture. A number of teacher education and professional development programs have been exploring critical and inquiry-centered preservice education and professional development with the intent that the transmission model of knowledge be replaced with a more collaborative approach to professional education.

In closing, Cochran-Smith and Lytle (1990) raised concerns about the future of teacher research in light of the standards movement. National, state, school district, and school policies that implement accountability initiatives in the form of research-based school improvement, teacher education, and student achievement have become the rule rather than an exception. These initiatives tended to de-emphasize differences in local context and decision-making. The process of reconciling the ideal of co-construction of knowledge by teachers and their students with the increased pressure of mandated specified curriculum and assessment by high-stakes tests was and remains a difficult task.

Effective Professional Development

The ESEA Blueprint for Reform (U.S. Department of Education, 2010) asserted that teachers needed "effective, ongoing, job-embedded" professional development that was targeted to student and school needs. In the era of accountability, teachers and school administrators understood the need for more effective professional development (Dearman & Alber, 2005). The intent of research in professional development was to produce new models that were informed by adult learning theory and guided by principles that supported meaningful learning (Hawley & Valli, 1995). Linking professional development activities to student achievement and teacher change was an important part of accountability (Guskey & Sparks, 1996). Optimally,

professional development should result in not only new knowledge acquisition, but also consistent and appropriate application of that knowledge (Joyce & Showers, 1996).

In a review of research related to professional development for teachers, Loucks-Horsley and Matsumoto (1999) identified four key areas within an environment that promotes teacher learning: content, process, structure and strategies, and context. The content of the professional development experience was the information that teachers were expected to learn. This meant that content should be focused on practice to help them understand their subject matter, their students, and teaching methods. The process of professional development, according to Loucks-Horsley and Matsumoto (1999) focused on how the content was to be learned and should be based on how teachers create their professional knowledge and apply it in their classrooms. The structure of the professional development dealt with how the content of the professional information was organized for learning and what strategies were used to deliver that information. The fourth key, context considered the culture and climate of the learning environment.

Hoffman and Pearson (2000) framed reading teacher education in a broad context of *training and teaching*. Training enabled teachers to develop specific skills required to carry out specific tasks. Some commercial reading programs involved training teachers in the exact way that the program could be successfully administered. In contrast to training, Hoffman and Pearson described teaching as professional education aimed at helping teachers "develop a personal and professional commitment to lifelong learning" (p.36). Teaching teachers was directed at developing individuals who are reflective, empowered, confident, and engaged in inquiry. Evidence suggested that effective professional development experiences could result in the development of knowledgeable, thoughtful, and responsive reading teachers. Continued research in the area was considered vital to improving our understanding of reading teacher education.

A multi-case study conducted by Sturko and Gregson (2009) explored the learning and collaboration of six Career and Technical Education (CTE) teachers in two different types of professional development experiences: (a) an integration course on integrating reading, writing, and math skills into CTE curricula, delivered by a master teacher; and (b) a small teacher study group that met regularly for the purpose of improving teaching practice in the same areas. The integration course emphasized building knowledge and pedagogical needs. The master teacher and course participants modeled, the teachers experimented with teaching approaches,

and reflected upon their progress. The teacher study group participants held conversations and told stories about classroom experiences and reflected upon these experiences. The integration course was more structured around a syllabus and culminated in a formal reflection paper. The teacher study group held regularly scheduled meetings that accommodated teachers' schedules. Topics were selected for sharing during discussion, and teachers maintained a reflective journal.

The outcomes of both types of professional development were positive. Both activities provided opportunities for teachers to collaborate and grow professionally. Qualitative data from the study (2009) revealed that the teachers in the integration course increased their awareness of integration of the skills and how it impacted classes. The study group provided an informal venue for sharing knowledge and resources while developing professional relationships between the academic and CTE areas. The feedback from colleagues in the teacher study group helped group members to share and expand their pedagogical knowledge while sharing frustrations and collaboratively building strategies to overcome problems.

Teacher Study Groups

The need for teachers to participate actively in their own professional development has given rise to Professional Development and Inquiry Groups, better known as Teacher Study Groups (TSG) (Clark, 2001). Research indicated that teachers need to create their own conditions for change by working collaboratively to solve problems in their schools and classrooms (Cochran-Smith & Lytle, 1990). TSGs were one way of creating a context in which teachers could make changes. Goldenberg and Gallimore (1991) noted:

> These contexts should consist, preeminently, of engaging teachers in rigorous examination of teaching: The concrete challenges and problems they face, the range of possible solutions, and most important, close examination of whether, over time, there is progress in addressing these challenges. (p. 69)

The development of TSGs was indicative of the new orientation toward a constructivist approach in professional development (Cochran-Smith & Lytle, 2001). Teachers formed communities in which they learned through dialogue and inquiry. TSGs were characteristic of professional development that Cochran-Smith and Lytle call *knowledge-of-practice*. In this type of professional development, teachers examined classroom and school practices in ways that helped them construct new knowledge about teaching and learning. TSGs were also representative of Richardson and Placiers's (2001) conceptualization of professional

development wherein teachers voluntarily exercised control of the agenda by choosing topics and determining the actions taken.

Topic study groups. Study groups were formed for various reasons and purposes. Some groups were developed to study a specific area of focus based on a needs assessment. Allington (2001) referred to this type of study group as a TAPER (Teachers as Professional Education Readers) group. He explained that the goal of this type of study group was to "develop individual expertness and foster the development of shared knowledge among members of the group" (p. 113). Cayuso, Fegan, and McAllister (2004) referred to this type of study group as a "topic group." Group members suggested several choices of texts, articles, or video series, to investigate. The materials were read and discussed within the group.

Practice study groups. Some groups began because of a common pedagogical goal. A "practice study" group or Teacher Inquiry Project (TIP) (Allington, 2001) was comprised of members who focused on a strategy that they could learn and experiment with in their practice. Teachers observed videos of themselves or others teaching, observed in other classrooms, or held discussions within their group about ways to improve lesson presentation, classroom management, questioning practices, or pacing of instruction (Cayuso et al., 2004). Members of the group were expected to implement ideas, strategies, or concepts gleaned from the group's research in their classrooms. Periodic share sessions were scheduled during which the teachers shared how the implemented lesson or strategy worked, work samples, or videos of themselves implementing the strategy. Members of the group could model some aspect of the strategy or lesson as well. Group members were expected to debrief and provide feedback with the expectation that they would learn to evaluate their individual level of implementation of the selected practice.

In a recent study (Gersten, Dimino, Jayanthi, Kim, & Santoro, 2010), randomized field trials were used to examine the impact of the TSG professional development model on first grade teachers' reading comprehension and vocabulary instruction. The multisite quantitative study was conducted in three large urban school districts from three states. The sample for the study consisted of 81 first grade teachers and their 468 students from 19 Reading First schools. Classroom observations of teaching practice showed significant improvements in TSG schools. The teachers participating in the TSGs significantly outperformed control teachers on the teacher

knowledge measure of vocabulary instruction. Analysis of students' outcomes in oral vocabulary indicated marginally significant effects (Gersten, Dimino, Jayanthi, Kim, & Santoro, 2010).

Whether teacher study groups were voluntary or implemented by individual schools or districts, they showed the capacity to support change in classrooms. TSGs provided a safe and supportive environment in which teachers articulated their understandings of teaching and learning (Clark, 2001). For many groups of teachers, TSGs provided opportunities to connect theory, application, and problem-solving to real classroom situations. Teachers developed a positive interdependence among group members as they communicated, resolved conflicts, and made decisions (Lefever-Davis, Wilson, Moore, Kent, & Hopkins, 2003) that affected their practice and impacted students' learning.

Conclusion

A paradox emerged during my literature review. Even though researchers advocated for active student participation in discussion during comprehension instruction, and devised instructional approaches to support authentic literacy discussions, studies showed that the discourse pattern for the majority of teachers' questioning continued to follow the traditional pattern of pedagogical dialogue, predominantly IRE (Alvermann et al., 1990; Nystrand, Wu, Gamoran, Zeiser, & Long, 2003) Evidence from research studies suggested that teachers recognized the elements of discussion; however, they had difficulty operationalizing those elements. Studies conducted by Villaume et al. (1994) and Sandora, Beck, and McKeown (1999) of teachers who documented their literature discussions reported that discussions were hard to enact due to the difficulty of getting students to respond meaningfully to questions asked about texts.

Though discussion had been recognized as a productive part of classroom activity, observational studies showed limited movement from teacher-led discussion to small-group or peer-led discussion. Group discussion remained underused and underdeveloped. Mercer and Littleton (2007) reminded us that dialogic teaching was both descriptive and prescriptive:

> It requires a teacher to orientate to the state of understanding of students, engage them in exchanges that will reveal the changing limits and possibilities of their developing interests and understandings, and adjust their communication strategies accordingly as classroom interaction progresses. (p. 136)

From this extensive study of the research literature, I perceived that the greatest challenge for teachers in transitioning from predominantly teacher-controlled discussion to dialogic discussion lay in the teachers' abilities to observe and evaluate their practice of asking questions during facilitation of discussion. Research showed that teacher questioning and the student responses were instrumental in indicating the readiness of students to control their own thinking processes. In addition, questioning during literary discussion by both teachers and students established a learning culture in the classroom that reflected a more autonomous relationship between the teacher and the students. This study should provide the researcher and participating teachers more insight into what happens during discussion about text in some classrooms.

Chapter 3: The Pilot Study

The two research questions addressed in the pilot study were (1) what reasons do three fourth grade teachers and one fifth grade teacher provide in explaining their thinking about questions they asked during literature discussion, and (2) what types of teacher questioning are evident in literature discussions across three fourth grade teachers and one fifth grade teacher? To conduct this study, I made three assumptions about knowledge and action, teacher thinking, and the context of literature discussion. The first of these assumptions was that knowledge is co-constructed through interaction among participants in an activity or event. The classroom is a community in which activity takes place among participants who are constituted by the complex environments that shape them culturally, socially, historically, and personally.

The second assumption was that teaching is a complex cognitive process that takes place in a predominantly unstructured, dynamic environment (Calderhead, 1987; Paterson, 2007). Teachers exhibit complex, multiple cognitive tasks as they work with readers to negotiate meaning from text. Examples of such cognitive tasks include continually accommodating background knowledge and various skill levels among their students, selecting appropriate instructional materials and activities that support active student engagement, and monitoring students' growth in the learning process.

A third assumption was that classroom discourse shapes literacy skills. The depth of knowledge and understanding available to students in the classroom is significantly influenced by the questions teachers ask, how teachers respond to students, and how they structure pedagogical activities. In most classroom discourse, teachers ask questions to guide conversation throughout the instructional activities. On one hand, teachers may ask questions that may encourage students to make their thought processes more explicit as they interact within question-and-answer sequences. On the other hand, the teacher's questions may encourage "procedural interaction" dominated by students raising their hands to be recognized and being called upon to answer questions thus leading to limited procedural understanding of the task (Barnes & Todd, 1995; Edwards & Mercer, 1987).

In the following sections of this chapter I give a description of the research process used in the pilot study. The first section, Research Design, begins with the researcher's explanation of her stance within the study. An overview of qualitative research methodology as it relates to the study is then provided. This is followed by a description of the research framework and its

relevance to the focus and context of the study. In the second section of this chapter, the procedure of the research is described as to the participants, data sources and collection, and the method of data analysis employed. The results and limitations of the pilot study are also included in this chapter.

<div align="center">**Research Design**</div>

The Researcher

My experience as an educator spans nearly four decades in public schools. My teaching experience encompasses nearly 14 years in rural schools as an upper elementary and middle school teacher of sixth and seventh grade language arts, science, and social studies. Upon obtaining a Master's degree and extensive hours of post-graduate work in educational leadership, my professional experience expanded to administrative and supervisory roles in PK-12 programs. My most recent classroom experiences have occurred while serving as a technical assistance provider for low-performing schools and a university mentor for pre-service teachers.

For this study, it was paramount that I acknowledge personal biases, preconceived ideas or theories that I may have in order to build an in-depth picture of the teacher's experience (Creswell, 1998). As a school division curriculum supervisor and on-site school administrator, I was required to observe and record impressions of teachers' daily instruction. During my experiences of collecting quantitative data describing teacher practice I was often frustrated by the state educational agency and my school division's central administration's emphasis on quantitative summative data in the form of students' test scores and the emphasis upon specific instructional practices deemed the most effective means for achieving acceptable test scores. An increase in effective research-based practices that ensured acceptable test scores was the primary instructional goal, rather than growth in the quality of instructional practice that supported students' learning beyond state criterion-referenced tests. I moved from one supervisory or administrative position to the next wanting to pursue ways of working with teachers that explored the level of teachers' and students' thinking within instructional activities.

It was my contention that qualitative research methodology using a phenomenological framework would provide opportunities for both the participant and the researcher to observe and think about instructional practice. This methodology would provide a forum in which the researcher and the participants could examine existing constructions of questioning during literature discussion and work toward increased knowledge and sophistication in their

constructions. By implementing video stimulated-recall as a reflective tool, I anticipated a multi-voiced reconstruction of the phenomenon as the participants and I conducted our inquiry into teacher thinking during questioning.

Qualitative Research

Qualitative research is a field of inquiry in which an observer interprets and represents phenomenon in terms of the meanings people bring to that phenomenon. This type of research can describe routine and problematic issues within individuals' lives through varied empirical methods. Qualitative research privileges no single methodological practice or paradigm, yet multiple theoretical paradigms make use of qualitative research methods (Denzin & Lincoln, 2005). These methods or practices may include narrative content, discourse and archival analysis, as well as applicable statistics and graphic explanations. Qualitative methods are ways of finding out the actions, knowledge, thoughts, and feelings of people by observing and interviewing them (Patton, 2002). Qualitative methods or practices are used in the context of human disciplines, particularly in the areas of sociology, medicine, communications, and education.

Qualitative research supports natural inquiry as a discovery-oriented approach in which the researcher minimizes manipulation of the study's setting and limits predetermined variables that may be used to describe the phenomenon under study. The researcher sets out to understand real-world situations as they unfold naturally or routinely in a given setting (Patton, 2002).

The research took place within four elementary classrooms. The focus of the inquiry was on teachers' questioning and the teachers' explanations of how they reason and access information as they question students during discussion. Relevant studies concerning cognitive processing or cognitive skills inquiry for the most part use experimental designs; however, there is support for nonexperimental, qualitative methods such as stimulated recall within education (Calderhead, 1981/1987; Morgan, 2007; Westerman, 1991). This method provided opportunity to investigate naturalistic, descriptive accounts of teachers' thinking during questioning.

Phenomenological Framework

Considered as a form of qualitative inquiry, phenomenology aims at gaining a deeper understanding of the nature of everyday experiences (van Manen, 1990). One form of phenomenology is existential phenomenology research, which is specific experience of individuals involved in actual situations (von Eckartsberg, 1998). Phenomenological research

focuses on how our interpretations of phenomenon we experience are put together to make sense of our world. Respondents within this method share experience and are able to express their thoughts in a "spoken, written, or graphic fashion" (Seamon, 2000, p. 17). For the participants and researcher of this study, the phenomenon being interpreted was "teacher questioning." Thoughts were expressed through the spoken words of the participants and the written words of the researcher.

Stimulated Recall

Stimulated recall is considered to be a valuable research method for investigating cognitive processes as the participant directly reports introspective reasoning (Calderhead, 1987; Lyle, 2003; Morgan, 2007; Plaut, 2006). Video-stimulated recall or V-SR is a procedure in which videotaped segments of behavior are replayed to a participant who is an actor in the video passage. The participant generates a verbal account regarding actions and the thinking guiding those actions during the review of the video segment. With current emphasis on critical reflection in professional education, research has been focused on participants' stimulated reflection (Daly, 2001; Liimatainen et al., 2001). A verbal account may be accompanied by a "think-aloud" procedure generated by the participant (Allison, 1987; Tjeerdsma, 1997) or a probe technique used by the interviewer to facilitate the participant's thinking. The prompts generally employed to stimulate recall are in the form of open-ended questions posed to the participant as soon as possible after the taping of the passages (Byra & Sherman, 1993; Martin et al., 1986;   In his report on stimulated recall in naturalistic research, Lyle (2003) outlines protocol for video-stimulated recall that serves as a checklist for this study. As a result of his study of video-stimulated recall, Lyle recommends that researchers ensure minimal intrusion into the activity under study while also minimizing the time delay between the videoed event and participants' recall. During the process of recall the researcher strives to reduce participants' anxiety while assuring them that the probing technique is not judgmental. Lyle cautions that while the function of probes is to stimulate the participants' recall of specific behaviors, probes should be structured so that novel insight, particularly that of the researcher, is not introduced into the recall process. Participants should be allowed "relatively unstructured responses" during retrospection of the events in the videoed passages.

This study incorporated recommendations of Calderhead (1981), Lyle (2003), and Marland (1984) with minimal variation from the combined techniques used in their studies.

Multiple lessons involving literature discussion were video-taped using a stationary video camera. The researcher recorded observational field notes during these sessions. The stimulated recall sessions followed the video recorded lesson as promptly as possible. The participating teacher and the researcher viewed the recorded sessions, wherein the participant identified questions posed during the discussion sessions. She was asked to give a verbal account of her cognitive recollections during the formulation and delivery of the identified questions. As the participant and researcher reviewed the recorded lessons, the stimulated recall sessions were audio recorded as a source of reflexivity and verification of appropriate research procedure for the researcher.

Qualitative researchers must remain cognizant of the fact that research is interpretive and guided by one's particular beliefs about the world. These beliefs are a product of the researcher's personal biography as one who "speaks from a particular class, gender, racial, cultural, and ethnic perspective" (Denzin & Lincoln, 2005). Realizing that such beliefs affect the researcher's interpretation of events and participants' responses, I situated myself within the context of the research and examined the personal characteristics, experiences, and beliefs relative to this research topic.

Research Procedure

Participants

Participants in this study were four female elementary language arts teachers who volunteered at the conclusion of the researcher's presentation of the research design at a meeting of fourth and fifth grade language arts teachers at one elementary school. Three of the participants taught fourth-grade students and one taught fifth-grade students. The four teachers met current state licensure requirements for teaching language arts in their respective grade levels. The teaching experience of the teachers ranged from 4 to 21 years. Three of the teachers had master's degrees in literacy instruction.

A total of 87 students in 4 classrooms participated in the classroom discussions. The students represented a wide reading ability range including students designated as gifted learners and those identified as special needs learners. There were 3 students among the 87 students who were identified as English Language Learners. The pilot study was conducted over a period of four months during the fall and spring semesters of the 2009-10 school years in a PK-5 elementary school located in rural southeastern United States. The school served a population of

627 students with a racial breakdown of 51% Black, 43% White, 3% Hispanic, 2% Asian, and 1% American Indian. The school qualified as a Title I school and had met state accreditation and AYP guidelines for the past six years.

The fourth and fifth grade teachers were teamed in dyads wherein one member of the teacher team taught language arts and history/social science while the other teacher was responsible for math and science instruction for approximately 40 students. Students moved between the two teachers' classrooms for instruction and reported to computer lab and health/physical education classes each day. Classes were designed to run 45 minutes in length; however, teachers were allowed some flexibility within their teams to extend instructional blocks when needed.

A total of 16 classroom discussions, four sessions per teacher, were observed and video-recorded during the pilot study. Classroom discussion groups ranged in size from 4 students (grade 5), to 8-10 students (grade 4) and to 22 students (whole-class grade 4). Each teacher participated in a video-stimulated recall session following her recorded classroom discussions, thus 32 sessions of audio and video recorded sessions were reviewed by the researcher. The V-SR transcripts contained the teacher and student dialogue with the teachers' comments during the stimulated recall inserted wherever the teacher paused the video and explained her thinking or actions. The researcher's probes were also inserted within the transcript. All sessions were transcribed by the researcher. Transcriptions, a digital video copy of the classroom discussion lesson, and a printed copy of the V-SR transcript were provided to the respective teachers for their review and comments as soon as possible following the V-SR session.

Data Sources

Video and audio recordings. As mentioned earlier, it was my intent that the study's setting would be as naturalistic as possible and the research least intrusive. Steps were taken to put the teacher and students at ease during the process of video and audio recording. Teachers were consulted as to what they considered the least intrusive yet most advantageous locations for technical equipment. The small handheld video camera was placed in a location away from classroom activity to remain unobtrusive and was focused on the teacher. Two small audio recorders were placed near groups of students. Video and audio equipment was set up as early as possible on the day of scheduled recording in order that students and teachers would become accustomed to the presence of the technology.

Video-stimulated recall sessions. The video-stimulated recall (V-SR) sessions were scheduled on the same days as the videoed lessons in order that the teacher's introspection could be as immediate as possible. In most cases, this occurred at the end of the school day after the students had been dismissed. One exception was a V-SR session that took place one day following the videotaped lesson due to an unexpected event that required the teacher to leave school shortly after the lesson was recorded. The V-SR sessions took place in the teachers' classrooms where only the researcher and the teacher were present. Each recall session began with the researcher explaining that the teacher and researcher would view the videoed passages together. The researcher instructed the teacher to pause the tape wherever the teacher determined that she had asked a question and then describe her reasoning at the time of the question or statement.

The participants were told that they could elaborate on any element of the question; however, the researcher listened closely to determine if a reason was given for asking the question. If a reason was not given, the researcher prompted the teacher to further elaborate on her reasoning for asking the question. Researcher prompts were carefully worded to minimize influence or interfere with the cognitive process of the teacher during the focused event. With this in mind, the researcher prepared sample prompts derived from research studies conducted on the topic of stimulated recall (Calderhead, 1981; Lyle, 2003; Mitchell, 1994). Sample prompts included: (a) "Describe what you were thinking when you asked this question?" (b) "What prompted you to ask this question?" and (c) "Why did you ask this particular question?" These video-stimulated recall interviews were audio recorded to provide accurate representations of the teachers' explanations and to document the researchers' participation in the V-SR activity.

Field notes. In addition to the audio and video recordings, I made systematic field notes during interviews and observations. Field notes were not recorded during video stimulated recall sessions because the researcher thought it inappropriate to record notes while the teachers were explaining their reasons for questioning. My impressions and insights of the classroom climate along with details about the physical environment were noted. Descriptions of interactions and activities that took place during the phases of the research study were written down to serve as a running record of details that would later augment transcriptions. Diagrams and sketches that charted the physical arrangement of the groups were made.

Reflective journal. The researcher's reflective journal served as a repository for personal thoughts, impressions, and intuitions that arose during the research procedure. Recurring themes of the reflective journal were the researcher's commentary and emotional reactions to events that occurred during the implementation of the research design. Occurrences during the research procedure prompted analytical insights as well as thoughts for modifying the research design.

Data Analysis

The researcher typed the transcriptions of the video stimulated recall sessions. Hard copies of the transcriptions along with digital copies of the classroom discussion were provided to each participant for the purpose of member checking for accuracy. Upon review of the transcripts, the participants did not recommend revisions of the transcripts. The researcher read each transcript multiple times for the purpose of locating "question events." Question events occurred when the teacher recognized a question and provided a rationale for having asked that question during the discussion. Each question event was considered as a datum.

In accordance with phenomenological methodology, I read the transcripts as I *immersed* myself in the data and gained *insight* about the salient themes and meaning embedded in the data (Bargar & Duncan, 1982). For analysis of teachers' reasons for asking questions during the discussion sessions, I used materials adapted from coding information developed by Kucan (2007, 2009). Kucan's studies were centered on comprehension instruction in the context of discussion. As a researcher and teacher educator, she used transcript analysis as a context for teacher inquiry and reflection to assist teachers in gaining insights about their discussion practice. Kucan's materials consisted of a coding manual that focused on two aspects of teacher talk: the kinds of questions teachers posed and the kinds of responses in the form of statements teachers used to facilitate discussion. The coding manual gave descriptions and examples of various types of questions and responses and was used in this study as a reference in categorizing the teachers' reasons for their questions. Teachers' question events were placed into the seven question types in accordance with the teacher's explanations for asking the questions.

Data analysis continued throughout the study. The research procedures were documented and any changes that occurred during the study were noted in order to determine impact upon the overall study and ensure dependability of the study. Triangulation took place as the video recorded discussions, the audio recorded recall sessions, and the researchers' observational notes

were compared. The coded data were reviewed by two reading specialists who are currently employed in a neighboring school division.

Results

I conducted the pilot study over a period of four months beginning in November, 2009, and ending in February, 2010. The research questions driving this study dealt with examining teachers' reasons for asking questions during literature discussion and the possible patterns of questioning evident in classroom discussions among three 4th grade teachers and one 5th grade teacher. Classroom literacy discussions were examined and qualitative analysis of teachers' reasons was conducted using data compiled from video-stimulated recall (V-SR) sessions of the teachers' classroom discussions during reading instruction. First, an overview of the teacher's reading instruction approach is explained. Second, a description of the observed classroom activities is provided in table format. Next, excerpts from the V-SR transcripts illustrating the types of questions and insights offered by the teachers for those questions are presented in vignettes. A table summarizing the types of questions described by the teachers is located in Appendix A.

Perceptions of Reading Approaches

Researcher's perceptions of the fourth grade reading approach. According to all four teachers and the principal of the school, the language/literacy program implemented in this school and throughout all elementary schools within the school division was described as a Guided Reading approach patterned upon the work of Fountas & Pinnell (2001). The framework of Guided Reading was flexible and accommodated multiple sources of content studied, text, and configurations of students (individual, small groups, the whole class). The three blocks of instructional content were 1) Language & Word Study, 2) Reading Workshop, and 3) Writing Workshop. During Reading Workshop it was possible for students to be involved in one of three activities: Independent Reading, Guided Reading, or Literature Study. Eight observations for this study were conducted within Guided Reading activities while eight observations were conducted in Literature Study groups. Teachers informed the researcher as to which reading blocks supported the most discussion about text. Two of the fourth grade teachers were observed during discussion in Guided Reading since they included Literature Study activities within this block. One fourth grade and one fifth grade teacher were observed during Literature Study activities since they preferred not to teach a separate Guided Reading block. During Guided Reading

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activities the teacher introduced a text, observed and sometimes listened to students read, and taught specific focused skills during the re-reading and re-visiting of the text. Sometimes word work was included from Word Study sessions.

Literature Study activities were those in which the teacher engaged the students in book talks. According to Fountas & Pinnell (2001), this is a venue where "routines for good group discussion" are made (p. 18). The teacher is responsible for summarizing the points students have made, emphasizing learning during or at the culmination of discussion, and introducing oral, written, or pictorial structures that aid in responding to the literature. Whether they participated in Guided Reading or Literature Study sessions, students were expected to actively engage in the reading. They were required to apply new skills they were learning. Their responsibilities included reading orally when appropriate, raising issues and questions, offering examples from their own experience, and connecting prior knowledge of text structures to what they read in the text. Students prepared for the discussion by reading and organizing their thoughts with teacher-constructed study questions or graphic organizers. Students also worked cooperatively on longer projects (ex. photo story project for book reports).

Students were grouped according to ranges or spans of reading levels. Teachers used results of students' Accelerated Reader and Star Reading assessments to determine individual student's reading levels. Teachers also commented that during the first weeks of school, each student was assessed by the teacher through the use of a reading inventory to verify reading and spelling levels.

All of the participating teachers emphasized the importance of teacher modeling of strategies in the whole class setting. Materials used during whole class instruction included skills booklets which focused on specific strategies (i.e. inferring, summarizing, cause/effect, etc.). Teachers described how these specific strategies were modeled by the teacher and practiced by the students within their respective guided reading groups or literature study sessions using their assigned texts. Literary devices (e.g., metaphor, symbolism) and story elements (e.g., plot, characters, and setting) were taught during the reading of chapter books.

In fourth grade, the teachers used trade or chapter books selected from a master list generated by the fourth grade teacher team. Most of these books were accompanied by study questions which also had been generated by the fourth grade teachers. As each teacher used a particular class set of books, these study questions were refined and placed with the set for

teachers to use, if they chose to do so. Students used these study questions as they read and wrote their responses using information from the text. The fifth grade teachers did not select book titles from a prepared reading list.

Teachers' perceptions of their fourth grade guided reading approach. During her initial interview one of the fourth grade teachers described her guided reading instruction.

The reading levels for my guided reading groups range from 2.5 to 3.5 grades for my low group, while my high group ranges from 3.6 to 6.8 grades. Presently there are 8 students in the low reading group and 14 in the high group. I wish that I could divide them into three groups, but I've tried that before and there just isn't enough time to work with three groups and cover everything adequately. I teach the reading strategies to the whole class and then divide them into their groups. While I am working with one guided reading group the other reading group is either working with the Title I teacher in smaller groups or individually. This is also when they complete their self-sustained reading. Each guided reading session lasts about 30 minutes. It's very important that the students be grouped at their instructional levels. If you try to teach a child at his frustration reading level, he just gets further behind.

Another fourth grade teacher explained that her higher and lower guided reading groups had similar grade level ranges with 9 students in the lower group and 13 students in the higher group.

I try to keep the number in the lower reading group smaller so that I can interact more with each of them – so that I can listen to them read, think aloud, and ask them questions to scaffold their use of reading strategies.

Given the option to use the guided reading small group approach or the whole class group approach, the study's remaining fourth grade teacher and her team partner had elected to try the whole class approach during that school year. She explained that the range of reading levels among students within the team allowed the two teachers to divide the students into two "manageable" reading level ranges so that larger groups of students could be accommodated. She also used the fourth grade "reading skills packets" to introduce and practice the reading strategies, identify literary devices, and recognize story elements which were then applied to chapter books. The three fourth grade teachers selected books from a reading list generated by the grade level teachers. The teachers also used study questions which had been generated by

teachers in their grade team to accompany each of the trade book titles. The study questions were refined as each title was used for instruction.

Researcher's perception of the fifth grade reading approach. There was no master reading list for fifth grade teachers. Titles of chapter books were shared between reading teachers; however, there were no "master" study questions, nor did teachers elect to use the same chapter books from year to year. The reading instruction block which was 1 hour and 15 minutes in length was not divided into smaller blocks of time each day for word study, writing, or skills practice/sustained silent reading. Mondays, Wednesdays, and Fridays were set aside for reading instruction while Tuesdays and Thursdays were "grammar and writing" days. Like the fourth grade teachers, the fifth grade teachers used skill booklets to practice reading strategies.

Teacher's perception of the fifth grade reading approach. The fifth grade teacher explained how the students were grouped throughout the fifth grade teaching team. Students' reading levels ranged between 2.7 to high school levels. The students were divided among three two-member teaching teams. Each two-member team divided the total students assigned to their team into two reading groups. The participating 5th grade teacher described her lower level students as having reading levels ranging from 2.7 to 4.0 while the higher group ranged from 4.0 to 6.0. She noted, however, that there were "students with the same ZPD in both reading groups." This teacher preferred a cooperative learning group format for her instruction. Students were organized in small groups of 4 to 5 students for most of the instructional activities. When asked to describe how specific reading strategies were taught, the teacher commented:

> I prefer a literature study approach. As we read a book, I integrate the teaching of the reading strategies within the reading of the selection from the basal reader or the chapter book. I don't "frontload" the strategies by explaining them first then reading the text. The strategies are revealed as I model them through think alouds. Vocabulary is taught the same way along with creating the word wall. We study the literary elements as we encounter them in the text.

Characteristics of Observed Activities

Participating teachers informed the researcher when discussion sessions were to be held in their respective classrooms; therefore, the teachers selected the text to be read and determined when they wanted to hold discussions. The researcher was provided a copy of the text being discussed directly before the videotaping for the purpose of accurate notation of author, etc. and

for points of reference for video recording and transcriptions. Table1 displays the characteristics of each discussion observed during daily Guided Reading activities. Each observation is described in regard to grade level and designated group (GRG for Guided Reading Group and Lower or Higher to indicate reading level ranges), number of discussants in the group, the text being discussed, description of the discourse activity, and discussion format (i.e. recitation or open-forum).

Table 1

Descriptions of Observed Classroom Activities

Discussions	Grade	Number in group	Text discussed	Description of activities (and discussion type)
			Teacher 1	
#1	4 GRG (Lower)	8	Christmas Eve Chapter 3	Teacher read sections of text orally. Teacher asked questions and students responded by raising hands and being called upon by teacher. (Recitation)
#2	4 GRG (Higher)	14	On Christmas Eve Chapter 9	Teacher read sections of text orally. Teacher posed questions and students responded by raising hands and being called upon by teacher. (Recitation)
#3	4 GRG (Lower)	8	Stone Fox Chapter 3	Teacher and students participated in "cloze" reading activity with teacher reading and pausing for students to complete reading passages. Teacher asked questions and students responded when acknowledged by teacher. (Recitation)
#4	4 GRG (Higher)	12	Charlotte's Web Final Chapter	Students had recorded "character traits" in their reading journals. Teacher read text segments and students shared answers by raising hands and being called upon by teacher. (Recitation)
			Teacher 2	
#1	4 GRG (Higher)	13	Take A Giant Leap Chapter 1	Teacher asked questions and students responded when called upon by teacher by teacher. (Recitation)
#2	4 GRG (Lower)	9	Stone Fox Chapter 5	Teacher asked questions and students shared answers from study guides by raising hands and being called upon by teacher. (Recitation)
#3	4 GRG (Higher)	13	The Hundred Dresses Chapter 1	Teacher asked questions and students responded by raising hands and being called upon by teacher. Students recited answers from study guides (Recitation)
#4	4 GRG (Lower)	9	Marvin Redpost	Teacher asked questions and students responded by raising hands and being called upon by teacher.(Recitation)

Table 1

Descriptions of Observed Classroom Activities (cont.)

Discussions	Grade	Number in group	Text discussed	Description of activities (and discussion type)
			Teacher 3	
#1	4 Whole Class	23	The Hundred Dresses Chapter 1	Teacher asked questions and students responded by raising hands and being called upon by teacher. (Recitation)
#2	4 Whole Class	23	The Hundred Dresses Chapter 5	Students read different segments of the text. Teacher asked questions and students raised their hands to respond when called upon by teacher... (Recitation)
#3	4 Whole Class	22	"Blame It On The Wolf" (A Play)	Students read the play for homework the previous night. Teacher assigned parts to students. Teacher asked questions and students responded when acknowledged by teacher. (Recitation)
#4	4 Whole Class	22	Cal Ripken, Jr.	Teacher asked questions and students raised hands to respond when acknowledged by teacher. (Recitation)
			Teacher 4	
#1	5 Whole Class	19	The Best Christmas Pageant Ever	Students read the chapter before class. Teacher asked questions and students raised hands to respond when called upon by another student. (Recitation)
#2	5 Whole Class	20	The Best Christmas Pageant Ever	Teacher asked questions and students raised hands to respond when acknowledged by another student. (Recitation)
#3	5 Whole Class	19	Sweet Clara and the Freedom Quilt	Teacher read the story aloud to students and asked questions about the story. Students responded by raising hands and teacher called upon student. (Recitation)
#4	5 Whole Class	20	Sojourner Truth	Teacher read the story aloud to students and asked questions. Students raised hands and responded when called upon by teacher. (Recitation)

Note. GRG = Guided Reading Group. Higher = higher reading levels. Lower = lower reading levels.

As shown in Table 2, the 16 discussions were identified as recitation. Recitations were typically characterized by the interaction pattern of teacher initiation, student response, and teacher evaluation, commonly known as IRE (Cazden, 2001). The recitational question and response sequences observed were teacher-dominated events in which the teacher maintained control of the direction and substance of interaction. Studies have shown that when discussions of literature were dominated by the recitational approach the results were students' recall of

particular episodes from text or "canonical" interpretations of the teacher (Marshall, Smagorinsky, and Smith, 1995; Nystrand et al., 1997).

Data Coding

To assist in the analysis of the teacher video-stimulated recall transcripts, the researcher used materials adapted from Kucan (2007). A table was constructed that described and gave examples of various types of questions that appear in teacher talk studied by Kucan and other researchers (Jewel & Pratt, 1999; Rosemary, Freppon, & Kinnucan-Welsch, 2002) who studied teacher talk during literature discussion. Teacher questions were categorized into 7 types of questions and corresponding examples of teacher questions. The 7 types of questions were: *Retrieve, Relate, Think/Explain, Think/Infer, Think/Predict, Think/Connect, and Think/Evaluate* as interpreted by the researcher. These question types are described and examples from the transcripts are given below.

- Retrieve questions asked students to use information that came directly from the text, personal experience, or memory (Where and when was Neil Armstrong born? Can you name the supporting characters in this story?),

- Relate questions asked students to think and talk about personal experiences (Do you make a frown when you're worried about something? Are there some times that you hold your head down when someone has spoken to you and you feel uncomfortable?),

- Think/Explain questions asked students to focus on explaining the meaning of a specific segment of text (What is going on here? How does this work?)

- Think/Infer questions asked students to consider information from more than one segment of the text or to infer information from what is given in one text segment (What happened earlier in the story that might him take this action now? What do you think she was hoping to see when she looked at Peggy?)

- Think/Predict questions asked students to use information from the text to make a prediction about what might occur next (What are some things we might learn about Cal Ripken, Jr. from this story?)

- Connect/compare/contrast questions asked students to connect, compare, or contrast information from one segment of text to information from another part of the text (How does his statement connect to some of the things we learned about his family earlier in the story?)

- Think/Evaluate questions asked students to provide an evaluation or judgment about a situation described in the text or to choose among possible alternatives (Should she go with her friend or stay home and wait for her parents?)

Question Event Data

This study explored the reasons teachers provided in explaining their thinking about questions they asked during literature discussion. A second purpose of the study was to determine the types of teacher questioning evident in literature discussions across three 4th grade teachers and one 5th grade teacher. Data from teachers' video stimulated recall sessions of 16 classroom literacy discussions were compiled using a Question Event Matrix using the previously explained 7 types of questions. A question event consisted of the teacher's question, the corresponding student response(s) and the teacher's V-SR explanation immediately following the last student response to the question. Qualitative analysis of the teachers' reasons for asking the questions was completed using this Question Event Matrix. A tally of the number of times each type of question occurred within each discussion was also recorded. From this tally, a table showing the percentage of occurrence for each type of question was computed (Appendix A.)

Retrieve questions. Retrieve question events were those that called for remembering or locating information explicitly in text or represented in illustrations. Analysis of the V-SR sessions showed that retrieval questions were the most frequently asked questions and made up 42% of the total questions asked. These retrieval questions prompted the students to gather information, solve words, and connect prior knowledge. Examples of retrieval questions were identified by the teachers during their V-SR sessions. Each question event is followed by the teacher's explanation (shown in italics). This question event occurred during the discussion of "On Christmas Eve" (Martin, 2006).

Teacher: Who is the main character in this story?

Katrina: Tess

Teacher: That's right, her name is Tess. Are there some supporting characters in this chapter? Can you name them for me, Andrew?

Andrew: Her sister, Evvie.

I always ask this question for every story. It's important that we identify the main character and supporting characters of the story. The state learning standards differentiate between the two. Near the end of the lesson, we will draw a story map.

The students need to have identified the characters to contribute to the story map.
While discussing "Marvin Redpost" (Sachar, 1999), the teacher gave this explanation for asking a similar retrieval question:

> *The Casey question…I asked about a lot of the characters who were introduced at the beginning of the book. I'm trying to make sure that they aren't mixing up the characters. It's important that they can identify the characters and then build mental descriptions of them. Later we'll talk about motives for some of the character's actions and the supporting characters' relationships to the main character. The second question was to determine if the student could locate the information in the text as evidence.*

The teachers' comments addressed retrieval questions which required the readers to recall or locate characters from the text. She expressed the importance of this skill in completing a graphic organizer and assessment. Another example of a retrieval question required readers to determine word meaning.

> Teacher: What does it mean to be "on exhibition?"
>
> James: Kinda like being on top.
>
> Ricky: Like in a museum for people to look at.
>
> Teacher: Like in a museum for everyone to see?
>
> Ricky: Yeah.
>
> Teacher: You do see exhibits in a museum for everyone to see. It's on display. It's an exhibition for everyone to see. Wanda's drawings were spread across the room on <u>exhibition</u> for all of the students to see.
>
> *I was looking for the meaning of the word here. The students had been given this word in their vocabulary list, but I hadn't asked them to pull out their definitions yet. "Display" is part of the formal definition. I wanted to help the student <u>connect</u> his idea of the word (exhibition) to the formal definition, so I brought the two ideas together, hoping that this would help him picture an exhibition in a museum in his mind. I'm asking him to connect what he already knows to the idea of how the word exhibition is used in this story.*

Just as three teachers used retrieval questions to identify word meanings, this teacher used a more interactive discourse to discuss the meaning of the word, "herd". The students were revisiting the first chapter of "The Best Christmas Pageant Ever" (Robinson, 1972).

Teacher: Does anyone know the meaning of the word "herd"?

Jimmy: It's like a group of something.

Teacher: Can you be more specific?

Robert: Like a big place.

Angela: It's like an animal.

Mark: It's like a bunch of cattle.

Teacher: Would one member of each group open your dictionary and find the meaning
 of the word, "herd" for us. You have thirty seconds.

Teacher: OK. Time's up. There are a couple of things we need to know. What page did
you find the definition of "herd" on and what are the guide words at the top of
that page?

Maya: Page 351.

Teacher: What are the guide words?

Maya: Henpeck and herein.

Teacher: Read the definition of "herd" for us, please.

Maya: Herd – a noun. A number of cattle or other animals of the same kind, kept or
staying together as a group; a large crowd of people. Verb. To bring together
in a herd. Herder, herdsman.

Teacher: Let's think. One of you told me that a herd was a group of something, another
said… *(She points to Angela.)*

Angela: An animal.

(The teacher points to Mark.)

Mark: I said cattle.

Teacher: Do you think "herd" is referring to a group of animals or cattle in this sentence?

Multiple Students: Nooo…

Teacher: What do you think, Robert?

Robert: It's talking about a bunch of people staying together.

Teacher: Alright, a bunch, or a group of people who are staying together. I want
you to remember this definition – it's not one of our story vocabulary words,
but keep it in mind as we learn more about the "Herdman" children. I want you
to think about why the author would have chosen this last name for the family.

The teacher offered this explanation.

I noticed that this author picks very descriptive names for her characters. This was the last name of a family of children who often acted like "a bunch of animals" and created chaos. I'm bringing this out now in the hope that as we point out more description about the characters' actions, [the readers] will put this information together and recognize this as part of the author's craft. Of course, the questions about guide words in the dictionary are my way of checking to see if they can apply their dictionary skills.

As the teacher explained, the questions asked the students to retrieve information first from recall and then from a text (dictionary); however, the cognitive behavior exhibited by the students can be interpreted as relating background knowledge while the teacher is guiding them to gather information for future analysis. This was a question that was double coded as both *Retrieve* and *Relate*.

Relate questions. Relate questions asked students to think and talk about personal experiences or to offer personal opinions/reactions to text. Relate questions that encouraged students to relate ideas in texts to their personal experiences constituted 7% of the questions asked. Several of the relate questions challenged students to use text-to-self strategies to empathize with the characters as in this segment of talk about *Sweet Clara and the Freedom Quilt* (Hopkinson, 1993):

Teacher: "Sweet Clara, you ain't gonna last in the fields, but I got a idea." Think

about Clara. If someone said that to you, how do you think that would

make you feel? Maggie?

Maggie: Sad.

Teacher: What would you feel, Rachel?

Rachel: Angry.

Teacher: Why angry?

Rachel: It would make me feel like she was putting me down. Like I wasn't as good as

the rest of the workers – kind of like I was too weak to do the work.

Here I am just trying to get the students into the text by having them empathize with the

character. I want them to connect their own experience with that of the character.

Another example of a relate question was asked during the re-reading of *On Christmas Eve*

(Martin, 2006).

Teacher: "…part of the excitement of an autumn that has left me nearly breathless."

Did this first part of the story remind you of any event in your life? Kara?

Kara: I feel like that when I'm waiting for the bus.

Teacher: Describe how you feel.

Kara: Very cold and shivery. I wear my big coat and stomp my feet to keep them warm.

Teacher: Anyone else have an experience like this one? Have you ever been so cold that it took your breath away? Chris?

Chris: I've been really cold at a football game. I was all bundled up, but the air was so cold that it hurt to breathe air in.

Teacher: So in a way you felt breathless?

Chris: Yeah.

I want the students to feel like the characters of the story – to be "in" the story. I ask questions that will help them relate their own experiences to those of the characters.

Throughout the discussions the relate questions asked students to make connections between personal experiences and the plot, characters, or setting of the text (text-to-self). It is also possible that this question could be considered as a *Think/infer* question since the teacher is asking the students to infer how the character feels or asking the students to empathize with the character.

Think/explain questions. Think/explain questions asked students to explain the meaning of a specific segment of text or idea. Teachers used this type of question when they particularly wanted students to explain meanings of figurative language, words in context, or when they wanted students to explain events described in the text in the students' own words. Think/explain questions comprised 17% of the total question events. In their discussion of *Stone Fox* (Gardiner, 1980) the students explained their interpretation of a term used in context.

Teacher: What do you think grandfather meant by the term, "city slicker"?

Richard: People that are dressed up and look slick.

Amy: They were people dressed up like they were going to a wedding.

Teacher: Grandfather says, "Why, they don't know a potato from a peanut."

Carson: I know what he means. City slickers are people who don't know anything about farming or living in the country. They don't know a vegetable from a nut and

they act different from the farmers. They don't know how to grow them.

Teacher: I think Carson has an idea of what grandfather was saying.

During the V-SR session, the teacher explained:

We really haven't gotten into the different types of figurative language yet, but it's important that the students be able to recognize that phrases like "city slicker" are not literal. Having the students talk it out and give their interpretations helps. Most of the time, someone has the background knowledge and contributes enough information that the students can figure it out on their own. You can tell that Carson is really connecting his background knowledge here. His dad is a tobacco farmer.

Think/infer questions. Students were asked to infer information from multiple text segments or "read between the lines" in single text segments to figure out why an event occurred or why a character has acted in some way. Among the total number of questions asked, 26% of teacher queries encouraged students to infer information beyond the literal meanings of the text. In many of the question events students were asked to infer events that might be critical turning points in the plot of a story. In the following discussion of "Sweet Clara and the Freedom Quilt" (Hopkinson, 1993), the teacher followed up her read aloud with this question:

Teacher: Think about what Aunt Rachel said: "You're gonna be a real seamstress." Why do you think that's going to be important to Clara?

Carla: She's not going to have to work in the fields with the other slaves.

Teacher: Anyone else have thoughts as to why this would be important?

Kayla: She was too weak to work in the fields so this way she can live longer.

Michael: Her owners might keep her longer because she can sew really good. They might not want to sell her as fast as some of the other slaves.

Aaron: That might get her sold to somebody else quicker because she can do more than work in the fields. She has a talent.

Teacher: So you think that Clara's talent is going to be important to the plot of the story?

Multiple Students: Yes.

I asked this question because I wanted them to think about why Clara's becoming a good

seamstress might be so important to the story. I realize that I'm on the fringe of

prediction right here, but the text never states that this is one of the major turning points

of Clara's life. This is something that they need to infer from what the aunt says and

a previous occurrence – Clara not being able to work in the fields.

       Think/predict questions. This question event occurred during a discussion about "Cal Ripkin, Jr." (Ripken, 1999) when the teacher asked a think/predict question as part of the introduction to the book.

       Teacher: What are some things that we may learn when we read this book?

       Marcus: Something like when and where he was born.

       Ashley: We might find out when and where he died.

       Teacher: What other things might we learn about Cal Ripken, Jr.?

       Susan: How he got started in baseball.

       Thomas: We might find out where he grew up and where he went to school.

       Teacher: Good predictions! How do you know these things might be part of what

          we will learn?

       Susan: It's a biography.

       Marcus: This is like the Lou Garrick story. It told us about things that happened in

          his life.

This question was asked to help the students with their comprehension. Before

they begin to read they already have an idea of what they're going to be able to

take from the text. They're getting an idea of the purpose of the story and are

anticipating the information they'll be getting from the text because they have

had experience in reading a particular genre (biography.) They already know what types

of information may be provided to them.

These students were connecting their knowledge of a specific genre of text read previously to future action of the present text. This question was doubled coded as both a think/predict and a text-to-text, relate question

       Think/connect/compare/contrast questions. One teacher explained her reasoning for asking a think/connect question in this excerpt from the students' discussion about *The Hundred Dresses* (Estes, 2004).

       Teacher: It also says here that [the girls] were saying to themselves that there were

a hundred dresses all lined up. Where have you heard that before?

Alison: Wanda had told them that there were a hundred dresses all lined up in her closet.

Teacher: Yes! When and where did she tell them this?

Marsha: When they played the hundred dresses game before school and on the playground.

Teacher: So how does all of this connect back to what Wanda was telling them each day when they played the hundred dresses game before school and during recess?

Walter: She was telling them the truth. They thought she was lying to them, because she wore the same dress every day to school.

Teacher: Do you think that Maddie and Peggy believe Wanda has a hundred dresses now?

Alison: I think they believe that she [Wanda] thinks she has a hundred real dresses.

Teacher: Why do you think that?

Alison: It says here, "Look, Peg," whispered Maddie, "there's that blue one she told us about. Isn't it beautiful?" "Yeah," said Peggy, "and here's that green one." It sounds like they are talking about real dresses.

Teacher: Knowing what we know about Wanda's family and home, do you think the hundred dresses are real?

Multiple Students: No.

I asked them this question because I wanted them to connect the conversations that the two girls had with Wanda earlier in the book to the conversation they had while looking at all of Wanda's drawings near the end of the story. I thought this was an important turning point, the climax, of the story. They hadn't believed Wanda, yet they remembered her descriptions of the dresses well enough to compare them to the drawings. They did talk about the drawings as though the dresses did exist. Here we're building to the point, hopefully, that the students realize that Wanda wasn't lying – she had created a world where there were a hundred dresses in a row.

Teachers mainly used Think/connect/compare/contrast questions during the discussions to connect across events within the text. Think/connect/compare/contrast questions comprised 4% of the total questions asked.

Think/evaluate questions. Less than 1% of the total questions were think/evaluate questions. An example of a think/evaluate question asked students to describe the aesthetic qualities of the text, *The Best Christmas Pageant Ever* (Robinson, 1972):

Teacher: Are you enjoying the book? If so, tell me what you like about the book.

Multiple Students: Yes!

Marvin: It's funny because of the way the author tells about some of the trouble the Herdman children get into.

Teacher: How does he make it funny? Eliza, do you agree with Marvin? If so, how do you think the author makes the story funny?

Eliza: I think the way the author told about the Herdmans eating the firemen's doughnuts was funny. The part about that you could see the doughnuts around Ollie's middle.

Teacher: Anyone else have a funny part they want to share?

Kenneth: The part about the fireman grabbing Claude and asking him if they set fire to the tool shed smoking cigars.

Richard: But they were playing with Leroy's chemistry set that he stole from the hardware store. That's what caused the fire.

Teacher: Can someone read a passage from the text that is a good example of the author's use of humor?

Deanna: This was funny. "…six skinny, string-haired kids all alike except for being different sizes and having different black-and-blue places where they had clonked each other."

Teacher: Tell me if I'm hearing what you're telling me correctly. You think the story is funny because the author describes the Herdmans as troublemakers who set fire to buildings, eat someone else's doughnuts, and hit each other?

Multiple Students: No.

Perry: It's the way she [the author] writes it so that you can see the Herdmans doing those crazy things – like clonking each other – it's the words she uses that make it funny. I could see them hitting each other – like CLONK right in the head.

Teacher: I see. You like the author's use of descriptive words. I agree. When you hear

the word CLONK, you hear the action. It's like when you say "ribbit" and you make or imitate the sound that a frog actually makes.

I was going for aesthetic qualities here, but I don't know if that was the result. This book has a very serious side as well, and we'll discover that later on. It may be even more effective to compare the two qualities of the text – the humorous and the reverent meanings of Christmas and how the author blends them to get a message across to the readers – I'd better write that down – there's also the issue of bullying that will be evident soon in the next couple of chapters. It will be interesting to see how seriously these readers take some of the social issues that are presented in this "funny" text.

The preceding teacher's reflection is an example of how the teacher may ask a question with a specific purpose in mind rather than a pre-determined answer. This reflective passage is also an example of the unselfconscious thinking and inner dialogue teachers shared with the researcher during the video-stimulated recall sessions.

Summary and Conclusions

Research in schools has revealed that teachers depend on particular linguistic strategies for guiding, monitoring, and assessing instructional activities in the classroom. All teachers ask their students questions even though teaching styles and classroom organizations may differ. As with any discursive strategies, teachers can use questions effectively or less effectively. Studies have found that more effective teachers used question-and-answer sequences not only to test knowledge, but also to guide understanding (Rojas-Drummond et al., 1998). Within these studies, teachers used questions to gauge students' initial understanding and adjust their teaching accordingly. To make an evaluation of teachers' questioning, we need to consider what the teachers' intended pedagogical goal might be. The research questions addressed in this study considered (1) the reasons three fourth grade teachers and one fifth grade teacher gave for asking questions during literature discussion, and (2) the types of questioning evident in literature discussions across these teachers.

Teachers' Reasons for Asking Questions

Teachers in this study asked questions within a pattern of teacher initiation, student response, and teacher evaluation (commonly known as IRE). Researchers who have studied this framework suggest that teacher-led discussions enable the teacher to draw attention to features and salient themes that guide students to better comprehension of text (Durkin, 1979; Menke &

Pressley, 1994). It was evident in this present study that teachers concentrated on vocabulary and literary features of the literature. Of the 322 question events analyzed, the retrieval questions (43%) focused on word meaning, and literary features of plot and characters within the stories. A recent meta-analysis of 49 studies which examined effects of teacher-led discussions within small-group approaches found that students showed considerable interpretive flexibility during teacher-led discussion (Soter & Rudge, 2005). In this present pilot study, 25% of the teachers' questions elicited students' inferences about characters' motives and events in the stories while 17% of the teachers' questions asked students to explain their thinking. Questions that prompted students to relate their personal experiences to characters or events in the stories made up 7% of the total questions. Students were asked to predict story events in 4% of the questions. Teachers asked students to connect information across segments of text in 3% of their questions while students were asked to evaluate text in less than 1% of the total questions asked.

Talking About Text vs. Discussion

The Merriam-Webster Dictionary (2011) defines the term "discuss" as a verb meaning (1) "to investigate by reasoning or argument," (2) "present in detail for examination or consideration," and (3) "to talk about." On the other hand, the term "discussion" is a noun that is defined as "consideration of a question in open and usually informal debate," or "a formal treatment of a topic in speech or writing." The teachers in this study used the term "discussion" to describe "talk about text" as the teachers and readers used a reading comprehension approach that incorporated strategy instruction. Strategy instruction encourages students to think about their mental processes and execute specific cognitive actions to interact with text (McKeown, Beck, & Blake, 2009). Talking about text in the context of this strategies approach better fits Merriam-Webster's definition of "discussing" rather than "discussion." The term "discussion," on the other hand, would be better served in the context of a more in-depth conversation in which readers would have been allowed to engage in talk about the ideas in the text and building mental representation of the ideas. This type of reading comprehension instruction exemplifies a content-oriented approach in which the students' attention is focused on general, more meaning-based questions about the text (Baker & Brown, 1984; Chinn, Anderson, & Waggoner, 2001; Saunders & Goldenberg, 1999). The present pilot study sought to examine the reasons teachers asked questions during discussion of literature. Despite considerable references to the term "discussion" during the teachers' interview responses, the observations of these classroom

discussions showed very limited incidents of open and in-depth exchanges of ideas. What was interpreted by the teachers as discussion more closely resembled what Nystrand (2003) described as "question-answer discussion," a form of recitation.

The classroom talk during the observed activities of this study revealed the teachers' misconceptions of discussion during the Reading Workshop phase of Guided Reading. The Guided Reading professional literature (Fountas & Pinnell, 2001) referenced by the teachers in this study differentiates between discussing text during guided reading lessons and discussion that characterizes Literature Study. Though there were incidents of uninterrupted, multiple-student responses during a limited number of question events, the topic and turn-taking were closely controlled by the teacher. The discussions observed were indicative of the pedagogical discourse described by Skidmore (2003) as a transmission model of teaching. During pedagogical discourse, one expert is in possession of knowledge and instructs someone who is ignorant of it. Though there was some evidence of teacher's questions being more open-ended for a brief period during the talk about text, it is my opinion that there were an insufficient number of open-ended question events to constitute authentic discussions of literature.

Time for Authentic Discussion

Debra Myhill (2006), in her study of questioning and comprehension skills during classroom discourse, contended that teacher discourse would not support student learning if it is "concerned first and foremost with curriculum delivery and with leading pupils to a predetermined destination" (p. 39). When teachers feel bound to curriculum, timelines, and assessments that hold them accountable, those boundaries will structure talk about text. The initial interview comments of the participating teachers reflected the immediacy of demands for content coverage and effective use of time. The teachers described their dilemma in meeting the prescribed pace of the curriculum and ensuing assessment:

> This is what [my schedule] is like – it doesn't mean that I like it. It's an hour and fifteen minutes – that's what makes me unhappy. On Mondays, Wednesdays, and Fridays, we're working on reading. On Tuesdays and Thursdays, we're writing and working on grammar skills because the Writing test is in March. We can't wait until the last minute to get ready for the test.

Another teacher described her reading instruction in this way:

> I set aside one hour and forty minutes total. The block is interrupted for 30 minutes

in the computer lab. (I have no control over that.) We do word study for about 20 to 30 minutes, then they go to computer. When they come back we work on specific reading/writing skills. Then we go into reading groups and I pull each group for about 20 minutes. Any day that we're not crammed – I never feel like we have enough time – we read independently.

Cause for Future Study

The purpose of a teacher's question is related to (1) how the teacher intends students to respond to the questions, (2) how the teacher guides the students' thinking, and (3) how we assist the students in learning to use the tool of questioning to further their learning process. To be effective questioners, teachers must know <u>how</u> they expect students to answer the questions as in what level of thinking they would expect the students to use. As skillful questioners, teachers must listen carefully to the content of the student responses, and use those responses in asking the next questions to shape their ideas and assist them in thinking about their ideas. The more conscious teachers are about the questions they ask and the follow-up used to the responses, the greater the impact teachers will have on the content of what students think and how they think (Dantonio & Beisenherz, 2001).

The results of this pilot study revealed that most of the teacher-student dialogue was limited to question-answer recitation rather than discussion. There is a need for further study to be carried out to investigate teacher questioning during discussion of text. Encouraging teachers to collect and analyze examples of talk from their classrooms could provide a useful starting point for professional development that might sensitize them to the functions of their questions and discussion patterns. Professional development could be focused upon alternate, participatory ways of focusing on discussion that provide students with opportunities to participate actively in their critical reading of text. An effective starting point for this professional development would be teachers' investigation of research that supports facilitation of dialogical discussion that supports students' higher-order thinking.

If the recitation method of question-answer-evaluation is to be changed, it is essential that teachers have tools to implement the change. Teacher-led discussion can have real and educationally significant consequences for the course of subsequent student talk; it may tend to retrace authoritative, teacher-controlled discourse; or it may invite students to engage in the riskier enterprise of formulating ideas and being answerable for their own thinking.

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Chapter 4: Methodology

This investigation was designed to answer the following questions:

- How will professional development in the form of a teacher study group impact the nature of discussions held in five classrooms?
- How will professional development in the form of a teacher study group affect the use of teacher questioning during discussion?
- How will a specific model of discussion affect teacher questioning to elicit critical thinking during discussion?

Positive experiences in the use of phenomenology frameworks in my earlier research projects influenced the decision to utilize existential phenomenology in the pilot study. This methodology drew upon qualitative data to determine the reasons that teachers asked the questions they asked during discussion about text. The results of the pilot study revealed that an overwhelming majority of the questions asked by the participating teachers during discussion were questions that promoted the recitation format (Almasi, 1995; Beck, McKeown, Sandora, Kucan, & Worthy, 1996; Cazden, 2001; Nystrand, 2006; Stodolsky, Ferguson, & Wimpelberg, 1981). This type of discussion consisted of repetitive chains of questions and answers that provided little opportunity for students to interact with one another or with the text in meaningful critical ways. The meaning of selected texts appeared to be located solely in those texts and subject to the interpretation of the teacher as she questioned students to obtain previously contrived answers. Teachers and students who continually participate in recitation rather than discussion may come to view the purposes of discussion solely as a means for review or assessment, rather than for constructing meaning of text (Almasi, McKeown & Beck, 1996).

Conventional naturalistic methodologies such as the phenomenological framework used in the pilot study can provide rich data; however, the data collected during the pilot did not provide specific factors about teacher questioning that inhibited or enhanced students' critical thinking about the text. The framework allowed the researcher to describe the teacher questioning and draw conclusions; however, it did not provide an opportunity to use the data to inform teachers' instructional practices. In essence, the results of the pilot study appeared to lack transformative value for all of the participants involved. The pilot study had not fulfilled my goals to gain theoretical understanding of effective teacher questioning promoting authentic discussion, nor my desire to use data to inform teachers as they sought common goals of

professional development and effective classroom interventions. With these goals foremost in mind, I selected a formative and design experiment methodology that might foster a more collaborative relationship with teachers and provide an opportunity to bridge theory, research, and practice.

The formative and design experiment methodology was chosen for further study of this research because of its flexibility and responsiveness to the input of those involved in the research. Formative and design experiments mirror instructional situations where teachers make changes in response to their perceptions of the effectiveness of an instructional method. An overview of the formative and design model and its relevance to the focus and context of the study are explained in the following sections of this chapter. The first section describes Rienking and Bradley's (2008) framework for formative and design experiments and several studies that utilized this approach. Within their organizational scheme, Reinking and Bradley also used six questions to guide the researcher in documenting the effects of data collected. These six questions are addressed within the various phases of the research process. Section 2 addresses the first two questions concerning the pedagogical goal and the intervention used in this study. Using Rienking and Bradley's organizational scheme, the research process is described in six phases: (1) participant recruitment, (2) collection of demographic and baseline data, (3) implementation of the intervention, (4) analysis of the data, (5) the comparison of baseline and intervention data, and (6) consolidation of the study's findings. These phases are described in Section 3.

Research Design

Section 1: Formative and Design Experiment (F&DE)

The interest in F&DE stems from education researchers with diverse orientations who desire to gain deep understanding of teaching and learning theory while bringing about positive change in educational practice. Researchers who favor the formative and design approach use theoretical understandings and test them in the real world of the classroom with the expectation that these theories will be modified in the course of their work. Reinking and Watkins (2000) maintain that the design was developed as a response to the following questions that are crucial to instruction within the context of ever-evolving information and communication technologies:

1. What factors add to or detract from an intervention's success in accomplishing a valued pedagogical goal?

2. How might the intervention be adapted in response to those factors to better accomplish that goal? (p. 384)

In her review of qualitative traditions Jacob (1992) emphasized that the goal of formative experimentation is to improve instruction through a combination of qualitative methods of investigation and interventions in learning situations. In her studies of culture, context, and cognition within schooling, she attributes the term, formative design, to neo-Vygotskian scholars' dissatisfaction with conventional methodology's ecological validity. The formative experiment, she suggests, arose from work of cognitive psychologists who investigated how cognitive tasks could be influenced by the context in which the task took place. She cited specifically the work of Newman, Griffin, and Cole (1989) in which computer-based science activities were specifically designed as a formative experiment. The work of Newman and his colleagues was one of the first to establish parameters of formative experiments.

Brown (1992) adopted this research approach in her work as an experimental educational psychologist. Her work was influential among literacy researchers because of her focus on metacognitive aspects of reading comprehension. She explored implications of her laboratory research upon reading instruction in the classroom. In her study, "Design Experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings" (1992), Brown described how she evolved from a classical learning theorist to designing experiments in classroom settings. She recalled how she and other researchers began to acknowledge that learning takes place in a social context; consequently, the importance of context necessitated a shift in how information was to be learned and how it would be assessed. Brown was also a proponent of video in determining contextual factors that influence efforts to implement interventions in the classroom setting.

Reinking and Watkins (2000) used F&DE to investigate how multimedia book reviews might increase independent reading among fourth and fifth graders. The researchers gathered qualitative and quantitative data during two school terms. Qualitative data in the forms of observational field notes and interviews with students and teachers were collected while quantitative data established a baseline for comparison of independent reading before and after the intervention. Four students in each classroom received instruction in writing multimedia book reviews using computers. The goal of increasing the students' independent reading was achieved. Since data were collected across multiple classrooms, the researchers were able to

observe variations in the effects of the intervention and note mitigating factors behind the differences in effects.

In 2001, Duffy published a study utilizing formative and design experiment while investigating the use of an intervention to accelerate achievement of struggling second-grade students during a ten-week summer school session. The study explored the theoretical tenet that literacy achievement can be accelerated by balanced instruction, responsive teaching, and quality instruction. The intervention consisted of a comprehensive configuration of literacy activities (book talks, read-alouds, discussions, word sorts, etc.). Instruction was adapted to meet the needs of the individual students. Both qualitative and quantitative data in the form of audio/videotapes, classroom observations, standardized assessments and writing samples were gathered. Similarly, Lenski (2001) conducted a six-month study investigating the use of textual references among third-grade students during discussion. Supported by the transactional theory of reading, constructivism and semiotics, a directed reading-connecting activity was employed to expand the number and variety of the students' intertextual references during discussion. The participating teacher acquired new beliefs about discussion and valued the range of student responses while students were observed to gain more independence and a willingness to lead more discussions.

Ivey and Broaddus (2007) adopted the F&DE approach in a study that explored theories of first- and second-language instruction for adolescent English Language Learners. The goal was to facilitate and promote engaged reading and writing among native Spanish seventh- and eighth-grade students in a language arts classroom. The intervention involved student self-selected materials accompanied by teacher-directed reading and writing activities over a period of one year. The observational data and the frequency counts of engaged reading revealed the students' expanded range of reading materials. A movement from whole-class to small-group work was also noted.

These researchers and their studies representing various interests exemplify researchers who are committed to understanding and transforming teaching and learning in real situations. Finding conventional research methodology inadequate, they sought alternatives; one alternative, the formative and design approach, better accommodated complexities of instructional practice.

Characteristics of F&DE. Based on their work using design based approaches Reinking and Bradley (2008) define six characteristics of F&DE that reflect a general perspective or

orientation rather than "a set list of criteria to be prescriptively applied to every investigation" (p. 17). The following list provides a brief explanation of the defining characteristics of F&DE:

1. *Centered in authentic contexts.* Interventions are studied in an authentic environment where all naturally occurring variation is allowed and where instruction responses are not unnaturally altered by the researcher.

2. *Goal-oriented.* The researcher articulates a goal of the intervention. This goal becomes a daily reference point to which data collection and analysis, modifications to the intervention, and assessment of progress is made.

3. *Adaptive and iterative.* Whereas other approaches base internal validity on precise specifications and implementation of an intervention within every classroom situation, the researcher using the F&DE approach assumes that the intervention may look substantially different from its initial implementation.

4. *Transformative.* The intervention has potential to positively transform teaching and learning. The unintended consequences have potential for contributing to theory building and future research.

5. *Methodologically inclusive and flexible.* Any approach to data collection and analysis is appropriate if the research can justify how the data method furthers the understanding about the theory supporting the intervention, the implementation of the intervention, and the effectiveness of that intervention. Quantitative and qualitative methods may be employed.

6. *Pragmatic.* The focus is on (a) creating conditions that allow an intervention to work, and (b) seeking theory that is directly useful to practitioners.

Section 2: Pedagogical Goal and Intervention

Framing questions. Reinking and Bradley (2008) devised an organizational framework which is guided by six questions that enable the researcher to "systematically conceptualize, conduct, and report research" (p. 73). Since this research project centered on "questioning," the components of this study are described as responses to the questions borrowed from Reinking and Bradley's framework. The first two questions are foundational in that the researcher's responses must articulate the pedagogical goal, the supporting research and theory which underlie the importance of that goal, and the intervention that is expected to achieve the goal.

The remaining four questions are foundational to data collection, analysis, and interpretation of the research findings; therefore, the responses to these questions are articulated in Chapter 5.

Q1. What is the pedagogical goal to be investigated, why is that goal valued and important, and what theory and previous empirical works speak to accomplishing that goal instructionally? The primary pedagogical goal of this study was to enable teachers to conduct authentic discussions that engaged students in collaborative reasoning. A secondary pedagogical goal was to affect teacher questioning during discussion. Research revealed that students' experience in discussion provided affective, social, and cognitive benefits to learning. Discussions promoted students' engagement with text (Almasi, McKeown, & Beck, 1996) and social benefits in the way of cultivating positive interaction between students (Goatley, Brock, & Raphael, 1995).

A significant feature of classroom discussions was the distinct pattern of exchanges between the students and the teacher. Previous findings of the literature review for this study indicated that the majority of the questions asked by teachers during discussion require limited reflective, creative, or critical thinking. Most of the time, the teachers asked cognitive-memory or factual-recall questions which comprised a teacher-dominated recitation event. Supporting research reveals that this type of discussion limits the students' opportunity to construct meaning, therefore disengaging students from developing deeper discussions (Almasi, O'Flahavan, & Arya, 2001). Conversations in which students are active participants and the teacher is the facilitator are more likely to "engage students'" in interactions to promote analysis, reflection, and critical thinking" (Goldenberg & Gallimore, 1991). In these classroom conversations students learn to discuss their understanding of a topic while listening to the ideas of fellow classmates. Teacher questions that move from literal, factual information to open-ended questions require students to examine text or information, think critically, and possibly formulate multiple interpretations.

Though the transition from teacher as controller to teacher as facilitator may seem a natural progression in classroom discussion, reading researchers and educators have devoted many studies and created several approaches to developing effective classroom discussion (Beck, et al., 1997; Palinscar & Brown, 1984; Chin & Anderson, 1998; Peterson & Eeds, 2007). As evidenced in the studies outlined in the review of literature and the findings of the pilot study, implementing discussion approaches continues to be difficult. Many teachers do not employ

questioning that stimulates students' reasoning to promote deeper understanding of text (Dillon, 1988, Nystrand, Wu, Gamoran, Zeiser, & Long, 2003).

Q2. What intervention, consistent with a guiding theory, has the potential to achieve the pedagogical goal and why? The intervention used in this study involved two components: (1) the professional development conducted to increase teachers' awareness of those questions which stimulate critical reasoning, and (2) the implementation of an established discussion approach, Collaborative Reasoning (Anderson, Chinn, Waggoner, & Nguyen, 1998; Chinn, Anderson, & Waggoner, 2001), to assist in the growth of students' critical thinking as they provide reasons and supporting evidence. The following is an explanation of these two components.

Component 1: Professional development. Teacher study groups (Clark, 2001, Cochran-Smith & Lytle, 2001) provide a context in which teachers may participate actively in their professional development and create their own conditions for change. Whether working collaboratively to solve common instructional problems or coming together to learn new curriculum content and teaching strategies, teacher study groups present opportunities for teachers to examine classroom practices and construct new knowledge about teaching and learning (Cayuso, Fegan, & McAlister, 2004). The purpose of this study group was to examine questioning practices that promote critical thinking during discussion of text.

The first Teacher Study Group (TSG) meeting began with a brief overview of the research studies and book chapters to be used as references for the group discussions. The research literature consisted of summaries and full-text articles and book chapters that addressed the topics of (a) teacher questioning during instruction (Dantonio & Beisenherz, 2001; Wallace & Hurst, 2009), (b)literary discussion (Almasi, O'Flahavan, & Alrya, 2001; Alvermann, O'Brien, & Dillon, 1990; Chinn, Anderson, & Waggoner, 2001; Gambrell, 1996; Mercer, 2007; Wegerif, Mercer, & Dawes, 1999; Wolf, Crosson, & Resnick, 2005), and c) Collaborative Reasoning as a framework to help teachers facilitate group discussions (Chinn & Anderson, 1998; Chinn, Anderson & Waggoner, 2001; Clark, Anderson, Kuo, Kim, Archodidou, & Nguyen-Jahiel, 2003). These summaries were prepared by the researcher in accordance with the guidelines of *Summarizing a Research Article* (University of Washington Psychology Writing Center, 2010). Members of the group were to have read summaries of the "teacher questioning" research prior to this meeting. During the meeting the researcher facilitated the discussion using

the CR framework. At the close of the session, two additional studies investigating Collaborative Reasoning were distributed to the teachers to be read before the next teacher study group meeting.

The second TSG meeting began with discussion of additional research materials addressing questions raised by TSG members during the first meeting. The focus of the meeting was levels of cognitive processes and how these levels could be recognized and elicited through teacher and student questioning. As a result of this meeting, the teachers generated a tool to assist them in recognizing levels of students' thinking that might be exhibited during discussion.

During the third TSG meeting, teachers discussed the provided research about classroom discussion. They identified features of the CR framework using a brainstorming activity. From the list of features generated during this activity, the group negotiated a protocol for implementing CR within class discussion. A matrix was developed to identify questions or statements and scaffolding moves teachers might use to facilitate CR based upon the examples provided in the research articles (Jaddallah, et al., 2011; Waggoner, Chinn, Yi, & Anderson, 1995). Upon recommendations from the group, a change was made to the researcher's original methodology which involved video stimulated-recall sessions following each CR discussion. Based on their experiences of V-SR following their baseline discussions, teachers felt that a more effective means of reflecting and evaluating their progress should be in the form of a written guideline which they would complete as they viewed individual videos. In place of the V-SR sessions, the members devised a video observation form that would allow teachers to view their CR discussions in a timely manner as they analyzed their facilitation of discussion in accordance with the CR protocol established during the previous meetings.

The remaining three TSG meetings were devoted to opportunities for teachers to share their progress with implementing the CR model. Group members read vignettes from their CR video transcripts, offered solutions for various problems arising during implementation of the model, and assisted one another in coding teacher instructional moves and student responses. As was the intent of the methodological design (F&DE), the cycle of ongoing data collection and analyses of the CR discussion transcripts and TSG recommendations allowed for modifications to components of the study.

Component 2: The Collaborative Reasoning discussion model. The Collaborative Reasoning discussion model was intended to create a forum for discussion wherein students use

an argument schema. The idea of argument theory stems from Vygotsky's notion of internalization: 'The higher functions of child thought first appear in the collective life of children in the form of argumentation and only then develop into reflection for the individual children" (1981, p. 157). In theory, participation in argumentative discourse helps children construct or internalize a schema for an argument consisting of at least one reason and a conclusion. Increased participation in arguments can result in more sophisticated argumentation characterized by multiple reasons, qualifiers, and counterarguments (Reznitskaya and Anderson, 2002, p. 321). CR creates an opportunity for students to think about their thinking in a reasoned manner while learning to respond to diverse views prompted by text and other sources of information (Waggoner, Chinn, Yi, and Anderson, 1995). The students gather in small groups to discuss "big questions" or issues and as they interact, they explain their positions, refer to text for supportive evidence, and listen to alternative reasons.

Teacher questioning in the Collaborative Reasoning model supports four discussion features: *critical stance, interpretive authority, control over turns, and control over topic*. Teacher questions that reflect a critical/analytic stance shift from literal questions about text to questions about reasons and evidence. Teacher questioning that reflects interpretive authority is more open-ended and does not seek one single "correct" response. The teachers ask questions that encourage construction of reasons and evidence. Questions are not asked for the purpose of assessing responses, but are asked as a means of allowing students to evaluate the soundness of others' reasoning through arguments and counter arguments. It should be noted that reaching consensus on the "correct answers" is not the goal of CR. Collaborative reasoning focuses on learning about complexities of questions and the value of examining questions through others' interpretations presented through discourse about a topic.

In the Collaborative Reasoning (CR) model, teachers are encouraged to ask fewer questions in order to promote more student turn-taking. A decrease of teacher control and increased student control of discussion is marked by the decrease of teacher IRE questioning and an increase in runs of student turns. Teachers' control of the topic is somewhat retained through the teachers' choice of the central question and open-ended questions that afford students a wider range of responses. The teacher's role is to introduce the "big question," scaffold moves during the course of the discussion, and debrief students at the conclusion of the discussion (Jaddallah, et al., 2011). The CR model follows seven basic steps:

1. After the class reads the text, a group comes together for discussion.
   (The teacher provides basics rules of talk before and after the discussion.)
2. The teacher poses a central question concerning a dilemma within the text.
3. Students freely explain their positions on the central question.
4. They expand on their ideas, adding reasons and supporting evidence from the text and experiences.
5. They challenge each other's thinking and ways of reasoning.
6. At the end of the discussion, a final poll is taken to see where everyone stands.
7. The teacher and students review the discussion and make suggestions on how to improve future discussions.

The teachers learn how to promote students' independent thinking and self-management of turn-taking through modeling strategies of prompting, clarifying, summarizing, and encouraging. Teachers learn to use phrases such as *give reasons, provide evidence, form an argument, and make an assumption* in the context of argumentation. As facilitators, the teachers may intervene if students' discussions go astray by repeating the central question, summarizing students' points so far, or asking a student to clarify a position; however, the aim of this discussion method is to give students an opportunity to improve discussion skills while eliciting a "higher rate of using beneficial cognitive processes" (Chinn, Anderson, & Waggoner, 2001, p. 408).

Section 3: Phases of the Formative and Design Experiment

Formative and design experiments follow a time line set forth through specific phases of the research development and study. The following explanation presents the six phases adapted from formative and design research studies conducted and examined by Reinking and Bradley (2008). A table follows the explanation which outlines the timeline of anticipated actions and data collected during the research process.

Phase one: Recruitment of participants. Prior to the beginning of this study, the researcher met with a school district administrator and the principal of the school to explain the nature of the research study. Assurance was given to the principal that this study would not be used to evaluate teachers' or students' performance in the classroom. During that meeting, the principal forwarded an email prepared by the researcher to teachers who taught grades 6 and 7. Those teachers were invited to an informational meeting scheduled for the following week. At

that meeting the researcher provided an oral and written description of the study. Teachers were advised of the scope of the study and the Informed Consent Form required of participants. They were also apprised of ethical issues in regard to the use of the data for dissertation purposes, confidentiality, and the participants' anonymity in the dissertation. The researcher distributed and reviewed written information packets that explained (a) the timeline of the research to be conducted, and (b) responsibilities of all participants and an explanation of the monetary compensation to be paid to each teacher for their participation in the study outside of the school day. Those teachers who wanted to participate in the study were requested to send an affirmative email to the researcher within the next three days.

Phase two: Collection of demographic data. Ethnographic methods including interviews and researcher's fieldnotes were employed to collect demographic data describing the school and participants. Pre- intervention interviews were conducted with the principal and participating teachers.

Phase three: Compilation of baseline data. Baseline data were collected during teachers' current practice of classroom discussion. Data were compiled from the first round of video recorded discussions and video-stimulated recall sessions (V-SR). These audio-recorded sessions took place in the teacher's classroom with only the teacher and the researcher present. Transcripts from the video and audio sessions were transcribed by the researcher and shared with teachers for the purpose of member checking.

Phase four: Implementation of the intervention. Reinking and Bradley (2008) describe this phase as the "heart of the investigation." During this phase teachers participated in Teacher Study Group discussions as they studied instructional moves and adaptations that might be necessary to implement the Collaborative Reasoning model into their classroom discussions. Videos and transcriptions of the CR discussions were provided to the participants as soon as possible following each discussion. The teachers viewed and analyzed their respective videos and transcripts in accordance with the group's coding matrix devised during the first two TSG meetings. During the latter three TSG meetings participants shared examples from their transcripts which exemplified enhancing as well as inhibiting factors within the discussions.

Phase five: Comparison of baseline data to intervention data. This was a point at which the baseline data from pre-intervention classroom discussion videos and transcripts were compared with data collected from the four observed CR discussions facilitated by each teacher.

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The data were analyzed by members of the TSG and the researcher to determine the effects of the intervention and progress toward the pedagogical goals. Post-intervention interviews were conducted with individual teachers and with the group.

Phase six: Consolidation of findings and summary of the results. Once the data was compiled, I conducted what Gravemeijer and Cobb (2006) called a "retrospective analysis" or meta-analysis of all the data to consolidate theoretical understandings. I drew conclusions and made recommendations based on pivotal episodes within the data. The timeline followed during the Formative and Design Experiment is detailed in Table 2.

Table 2

Research Study Timeline

Dates	Actions Taken	Data Collected
	Phase One	
December, 2011	• Met with school division assistant superintendent and principal to review goals of the study. • Met with principal and initiated recruitment procedures.	• Division guidelines for conducting research within the school division and written permission from the superintendent and principal to conduct study • List of possible teacher participants • School demographic data.
January, 2012	• Met with teachers, reviewed components of the research study, and invited teachers to participate.	• Field notes
	Phase Two	
February, 2012	• Met individually with participating teachers and conducted pre-intervention interviews.	• Signed Informed Consent Forms, • Personal teacher demographic data (i.e. experience, etc.), • Class demographic data • Audio recordings • Field notes
	Phase Three	
February, 2012	• Observed and recorded baseline discussions and stimulated-recall sessions for each teacher. • Transcribed baseline discussions and V-SR sessions, • Provided transcriptions to participants for their review. • Distributed research packets to individual teachers.	• Video-recorded class discussion sessions, • V-SR audio recordings • Baseline and V-SR transcriptions • Field notes

Table 2

Research Study Timeline (Cont.)

Dates	Actions Taken	Data Collected
	Phase Four	
March – June, 2012	• First Teacher Study Group meeting (TSG1) March 19, 2012. • Second Teacher Study Group meeting (TSG2) March 26, 2012. • Third Teacher Study Group meeting (TSG3) April 2, 2012. • Observed, recorded, and transcribed first round of CR discussions (CR1) April 23-27, 2012. • Fourth Teacher Study Group meeting (TSG4) April 30, 2012. • Observed, recorded, and transcribed second round of CR discussions (CR2) May 7-11, 2012. • Fifth Teacher Study Group meeting (TSG5) May 14, 2012. • Observed, recorded, and transcribed third and fourth rounds of CR discussions (CR3 & CR4) May 15-31, 2012.	• Research articles and PPT • Audio recordings • Flip chart notes from TSG meetings • Teachers' Video Observation Forms (VOF) • Teachers' coded CR discussion transcripts • Fieldnotes
	Phase Five	
June 18, 2012	• Sixth Teacher Study Group meeting June 18, 2013.	• Audio recordings and transcripts of post-intervention interviews • Completed teacher-coded transcripts of baseline and CR discussions • Copies of teachers' personal protocols for CR discussion implementation • Email correspondence with teachers

Summary

The review of literature provided evidence that teacher questioning was effective in providing opportunities for students to learn new ways of talking and thinking. The need for models of teacher questioning that will enhance student engagement and elicit higher-order thinking processes has been well documented. The instructional intervention used in this study,

Collaborative Reasoning, is an approach to discussion that may allow students a "higher rate of using beneficial cognitive processes" (Chinn, Anderson, & Waggoner, 2001, p. 408).

Professional development in the form of a teacher study group has also been documented as an approach that may respect teachers' identities, center upon their previous expertise, and build upon their self-direction (Terehoff, 2002). The intent of this study is to enhance the expertise of the individuals in the teacher study group while building from their individual efforts to collaborative efforts that enhance the implementation of the intervention, Collaborative Reasoning. As teachers work within the study group to implement the instructional model, the research framework, Formative and Design Experiment, should provide the flexibility to allow changes in the specifications of the instructional model that meet the realistic characteristics of learners and classroom situations.

Chapter 5: Data Collection and Analysis

The results of this study will be described using the four remaining phases of Reinking and Bradley's (2008) framework for Formative and Design Experiments (F&DE): (3) collect and analyze data, (4) modify the intervention in light of the data, (5) identify unanticipated effects, and (6) describe changes in the instructional environment. Data collection within this study was multilayered as is characteristic of the formative and design experiment method. The data were collected using both qualitative and quantitative methods. The first section of this chapter describes the first two phases of the formative and design experiment method. While the first phase of F&DE entailed securing the study site and establishing the pedagogical goal(s), the second phase of the experiment focused on data collection and characterization of the instructional context specific to the intervention. Section 2 of this chapter is centered on the third question in Reinking and Bradley's framework (2008) which deals with the factors that enhanced or inhibited the effectiveness and efficiency of the intervention. Section 3 provides evidence of progress toward the pedagogical goal in response to the three remaining questions of the F&DE framework.

Section 1: The Instructional Context and Baseline Data

Phase One: Instructional Context

The collection of data in this study occurred over the course of six months during the 2011-2012 school year. A number of qualitative methods were used to obtain these data including audio recorded pre-intervention interviews, field notes, and direct observations. Observations were made during an initial meeting with the principal of the school, the individual pre-intervention interviews, and the baseline class discussions. Field notes included my perceptions of the school and classroom climates as well as the interactions between teachers and students.

The study site. The first phase of the study involved securing a site, recruiting participants, negotiating the responsibilities of those participants, and setting the goals for the study. North Middle School was housed in a former high school complex originally built in 1955. The school enrollment averaged 625 students with 56% of students receiving free or reduced lunches. Student population was comprised of 45% Black, 51% percent White, 2% percent Hispanic, 1% percent Asian, and 1% American Indian and is representative of the community of approximately 5000 residents.

North Middle School was selected for this study for several reasons. Though I had not been employed by the school division during the past seven years, I had maintained my interest in the status of North Middle School's struggle with meeting state accreditation standards and yearly progress. During the spring semester of 2010, I had worked with eighth grade teachers and students in preparation for the state English/Writing standardized tests. After procuring the necessary permission from the central office administration, I approached the principal of the school in December 2011 with my request for conducting this research in the school. The division administrator and principal were very supportive of implementing this intervention at the sixth and seventh grade levels. The principal explained that the school division had begun an initiative, the Gradual Release of Responsibility model (Fisher & Frey, 2008) which emphasized shifting "cognitive load" from the teachers as they modeled the learning for the students as they worked "collaboratively and later independently." She pointed out that a very important component of the Gradual Release model was collaborative learning wherein students were expected to negotiate with others by discussing ideas and "engaging in inquiry." The principal was concerned that during her recent observations of classroom instruction, the time set aside for collaborative learning seemed to be filled with students working in small groups to complete worksheets or written assignments. She had observed that students were engaged in limited discussion about their tasks. During that meeting, the principal and I composed a joint email that invited sixth and seventh grade teachers to an informational meeting about the research project.

Informational session. The informational session was held in February 2012 as an introductory session for perspective participants. An overview of the research study was shared with the participants including the purpose of the research, brief descriptions of the professional development and discussion models to be implemented, approximate timelines, and protocols to be followed in regard to anonymity and the monetary compensation for participants in the study. At the close of the researcher's explanation of the project, teachers were asked to send an affirmative email to the researcher within three days. Six teachers agreed to participate in the study; however, over the course of the first phase of data collection one teacher had to withdraw due to personal illness. That teacher's data were returned and eliminated from the baseline data collection.

The teachers met individually with the researcher during the third week of January 2012 to sign informed consent forms (Appendix B) and to schedule pre-intervention interviews. The

participants were given an outline for the research study which included approximate times of implementation and descriptions of activities to take place during each of the TSG meetings. Student and Parental Informed Consent forms were given to the teachers for distribution to parents of participating students prior to baseline discussions (Appendix C). I also provided a questionnaire (Appendix D) as a guideline for the pre-intervention interviews. A schedule was then established for pre-intervention interviews.

Phase Two, Part 1: Collection of Baseline Data

Pre-intervention interview data. The interview questionnaire consisted of eight open-ended questions. The first and second questions of the interview inquired about demographic qualifiers related to the teachers and students as discussed in the next section. The third and fourth questions focused on the teachers' perceptions of the three most challenging issues related to their teaching and students' academic progress. The remaining four questions probed teachers' perceptions of their use of questioning during discussion of text and the discussion approaches the teachers employed in their practice. The interviews were audio recorded and later transcribed by the researcher. Copies of the transcripts were emailed to the teachers for member checking and verification of demographic data.

Teacher participants. The five teacher participants in this study taught sixth or seventh grade middle school students in a southeastern rural school division. All of them met state licensure requirements for teaching their respective grade levels and content areas of language arts, history/social science, or science content areas. Teachers, with the exception of the AgriScience teacher, worked within a team of four teachers. More detailed data is included in Table 3.

Table 3

Teachers' Demographic Data

Pseudonym	Education	Yrs. of experience	Grades taught	Present Grade Level	Number of reading instruction courses taken
Ava	MA Ed	3	6, 8	6	1
Brooke	BS Ed	3	K	6	2
Cathy	BS Ed	14	6, 7, 8	7, 8	2
Dana	BS Ed	4	7	7	1
Emily	MS Ed	3	6, 7, 8	7, 8	0

Ava. During her three previous years at North Middle School, Ava had taught English and writing in Grade 8. Having received her post-graduate degree in history, Ava was pleased

to be teaching her preferred content area of history/social science this year in Grade six. She taught four classes of history each day with an average of 25 students per class.

Using the textbook teaching guides and a district-wide pacing guide, Ava constructed daily lesson plans that focused upon the history of the United States beginning with colonization and ending with the Civil War. Striving to "bring history alive to students" Ava provided opportunities for students to identify personally with the content of the course through imagery as well as written content obtained from historically accurate websites, videos, and pictures. She challenged students to go beyond secondary sources of documents and information to investigate primary sources of information whenever possible.

When asked to identify the three most challenging aspects of her instruction, Ava cited the prescribed pace and lack of emphasis on "big ideas" and concepts in the existing curriculum framework as being her biggest challenge. She felt that the "essential knowledge" students were expected to gain was "based on lobbyists who influenced the writers of the state curriculum" rather than on the knowledge students needed to understand the events and the people who helped to shape their lives today and possibly their future. Ava further described the challenges her students presented as: (1) the variance in reading comprehension levels, (2) their lack of prior knowledge in the content area, and (3) what she perceived as a lack of motivation among many of the students.

Ava's formal training in reading instruction consisted of one course which emphasized comprehension within content area reading. To help those students who struggled with reading and understanding the text, Ava implemented SPQ3R (Survey, Predict, Question, Read, Recite, Review) and "HOT Spots" reading strategies (an interactive method that entails seeking clarification for unfamiliar ideas and words in text) during content area reading assignments. She incorporated an interactive notebook strategy as a means of furthering students' interpretation of essential knowledge of history and geography. Each student was required to paste teacher-composed notes on the right side of the opened notebook pages while the left side was reserved for student-created graphics and notes that represented the students' interpretation and interaction with the teacher-provided information. Though Ava found all of the above strategies to be effective, she lamented that her efforts to help those students who struggled with content reading assignments often fell short of what they needed.

Ava described her use of questioning during daily instruction as a way "to check for understanding or comprehension of the information provided." Her use of teacher questioning served as a means of promoting students' application of prior knowledge and new information to new situations. Ava recognized that in order to promote students' understanding, application, and analysis in historical context, she, as the questioner, had to construct questions which prompted "memorization of essential knowledge" while "evaluating the students' level of comprehension of that knowledge." She emphasized that "students must learn to question themselves" in order to measure their depth and application of knowledge. Her major expectations of the students were to "question history – the textual and oral information they encounter," and to be able to "question commonly accepted perceptions of history as they consider and evaluate others' perspectives of facts and events." Ava envisioned classroom discussion as a means to "promote personal and world connections between and among the people and events within U.S. history and the students' world" as they shared different perspectives on those people and events.

Brooke. With licensure to teach reading, writing, math, science, and social studies within grades K-6, Brooke had been teaching Kindergarten for the past three years. Brooke had wanted the experience of teaching sixth grade students; therefore, she had accepted a position at the middle school for the 2011-2012 school year as a reading instructor in the Response to Intervention (RTI) program. Due to the resignation of a sixth grade language arts teacher near the beginning of the second semester, Brooke was reassigned to that teaching position. Realizing that the sixth grade students she was to teach had undergone instruction from various substitute teachers, Brooke concentrated on establishing consistent classroom structure and instruction for the remainder of the school year.

Brooke wanted her students to gain "a deeper understanding of reading skills and strategies that could help not only in reading, but in other content areas." She emphasized that reading comprehension touched every facet of one's life from understanding directions to reading information on the Internet. Brooke utilized the state and local division curriculum framework as a guide to organize her instruction; however, she struggled with the pacing of the curriculum. Effectively teaching both the sixth grade English and reading curriculum standards combined in a 65-minute block proved to be very challenging for Brooke. The language arts textbook or anthology was not a sufficient resource because of the higher reading level of the majority of the selections. Brooke elected to use novel studies as an alternative to the prescribed

text and aligned her reading lessons with the standards outlined in the framework. The "grueling pace of the curriculum" coupled with the wide range of reading abilities among her sixth grade students made the school year "the most challenging year" of her career thus far.

Brooke considered the students' inappropriate classroom behavior and their apathetic attitude toward learning to be the most inhibiting factors to her students' lack of academic progress. Students' lackadaisical attitudes combined with "parents' lack of support and awareness of academic issues" created an atmosphere among Brooke's students that was very different from the eager kindergarteners she had taught in the past. Despite the difficulties, Brooke was able to use those strategies garnered as an early childhood teacher in classroom management and her training as a reading teacher to help the students be successful.

During reading instruction Brooke relied upon QAR (Question-Answer Relationship), "HOT Spots" and "Think -Alouds" conducted by the teacher and students as comprehension strategies. Brooke considered the three most important purposes for teacher questioning to be checking for understanding, modeling questioning to increase student self-questioning, and promoting ongoing review and clarification of information. Brooke outlined three steps she takes in planning her questions:

- Have a goal in mind. (In what direction do I want to go with the topic?)
- Ask myself what questions the students might have about the topic.
- Make sure there are questions on all learning levels.

She commented that these steps might sound simplistic, but if the teacher experienced a situation in which students did not want to respond she, as the teacher, had to keep the discussion going. Brooke was "sure" that if a discussion was held with no goal in mind, the students could easily get "off track" and "cause more confusion instead of clarification" for themselves and other students. If questions were not planned for all learning levels, various students could become disengaged from the learning. It was important to her that everyone in the group "contribute and benefit" from the discussion.

Cathy. During the past 14 years, Cathy had taught reading, science, and social studies in various grades at the middle school level. Her assignment for the 2011-2012 school year was Honors Language Arts for sixth, seventh, and eighth grades. The curriculum for Honors Language Arts followed state and local English and reading standards for the respective grade levels. Students taking the course were considered to be high achievers as measured by

standardized and state-mandated tests coupled with recommendations of former teachers. Expectations for students in this class were indicative of an accelerated program. Even though students were functioning at a high level of performance in most content areas, Cathy indicated that some students lacked motivation and maintained uncooperative attitudes within her class.

Cathy sited various "hindrances to the instructional program" emphasizing the lack of adequate technology (i.e. limited laptops and no current classroom Internet access) and limited reading materials that interested her students. She had overcome some of these obstacles by taking her students to the library to use the computers, and by downloading and printing reading material from the Internet. She purchased class sets of recommended novels when funds were allocated.

Reading strategies emphasized in Cathy's instruction were KWL charts, predicting, relating background knowledge to text, retelling, summarizing, building vocabulary, and inferring. In addition to her formal training, Cathy attended Best Practices Institutes and participated in online Discussion Boards to further her knowledge of reading instruction. Cathy believed that teacher questioning served three major purposes in her daily instruction: (1) questioning helped students make connections to the real world and personal experiences, (2) questioning "helped students commit text to memory." and (3) it provided an "avenue for building understanding and respecting peers."

In preparing teacher questions, Cathy concentrated first on the text and the opportunities the selections provided for discussion. Secondly, her questions had to be formulated in a way that students could make connections and build upon comments and questions of other students. Third, the teacher had to construct questions (whether written beforehand or "off the cuff") that monitored discussion when students wandered too far off topic. Cathy described her purposes for classroom discussion as "making real world and personal connections and allowing students to have a voice and share their feelings." She supported group discussion as a way of "increasing comprehension and enhancing the students' ability to commit information to long-term memory."

Dana. As a teacher licensed to teach life science, Dana had taught seventh grade Life Science for four years. The science curriculum at this grade level emphasized animal and plant life topics beginning with the smallest units of cells and ending with the broader concepts of Ecology and Evolution as designated by state and local standards. Dana described her classes as

"hands on" as she structured instruction as much as possible around small-group activities. Her goals were to "relate science to students' lives; excite students about science; and to make science content fun to learn." Direct instruction included some lecture and explanation incorporating information from textbooks and Internet sources. One of Dana's major challenges was to teach the large volume of information within the seventh grade science curriculum. She explained that the pace of the prescribed instruction was "rigid" and "very fast paced."

Dana conveyed that a major hindrance to the students when attempting to learn the volume of material so quickly was the range of reading comprehension among the group. She modeled reading strategies such as highlighting important words, and summarizing information at the end of each paragraph or page. Dana explained that she used strategies such as student-constructed flash cards, foldables, illustrations, and models to assist students in interpreting the meaning of science vocabulary and concepts. Students also kept a journal in which they recorded science notes and personal perceptions of learned information. Dana commented that the lack of sufficient funds for lab supplies made experimentation more difficult to plan and limited.

Dana included lessons that focused on basic principles of science and scientific investigation. She explained that when she was teaching "scientific inquiry" she asked open-ended questions that "helped lead students to linking ideas together." Her use of classroom discussion was to "assess the amount and quality of information that students have understood and retained." Dana emphasized that some of the questions were asked "to get direct feedback on knowledge of vocabulary" and some were constructed "to see if students can understand the concept and apply the information."

Emily. A master's degree in Agriculture Extension Education enabled Emily to teach two classes each of Introduction to AgriScience, AgriScience Exploration, and AgriScience Technology. This was Emily's fourth year of teaching Agriscience in Grades Seven and Eight. The curriculum for AgriScience classes was based on state standards; however, Emily described the textbook used in the course as being out dated. She incorporated instructional materials which were teacher-constructed based on current research in the respective fields of Agriscience. The curriculum focused on plant and animal sciences, agriculture mechanics, conservation of natural resources, and agricultural history. Emily strove to educate students about "the

relationship between agriculture and their daily lives." She emphasized consumer education and the origin of the products purchased by students and their families.

Daily instruction in Emily's classes began with a question displayed on the Smart Board. Reading and writing activities included researching topics from teacher-constructed texts or the Internet, writing essays, formulating business plans, and presenting information to class members. Emily described teacher questioning as a way of "assessing what they already knew, and what they wanted and needed to know about class content." Emily related the three most important factors in constructing her questions were "determining what students already knew, what vocabulary to use, and what direction I want them to go." When asked about her perception of her students' most challenging issues to academic progress in her classes, Emily described the students' difficulties in remembering information and being able to express what they knew. Emily was concerned that she was so often consumed by the paperwork, mandates, and "politics" of "real world teaching" that she did not have adequate time to plan differentiated instruction that accommodated students' learning styles and cognitive levels – those things she was trained to do in her teacher education coursework.

Discussion in Emily's classroom was used primarily as a forum for introducing topics and sharing information. Emily explained that her model for group discussion was based on guidelines presented in a text provided to the teachers during professional development provided earlier in the school year. She explained that the text, *Better Learning through Structured Teaching: A Framework for the Gradual Release of Responsibility* (Fisher & Frey, 2008) guided her instruction, collaborative learning, and learning tasks among her students. Emily described her interpretation of "gradual release of responsibility" as "what I've always done in teaching my students. I teach the material; we work together; and then the students work independently."

Student participants. Approximately 120 students were assigned to each of the six core teaching teams in the middle school (two teams per grade levels 6-8). Students attended four 65-minute core classes each day along with one 38-minute elective in the morning and one 45-minute elective in the afternoon. Students were heterogeneously grouped with the exception of one Honors group per grade level. Demographic data inclusive of gender, race, academic achievement ranges of the student groups, and approximate reading ability ranges are provided in Table 4.

Table 4

Demographic Data for Student Groups

Teacher	Content & Grade	Number In Group	Male	Female	Black	White	Other	Academic Range	Reading Ranges
Ava	History 6	23	11	12	10	12	1	Medium	5.3-8.1
Brooke	Reading 6	24	12	12	9	14	1	Medium	5.0-9.4
Cathy	Lang. Arts 7	24	8	16	4	20	0	High	8.5-12.0
Dana	Science 7	24	12	12	12	11	1	Medium	6.8-8.3
Emily	AgriScience 7	24	8	16	4	20	0	Medium	7.2-9.6

Phase Two, Part 2: Baseline Discussion Data.

　　Ava selected her first period class as the "CR Project Class." She described this group of students as being generally attentive, but noisy and boisterous when not constantly engaged with activities. On the morning of the baseline discussion, the students completed a brief written assignment in their workbooks and turned their attention to the teacher as she explained the next activity. The students were reminded of classroom rules established for discussions. The "big" question of the discussion was displayed on the promethean board located in the front of the room. The question, "Which group do you think had the most impact on United States society – Abolitionists or Suffragists?" was the focus of discussion that served as a culminating activity for a two-week long unit. Students were seated in rows of desks and Ava commented that the arrangement was "not the best" for "face-to-face" conversation; therefore, she asked students to turn in their seats and face respective students, if possible, when listening or speaking. The students were instructed that once the discussion began, they were to state whether they agreed or disagreed with the previous speaker's response and tell why. A majority of the students showed interest and readily raised their hands as they teacher called upon them to speak. The number of respondents decreased, however, once the teacher emphasized that speakers must tell why they agreed or disagreed with one another's opinions and support their opinions with evidence from previously studied text.

　　Brooke selected her third-block reading class for CR discussion. Rather than beginning a new novel so close to the end of the school year, Brooke had elected to spend more time on the comprehension of nonfiction text. For the baseline discussion she selected a segment from the students' history/social science text. The topic of discussion was "States' Rights vs. Nation's

Rights." As students were volunteered to read paragraphs, the teacher asked questions about students' interpretations of the text. There was no evidence of a teacher-prepared list of questions; however, the questions varied in their purposes ranging from those that recalled prior information studied to individual students' interpretations of meaning.

Cathy described the students in her CR discussion class as "high achievers," thus their assignment to this Honors Language Arts class. Since the students had just completed their study of the novel, "A Day No Pigs Would Die" (Peck, 2000), the baseline video was made of the students' discussion about the book. For this activity students were seated in small groups of 4 or 5 around tables. They were asked to turn their chairs toward the teacher who sat in the front of the room. The discussion progressed as the teacher asked questions about characters, events, and plot development in the various chapters of the novel. The majority of the responses appeared to be information that had been previously discussed in class. Students volunteered answers without raising their hands and respectfully took turns speaking.

Dana chose her fifth period class for her CR discussions. Their baseline discussion was on the topic of "White Nose Syndrome in Bats." Having read an article and viewed a video on this particular disease two days prior to this activity, the students' discussion served as a review. The students explored the immediate danger to the bat population and its consequent impact upon the ecological systems related to insects, bats, and humans. The students raised their hands to respond to the teacher's questions which appeared to be based on an outline of the main ideas written on the Smart Board. A few of the students directed questions to the teacher to clarify information.

Emily implemented the CR discussion model in her third period class. As indicated by Emily's description of her daily instruction, the baseline discussion began with a "big" question. The students were asked to respond to "What is Biotechnology?" It was apparent that the students were accustomed to talking above the sounds adherent to the classroom/workshop environment such as the animal noises emitted from the various crates in the back of the "shop" and the hum of the hydroponics station. Some students did not hesitate to respond to the questions while others quietly listened. They recalled and attempted to apply prior information learned about animal and plant science to the new topic of Biotechnology as the teacher questioned them about visual representations displayed on the Smart Board.

Phase Three: Compilation and Analysis of Baseline Data

Observational data collected from the pre-intervention interviews and the baseline discussions. were analyzed separately, and then compared using a constant comparative method (Glasser & Strauss, 1967). Statements and behaviors were coded using descriptive labels in each set of data. The descriptive codes were then examined to determine related content. Those related codes were then grouped into categories which were continuously refined as the comparison progressed to become themes within the data. Analysis of the baseline data revealed the following themes.

Teachers' perspectives on pace of taught curriculum. Four of the five teachers described the scope and pace of the school division's curriculum pacing guides as being the foremost challenge to their instruction. This issue with the curriculum and the limited time in which to teach it was mentioned throughout the teachers' interviews. Though Emily did not cite curriculum as being a challenge, she noted that the materials provided to her students to support the curriculum were outdated; thus, she spent a great deal of time searching for current resources for her Agriscience students. Two of the teachers stated that the pacing guide lacked focus on "big ideas" and major concepts within the content of history/social science and science.

Students' struggles with reading comprehension. All of the teachers had taken reading coursework during their teacher training, yet three of the teachers felt inadequate in addressing the needs of those students who struggled with understanding text in their respective content areas. As language arts teachers, Brooke and Cathy had received specific training in elementary and middle school reading in their teacher education programs. Dana had taken reading in the content coursework during her teacher training while Ava and Emily received this instruction during postgraduate programs. Both language arts teachers remarked that the majority of literature used to teach reading strategies at the sixth and seventh grade levels was fictional since fictional trade books were the primary source for instruction. Brooke and Dana lamented that they knew that many of their students were having difficulty comprehending nonfiction or "informational texts" because the students were having difficulty transferring the reading strategies to this genre of text. To assist students in reading content-specific texts, all of the teachers relied upon: (a) Question-Answer Relationship (Raphael & Pearson, 1985), (b) HOT Spots (Candler, 2012), (c) reading aloud and summarizing at the end of each paragraph, (d)

highlighting important words in the selected text, (e) KWL charts, and (f) student paraphrasing of text selections aloud to increase students' reading comprehension of informational text.

Purposes of teacher questioning. Teachers were asked to describe the three most important purposes for asking questions during their instruction. All five teachers referred to questioning as their chief means of assessing students' knowledge of a topic. The history/social science, science, and Agriscience teachers used questioning mainly during summaries and later reviews of lessons. They also spoke of using questions to access students' background knowledge of a topic or to motivate students' interest in a new topic. The language arts teachers, Brook and Cathy explained that questioning was used mainly in their instruction to access students' background knowledge and to assess students' use of comprehension strategies. Ava, Dana, and Emily also explained that they questioned to determine how well students could apply taught concepts or procedures to real life situations. All five teachers mentioned asking questions to gauge students' attitudes or elicit points of view during instruction. One teacher, Ava, "occasionally" asked questions to encourage students to pursue knowledge on their own about particular historical or social science topics.

Teachers' limited experience with discussion approaches. Teachers disclosed that for the most part they referred to teaching guides or teacher-authored articles for ways to incorporate discussion in their instruction. Several mentioned segments of professional development that had focused on uses of discussion in the classroom. Dana credited a course that focused on the nature of science and science inquiry as her guide for asking open-ended questions and linking ideas during discussion. Brooke relied upon discussion strategies gleaned from sources on the state's department of education website and her experience of teaching reading comprehension strategies through questioning during the reading of text.

Discussion as review. The five teachers referred to classroom discussion as their major strategy for reviewing previously taught information. All teachers indicated that they used discussion to probe for students' background knowledge of a topic. Ava used discussion to promote connections between historical events and students' personal lives to help them retain information. Dana and Emily implemented discussion as a way to introduce topics as well as to assess what students had learned about taught content.

During the baseline discussion recording, it was noted by the researcher that four of the five discussions were related to review of previously studied information with limited

introduction of new information. Emily's discussion was the exception in that her discussion centered round a new topic, Biotechnology. The recitation method of questioning was used in all five of the baseline discussions. Students would wait to speak after they were acknowledged by the teachers, and teachers either responded with an affirmative or negative statement or gesture.

The analysis of baseline data resulting from the pre-intervention interviews indicated that teachers were aware that their students struggled with comprehending informational texts. The teachers relied upon similar strategies to help their students understand those concepts deemed "essential knowledge" within their respective content areas. Though all of the teachers had received training in promoting reading comprehension, they did not talk about any research or instructional approaches that directly related to teacher questioning during discussion to increase students' level of critical thinking.

The four themes within the baseline data substantiated my original foci for the professional development portions of the intervention. The analysis of the data led to my personal belief that theoretical knowledge about teacher questioning to facilitate interactive discussion could be beneficial to these teachers' practice as long as they had time and sustained opportunities to link their understanding of research to their daily instruction. It would also be important that the sources of information provided to these teachers be easily accessible and most applicable to the current problems in their classrooms.

Phase Four: Professional Development and Model Implementation

Data that provided guidance about what instructional moves and adaptations were necessary to implement Collaborative Reasoning were prevalent in the professional development phase of the intervention. Transcripts of Teacher Study Group meetings, teachers' reflections, and field notes provided extensive information. These sources of data also provided an account of the teachers' awareness of conditions that might inhibit or positively affect the implementation of the intervention and what instructional moves would be needed to enhance the effectiveness of the intervention toward the pedagogical goal. Descriptions of each TSG meeting are included in this section to provide the reader insights into how topics were developed and how the group process evolved.

TSG1: "Have the purposes of teachers' questions changed over the past 40 years?"
From the onset of the first meeting I facilitated the TSG meetings using a protocol consistent with the Collaborative Reasoning discussion model. In my experience, the closer the introduction

of an instructional model resembles authentic classroom instruction, the better the chances that teachers will adopt that model into their teaching practice. My goal was to not simply deliver the information but to also model how the discussion intervention would function in the classroom. The first TSG meeting began with posted statements of our primary pedagogical goal: "to enable teachers to conduct authentic discussions that engage students in collaborative reasoning" and our secondary goal, "to affect teacher questioning during discussions." Our first action was to establish ground rules for our discussions during the meetings and to post the rules in the meeting room:

- Be a good listener
- Sit still and do not "fidget" while listening to speaker
- Face and maintain eye contact with the speaker
- Everyone speaks and takes turns speaking
- Refrain from negative comments about others' ideas
- Make notes of questions you want to ask or comments you want to make

Our discussion began with the article, *Why Do Teachers Ask Questions?: Analyzing Responses from 1967, 1987, and 2007* (Wallace & Hurst, 2009). As facilitator, I began the discussion with the big question, "Have the types of teacher questions changed during the past 40 years as reported in this study?" Dana commented that she did not feel that teachers had made much progress in "questioning beyond the assessment level" since the 1980s. There ensued an active discussion among all of the participants about the circumstances and purposes of teacher questioning during their classroom discussions. An informal tally maintained by the researcher revealed that the majority of participants described three major purposes for questioning: (1) assessment of student knowledge, (2) review of essential content, and (3) helping students relate topics or ideas to personal experiences. The consensus of the group was that the curriculum's focus on essential knowledge as outlined by standards precipitated a "narrow" view of questioning the students. As one member of the group stated, "Students [were] expected to memorize the information and give it back on the test." Participants related that this type of learning entailed teacher questioning as a means of 1) assessing what students already know, 2) figuring out what viable connections the students are making between new information and background knowledge, and 3) reviewing those connections to help students retain information.

The teachers were adamant about the fact that the pacing of the curriculum required "direct instruction with little time for other instructional strategies."

Later during the discussion about the Wallace and Hurst (2009) article, Brooke pointed out this statement in the text, "In 2007, there was a continuation of a focus on taxonomies and strategy-based questioning but with an additional focus on self-questioning." That prompted another comment from a member of the group, "What taxonomy?" A part of the discussion among the participants dealt with various taxonomies they had followed during undergraduate and graduate study. Some of the participants were familiar with Robert Marzano's "New Taxonomy of Education Objectives" (2000) through professional development. All participants had studied "The Revised Bloom Taxonomy" (Anderson & Krathwohl, 2001). In the words of one member, "I had to know that taxonomy inside and out when I had to write and turn in my lesson plans in my teacher education courses. Now, I don't think about it so much when I'm asking questions." Another member read from the Wallace and Hurst article, "Understanding the different purposes for asking questions helps teachers to assess and motivate students, enhance student thinking, and reflect on their teacher effectiveness." This prompted members to reveal their feelings of inadequacy about knowing what levels of thinking students may be exhibiting in their responses to questions – not to mention how to go about enhancing student thinking through teacher questioning.

Although I had designed a complete plan for TSG sessions, it was obvious that this session had led to deeper discussions of various concerns about questioning and levels of thinking. I asked participants if they would like more information about these topics. The group unanimously agreed that this information would be essential as they studied questioning for critical thinking.

TSG2: "Which taxonomy do we use?" We opened our second meeting with a discussion about the provided research materials. The research packets about "questioning" and "taxonomies of thinking" contained two tables with accompanying explanations of *Marzano's New Taxonomy* (2001) and *Bloom's Revised Taxonomy* (2001). The explanation of Marzano's taxonomy included three systems (Cognitive, Metacognitive, and Self-System) and a Knowledge Domain. Bloom's Revised Taxonomy included explanations of three domains, (Cognitive, Affective, and Psychomotor). A third table entitled *Types and Functions of Questions* adapted from *Thinking through Quality Questioning: Deepening Student Engagement* (Walsh & Sattes,

2011) was included in the packet. Several of the participants commented that the information as presented was overwhelming. However, once we were able to put Marzano's and Bloom's taxonomy tables side by side and compare similarities and differences in Marzano's Cognitive system and Bloom's Cognitive Domain, the participants began to talk about their interpretations of the information. I noted that the participants began to integrate the terms, "cognitive processing," and "expected cognitive level" when referring to the kinds of student responses to teacher questions.

Following the comparison of the two taxonomies, we viewed a PowerPoint presentation entitled *Teaching with the Revised Bloom's Taxonomy* (Giesen, 2009). The teachers decided that a chart combining Bloom's taxonomy and a table from the Walsh and Sattes (2011) text would be helpful in constructing appropriate questions and evaluating the level of thinking demonstrated by student responses. Participants preferred the explanations in the Walsh and Sattes table because each cognitive level was further broken down into categories (i.e. the level, *remember,* included the two categories of cognitive processes labeled as *recognizing* and *recalling*). One member explained that she often identified the category of thinking first, and then tracked it back to the "overarching" cognitive level. She gave this as an example. "I can recognize when a student is inferring information by drawing a conclusion from text. Using this taxonomy, I can place a more general label on that thinking as the cognitive level of *Understanding*."

The remainder of this session was devoted to the participants' interpretations of six levels of cognition and their examples of questions that illustrated each level. As participants interpreted the levels and categories, and formulated examples of questions to fit each category, I recorded the information and later incorporated their interpretations into a table and later distributed it to the participants to serve as a guide during CR discussions. TSG members labeled this table as their Levels of Thinking Chart (Appendix E).

TSG3: "Recitation vs. discussion: what's the difference?" Our third TSG meeting was based on research about group discussions. Our first article entitled *What Teachers Do When They Say They're Having Discussions of Content Area Reading Assignments: A Qualitative Analysis* (Alvermann, O'Brien, & Dillon, 1990) was used as a springboard for our discussion. We referred back to a question on the pre-intervention protocol which asked, "For what purposes do you use classroom discussion?" Members' responses varied with such purposes as

"introducing topics," "assessing what we've learned," "for clarification," and "giving students an opportunity to share ideas on a topic." Participants quickly connected results of the data to their personal responses during the pre-intervention interview. They talked about the intent of their class discussions as being "open-forum," yet the results were often close-forum discussions which according to our reading were considered as "lecture-recitation" or "recitation." Emily and Brooke began a conversation about the problems they encountered in "holding" discussions. They cited the difficulties of keeping students' attention when there were students at "various levels" in a large group discussion, and the facilitation of four or five small group discussions. All of the members agreed that motivation was a "huge" hindrance in getting students to participate in discussions. Ava and Dana described numerous occasions in which they attempted class discussions, only to have a "few of the students – usually the same ones – participate."

Our second article, *Collaborative Reasoning: Expanding Ways for Children to Talk and Think in School* (Clark et al., 2003) focused on a comparison between recitation and CR discussion. We compared the dialogues in Table 1 (p. 182) in regard to teacher and student turns, and studied the seven basic steps of the CR framework presented in the article. Cathy, a language arts teacher, commented that the discussion was about fictional text, and in her opinion, "It was much easier to get students to talk about information and events in fictional stories than it was to keep a discussion going about nonfiction text."

Group members referred to our next article, *Collaborative Reasoning about Stories* (Waggoner et al., 1995) as the "how to" article. From their perspective this article provided the most explanation about facilitating CR discussion. As members took turns reading the section of text, *Instructional Moves That Support the Development of Reasoning*, seven basic instructional moves were listed on chart paper. Members agreed that these instructional moves (IMs) accompanied by explanations and sample questions should be placed in a table format to be used as a CR facilitation tool (Appendix F). A group member suggested that this table could also serve as the basis for describing purposes of the questions thus providing a "coding matrix" for the transcripts during data collection.

According to my original plan, the fourth TSG session was to be a practice session wherein members of the group would role play CR discussion in their respective content areas. However, the five teachers were anxious to start the implementation of CR discussion with their students. Consequently, we constructed a tentative schedule for videoing the first round of four

CR discussions for each teacher beginning the fourth week of April and concluding within the last week of May. Another change in the original plan came with the omission of stimulated recall sessions. Having experienced the baseline stimulated-recall sessions, the teachers proposed that we substitute a written protocol that the teachers would complete while reviewing each discussion video. Teachers felt that their time would be better utilized if they could take their time and view the videos with a guideline to help them reflect upon their facilitation of the discussions. The group spent the remainder of the session comprising a protocol for viewing the videoed class discussions. Following this session, digital and hard copies of the protocol, titled CR Video Observation Form (VOF) (Appendix G) were sent to the teachers. The completed protocols were emailed to the researcher as soon as possible following each CR discussion.

TSG4: "How do we know that the CR model is impacting discussions?" The teachers began to share their experiences as soon as we assembled for the meeting. Ava was pleased with her students' participation in their discussion about "Prayer in Schools," but she also commented that she needed to "spend more time preparing [her] questions." Brooke thought her discussion was "okay," but she would definitely plan her questions better and spend more time "selecting a topic for discussion." Cathy was concerned that some of her students "shut down" because several of their classmates "did not show respect for others' opinions." Even though the topic of discussion for Dana's group was one that she described as being "supported by two articles and a video," Dana described her experience as "digging" to keep the discussion going because "students needed constant prompting." Emily "felt like it went fairly well," but there were times when they were "off topic" and she "had to prod them more than [she] wanted to."

The sixth grade teachers, Ava and Brooke, were concerned about students' inability to take turns talking during the discussion. They described multiple instances of students interrupting and "talking over" one another. Emily was frustrated with five of her female students who verbally sparred with each other across the room, leaving little time for others to join in the discussion. Members of the group brainstormed ideas that might help the "management issues." Dana offered a suggestion for managing turn taking among the sixth grade discussion groups, "Once Student A completes his talking turn he acknowledges Student B from the pool of students signaling that they want to talk. That way they can control the turn taking." Another suggestion for managing turns of those students who monopolized the discussion was to use tokens (i.e. popsicle sticks or poker chips) that would be equally distributed to all students.

As students took turns talking they would "turn in" a token. This would then limit the number of turns for each student as well as distribute turn taking among all students in the discussion group. It was also suggested that Emily have a private talk with the five students who monopolized the discussion, and remind them of the class discussion guidelines.

TSG5: "Are we improving our facilitation of the CR discussion model? Our fifth TSG meeting began with intense conversations among the five participants concerning school policies and the demanding pace required near the close of the school year. It was evident that the teachers needed to share their frustrations and offer words of encouragement to each other. Despite the "crush" of their professional day, the participants were enthusiastic about sharing their experiences thus far with CR discussion. Those who had been pleased with their progress during the first CR discussions were disappointed with their second sessions, and those teachers who were disappointed with their first sessions had seen improvement in their facilitative roles and in students' participation during their second discussions.

Ava described her second CR session as "not going as well as the last." She commented that she had learned "a thing or two about appropriate topics for sixth grade students and [her] preparation for discussion." Ava believed that her students did not have enough background knowledge of the discussion topic; therefore, they resorted "to telling stories about their own experiences" without making connections to the events and concepts in the text. Cathy felt that the content of students' discussion was more superficial during her second CR session. She had wanted "the discussion to be more in depth and less based on opinion alone." Brooke, Dana, and Emily had concerns about the "stretches of dialogue" in their second CR discussions which were "still characteristic of recitation." Brooke admitted, "I still have a bad habit of repeating student responses too often and using too much prompting to get students to respond to points being made." Emily shared that she had done "a better job of staying neutral and facilitating" during her group's discussion about Organic vs. Nonorganic Farming while her students were "starting to take more responsibility for acknowledging speaking turns of other members of the class."

The next part of this session was reserved for coding transcripts of the first two CR discussions. Each member coded their teacher turns as to the type of instructional move exhibited. When participants were unsure of what to code their moves they sought input from each other or the researcher. During the latter part of the session, group members shared their "best" examples of the seven basic instructional moves of CR facilitation as they read sections of

dialogue from their transcripts aloud. Their readings were interspersed with exclamations of "I can't believe I said that," "listen to what happened here," and "what was I thinking?" It was obvious that the participants enjoyed sharing their experiences.

The teachers reported that they were unable to identify any "modeling" instructional moves in the transcripts. They were disappointed that they could not offer any examples of demonstrating the reasoning process by thinking out loud for the students. Group members were very candid in explaining their feelings of inadequacy in modeling. They talked about being expected to implement the gradual release of responsibility model of instruction (Fisher & Frey, 2008) in which modeling was an essential instructional strategy. Yet, the participants did not feel confident in their ability to model their thinking during a focus lesson.

Participants ended the session with the understanding that once they had completed their remaining two CR discussions, and I had emailed transcripts to them, they would be responsible for coding their instructional moves <u>and</u> the cognitive levels of thinking depicted by student responses. The sixth TSG meeting would be held as soon as possible following the completion of these activities and the close of the school year.

TSG6: "Are we there yet?" The first portion of our final meeting was a share session in which teachers read selections from their transcripts and occasionally asked each other to member check codes. Many of the questions about coding dealt with the levels of thinking exhibited by students. All participants described this coding to be the most challenging. A discussion of what is considered lower-thinking and higher-thinking levels of processing.

There was much consternation among group members as to what levels corresponded to lower- and higher- levels of thinking. Some wanted the higher-levels of thinking to begin with the *applying* category of thinking because of the inclusion of inferring and predicting in this category. Others insisted that according to the *Revised Bloom Taxonomy* (Anderson & Krathwohl, 2001) higher-order thinking would begin at the analysis level. I shared a diagram based on *Bloom's Taxonomy* that showed the separation of higher-order and lower-order thinking skills between the *applying* and *analyzing* categories. The group reached consensus and it was agreed that lower-level portion of the coding scale would include the categories of remembering, understanding, and applying, and the higher-order thinking skills would include analyzing, evaluating, and creating. This division in the hierarchy also coincided with the earlier definition of critical thinking. The teachers "tested the coding scale" by reading aloud student responses

and talking through their collaborative rationale of various codes. They unanimously agreed that the scale would provide sufficient data to determine if the thinking levels of student responses had been affected by the intervention.

It was not possible to complete the coding of all transcripts by the end of this meeting; therefore, I made arrangements with teachers to collect the completed transcripts before July 1, 2012. The last half of the meeting consisted of a group interview conducted by the facilitator. The interview consisted of five questions (Appendix H). Participants were allotted time to write their responses and then discuss each of the questions within the group. All of the participants expressed their interest in implementing CR discussion in their instruction during the next school year. As a culminating activity each member constructed a personal approach to implementing CR in her classroom practice. Once group members had completed their approaches, they were asked to collaboratively construct a protocol for facilitating CR discussions (Appendix I).

Follow-up communication. It was necessary to follow-up communication during the next two months. Communication was conducted through email. Data tables and figures were compiled from the coded transcripts and emailed to each participant (Appendices J through N). Additional follow-up emails consisted of clarifications of data, post-intervention interview questions, and some member checking of coded transcripts. All members expressed interest in a follow-up TSG session during the first semester of the coming school year to talk about their implementation of the CR model in their future instructional practice.

Section 2: Factors Affecting the Achievement of the Pedagogical Goal

The intent of F&DE is to "understand contextual factors that influence the effectiveness of an intervention" (Reinking & Bradley, 2008). In this section, I present data addressing the factors that enhanced or inhibited the effectiveness in achieving the pedagogical goal. As I reviewed the data collected on a regular basis, factors that influenced the implementation of the intervention emerged. It became obvious that one category of factors was inherent to the structure of the school's instructional program, and not within the purview of the teachers to control. Another category of factors focused on aspects of the instructional environment over which the participants could exercise control. I labeled structures or circumstances outside of the teachers' control as external factors while those factors related to actions of teachers and students as internal factors. These external and internal factors altered the effectiveness and efficiency of the pedagogical goal.

External Factors Affecting the Intervention

Certain conditions or components within the school selected as the site of this study greatly influenced the direction that the participants took in many aspects of their research and CR model implementation. The organization of curriculum, methods of assessing student progress, school district instruction initiatives, and school structures were four factors that permeated the participants' individual interviews, discussions during group meetings, personal reflections, and ultimately the participants' decisions during implementation of the intervention. Each external component is described below.

Curriculum. The public school district involved in this study had developed its district curriculum over a number of years with close adherence to the mandated state standards for each core area of instruction. The curriculum was designed in units which incorporated specific standards, frameworks which detailed specific knowledge and skills required of students to meet the standards, and scope and sequence guides with detailed lesson plans for aligning teacher instruction with those standards to be tested. The school district curriculum was organized in a recommended order and pace for instruction.

Assessment of student progress. Students were tested each year using the state assessment of annual yearly progress and student proficiency in the cores areas of reading, math, science, and history/social science. An additional layer of testing was also mandated by the district and administered quarterly during the school year to serve as benchmarks which could inform teachers of students' progress and possible weaknesses within the "taught curriculum" for each learning standard. Core content teachers were responsible for teaching the content of the standards before students took the state assessments in May.

Instructional model initiative. At the beginning of the 2011-2012 school year, an instructional initiative was introduced to teachers throughout the school district based on the text written by Douglas Fisher and Nancy Frey (2008) entitled *Better Learning Through Structured Teaching, A framework for the Gradual Release of Responsibility*. Professional development in this instructional initiative was to be in a Book Talk format. Teachers were encouraged to organize book talks that would take place during weekly grade-level planning meetings in order to facilitate their implementation of the Gradual Release of Responsibility Model of instruction.

Increased teacher accountability. An increased focus upon accountability for teacher performance in this school district resulted in the implementation of a revised teacher evaluation

system during the 2011-2012 school year. One notable difference between the revised teacher evaluation process and its predecessor was the evaluation of specific types of instructional delivery to be observed in the classrooms. Evaluation forms closely adhered to the Gradual Release Model instructional design. The 2011-12 teacher evaluation also specified that assessment of student learning be based upon district benchmarks, division curriculum and pacing guides, and maintenance of pre-/post-assessment data on each student.

Unprotected planning time. During the second semester of the 2011-12 school year, budgetary concerns within the school district necessitated a reduction in the number of substitute teachers available for teachers who were absent from school. As a result, teachers present for the day were assigned to cover instruction for absent teachers during their assigned planning periods. Notes were placed in teachers' mailboxes each morning to serve as notification of their "assigned coverage" each morning.

Daily schedule. The sixth and seventh grade students and teachers at North Middle School followed a 6-block schedule each day. There were two teams of teachers, each with a language arts, math, science, and history/social science teacher. There were approximately 120 students in each team. Students attended four 65-minute core classes each day along with one 38 to 40-minute elective in the morning and one 45 to 50-minute elective in the afternoon dependent upon the grade level.

Additional remediation/enrichment periods. The remediation/enrichment period was an intervention designed to provide students with additional support or enrichment in respective core areas as indicated by student performance on benchmark assessments. The remediation/enrichment period was created during the second semester of the 2011-2012 school year by reducing the time in elective periods and inserting designated 20-minute periods in the daily schedule. During these periods, teachers were to provide additional instruction for those students demonstrating need in content areas. Students needing remediation or enrichment within specific content areas were identified by their teacher and appropriate instructional activities were prepared. These activities were then sent to the teachers who were supervising the students during that period to be completed.

Internal Factors Inhibiting the Intervention

One internal factor that inhibited the intervention was the teachers' reliance upon recitation. The remaining internal factors were attributed to the limitations of students. Much of

the teachers' conversations during TSG meetings, especially during coding sessions dealt with the students' lack of skills in listening, observing ground rules of discussion, supporting arguments with evidence, and using appropriate types of talk during discussion.

Teachers' reliance upon recitation. The teachers cited various reasons for their reliance upon recitation. During the second TSG meeting Dana explained her preference for recitation in this way: "I feel that our class discussions are often recitations because my content area, science, relies heavily on students learning vocabulary before they can discuss scientific content or procedures." Other teachers characterized recitation as a reliable means of "checking for students' understanding of a topic" (Brooke, April 2, 2012) or "the fastest instructional tool ...that will provide feedback from the students." (Emily, April 2, 2012).

Three teachers cited content standards and the pace of the curriculum as a cause for their reliance upon recitation. "I'm always worried that a supervisor will walk in and we're discussing a topic outside of the specified content of instruction," commented Ava. "At least if I'm asking questions that are right on target with the standards or essential knowledge, I won't be called into the office later," added Cathy. Dana explained that her students needed "cues" to help them focus on what was to be learned. By asking specific questions that required a limited number of answers or vocabulary, Dana was more confident in her students' knowledge of the content (April 2, 2012).

Students' limited use of active listening. The teachers' comments about "students' not listening" abounded in their reflections, video viewings, and transcript analyses. Emily's reflection upon her first CR discussion began with these thoughts. "You can tell that they aren't listening to each other when their responses have absolutely nothing to do with the preceding student's response. I don't think they know how to listen for pertinent information in each other's responses."

Brooke recalled, "During my first two CR discussions I kept asking, 'does anyone have anything to add to that? The students weren't commenting on one another's points. I couldn't tell if there was lack of interest about the topic, lack of background knowledge, or if they lacked the ability to recognize the points of the information other students were relating" (May 14, 2012). Dana concurred that the majority of her students were making comments based on their thoughts about the topic without consideration of what others were saying. Cathy and Ava corroborated

that their students tended to "worry more about speaking their opinion" instead of "listening to the ideas and viewpoints of others" on the topic (May 14, 2012).

Emily offered an interpretation of what was happening in her CRD1. "I think the students are reluctant to listen because they are holding their thoughts or opinions until they can speak, and they are afraid to 'complicate' their thoughts with someone else's." All of the participants were in agreement with Ava's statement, "If the students do not learn to listen for the main idea or premise in each other's comments, then they cannot begin to reason their own arguments and support them with evidence" (June 15, 2012).

Students' nonobservance of "ground rules" for discussion. Students struggled with appropriate turntaking and ground rules for discussion. The teachers were disappointed early in the CR discussions when the students were not allotting opportunities for fellow classmates to speak without interruption. "Our first CR discussion seemed to begin as a 'free for all' with students trying to talk over one another's voices. I felt like a referee," remarked Brooke. All teachers had assumed that once the class discussion rules were established and reviewed before the discussion, the rules would be observed. Such was not the case. Three of the five teachers reported having to require students to raise their hands for permission to speak during their first CR discussions.

Ava remarked that it [recognizing talking turns] seemed more difficult for the sixth graders. "The students did not recognize talking turns today. The student shouting the loudest became the recognized speaker for the moment. I had to continuously say, 'wait, one at a time" or "let her finish speaking.'" Brooke explained that the sixth graders would fervently defend their opinions on certain topics, but their enthusiasm overshadowed the rules of discussion. Several students' comments in the CR transcripts implied that if they were not able to speak their thoughts immediately, they would forget what they wanted to say.

Emily interpreted her students' nonobservance of talking turns as a social issue. "There were certain students who monopolized the discussion. These students were the same ones who frequently volunteer answers when we are in recitation mode." Emily realized the same "social hierarchy," as she termed it, existed in the class discussion to the point that she had to constantly remind certain students that every member of the class should have an opportunity to participate.

Students' limited use of supporting evidence. "My students had too many opinions and no evidence to back them up. They relied wholly on their background experience rather than

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supporting information in the text," Emily observed (CRD2 VOF). Ava and Brooke had similar experiences during their second CR discussions. Students related personal experiences about the topic, and omitted significant supporting evidence from the text. Ava commented that the more personal experience the students seemed to have with the topic, "the more difficult it became to bring them back to the salient information in the text" (May 14, 2012). Dana recalled:

> I found myself leading students' opinions with my questions and statements (IMs) because I feared that my students would not consider the evidence in the texts (article and video). They were referring only to personal experience or hearsay rather than the facts in the text. I did not want my students to come away from the discussion with some serious misconceptions about the topic (May 14, 2012).

The teachers reiterated that it was important that topics for discussions be relevant to the students' interests; however, it was also very important that the students recognize that the selected texts provided supporting evidence for their opinions. The teachers reiterated that the students must learn the importance of asking for this evidence within their fellow discussants' responses.

Students' limited use of productive language. As the intervention progressed, teachers soon began to describe the quality of the students' verbal exchanges as "productive" or "nonproductive." Some of the student talk involved unproductive, highly competitive disagreements. Research on the "typology of talk" (Mercer, 2007) designed to reflect the ways in which students talked together was provided to the teachers following their first round of CR videos. As part of their analysis of CR discussions, the teachers began to note the types of talk occurring among the students. They began to analyze student exchanges within their individual CR transcripts using the three types of talk as a guideline. The three terms, disputational, cumulative, and exploratory permeated the later TSG discussions.

During their reading of Mercer's article, the teachers defined disputational talk as "disagreement with others without considering their view points or interpretations of ideas." Data from the teachers' reflections and analyses of transcripts revealed that disputational talk hindered the effectiveness of their CR discussions. Emily recalled:

> I had a group of girls who were constantly arguing with each other. Their talk was very disputational and it distracted the other students from the actual topic. This group of girls

ignored the ground rule of 'respond to the idea and not the person.' Some of the students became uncomfortable while others lost interest in the topic. (April 30, 2012)

Though Collaborative Reasoning was characterized by "reasoned argumentation" (Clark, et al., 2003) in our research, Brooke learned that she had to use the terms "argument" and "counterargument" sparingly when facilitating discussion. "I think I've used the terms 'argument' and 'counterargument' too much in my prompting. Some of my students are using the discussion forum to snark at each other. The tone of the talk was disputational and the other students did not benefit from this." Brooke further explained that the disputational talk led to arguments that extended beyond the discussion session and the class period.

Cathy's reflection following her CRD3 revealed that the discussion was not as productive because it "took on" a more "disputational quality of talk." She continued to write, "I am not sure if it was the topic, my lack of facilitation, or if the students chose to ignore the 'respect others' opinions' ground rule. Cathy noted that there were several incidents of students challenging others' ideas through "argument/counter argument" that progressed into angry, disruptive disputes. She was concerned that students were hesitant to contribute to the discussion for fear of being "confronted by others" who just refused to listen to other points of view.

Cumulative talk was also noted in the teachers' observations. Cumulative talk, as defined by the teacher group, was talk that involved "layering similar ideas without challenging them for accuracy." Ava found this type of talk exasperating as she described how her class's discussion about brain concussions during sporting events became a forum for cumulative talk. "Our 'concussion' topic lent itself to more cumulative talk, because the students did not have enough background knowledge to explore repercussions (no pun intended) of sustaining a concussion. They layered one personal injury story upon another – and some of those weren't even head injuries" (TSG6, June 18, 2012).

Emily described cumulative talk in her reflections as "constructive" talk between several of her students during the discussion. Some of my students actually "built on each other's ideas" by adding supportive evidence when they shared the same point of view. "The problem comes when students become so supportive of each other that you lose that edge and no one wants to argue a counter idea" (TSG5, May 14, 2012). Emily continued to relate how during one CR session she had to constantly challenge her students by reminding them of issues they hadn't

thought about or "play the role of devil's advocate" and give a reason from an opposing view point to keep the discussion going.

Even though exploratory talk was the most desired type of talk, the teachers felt that the students in the majority of their discussions did not encourage each other to reason through a problem/solution or answer a question. "It's that lack of evidence issue again," commented Cathy. "They have to challenge each other to support their opinions with evidence so that they can, you know, hear differing ideas. If students don't ask for evidence, there is nothing for them to explore or challenge" (VOF, May 17, 2012). Dana, on the other hand, enthusiastically gave an account of one of her CR discussions in which the students "explored" possible reasons for human euthanasia. She expressed her amazement at the students' reasoning and ability to take one another's ideas and expand upon those ideas to create a set of guidelines supporting euthanasia. "I had not observed the students exploring a topic to this extent and actually creating a solution to a problem without being prompted to 'solve a problem.'"

Internal Factors That Enhanced the Intervention

By identifying those factors that may have inhibited the intervention, the teachers were able to make changes in their facilitation of CR discussion. The teachers' insights as to what actions are needed to achieve the pedagogical goal described here are in response to the fourth question in the F&DE framework: "How can the intervention be modified to achieve the pedagogical goal more effectively and efficiently and in a way that is appealing and engaging to stakeholders?"

Selecting appropriate topics for discussion. Teachers emphasized that topics of discussion must meet three criteria in order to enhance the implementation of CR discussion. The first criterion for an appropriate topic was that it be open to multiple interpretations, and the second criterion was that the nature of the topic be related to students' interests or relevant to their lives. Ava noted, "The students were not interested in our topic (concussions in sports) today. They began to tell stories about their own injuries – not necessarily sports related – and did not make connections between Colorado Senate Bill 40 which regulated procedures taken when a minor has suffered a concussion in sports" (Ava, CR2 VOF). Ava surmised that many of her students were not involved in sports and could not relate to the topic. To compensate for their disinterest in the specific topic, students resorted to telling stories about personal injuries which were not related to sports.

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The third criterion for an appropriate topic was that it must be one for which students had ample background knowledge. If the students do not have enough background knowledge of the topic, they cannot relate personal experience, or textual knowledge to the topic.

> When students have limited knowledge about a topic and have reading difficulties, the discussion is dead." At best, the result might be cumulative talk in which students "stack" similar opinions which are not supported by evidence. (Emily, VOF, May 10, 2012)

Cathy commented, "Good discussion topics have to be about something that students can relate to or have had experience with" (June 18, 2012). All members of the group agreed that topics closely related to students' life experiences brought different interpretations, opinions, and feelings to the discussion" (June 18, 2012). "Then, they have to think about what counts as sound evidence for interpretations, etc. in a person's life experiences" (Ava, June 18, 2012).

Planning the questions. Brooke's reflection, written after watching her first CR video, emphasized the need for planning questions ahead of time to facilitate discussion. "As I viewed the video I realized that if I had prepared questions about the text ahead of time, I could have used them as a basis for prompting student responses. It was really difficult asking questions 'off the cuff' while trying to engage students in higher-level thinking." Later, after her second CR discussion, Brooke wrote, "I always felt like the more questions I asked about the content, the more informed my students would be. What I was really doing was asking them to recall information from the text and not necessarily asking them to think about ideas represented in the text" (CR2 VOF).

Emily made a similar observation in her reflection following her third CR video, "I think it will be important to have some questions prepared as prompts for my next discussion. Even though I may not know exactly what ideas the students will bring up, if I have some questions that target specific ways of thinking specific to the topic, I can adapt them to the student responses." Emily admitted that she would have been better prepared to use the IMs if she had thought about the "different directions" the student responses may have taken.

Cathy expressed concern that if she didn't prepare some questions that dealt with important ideas about the topic, she and the students might "miss some of the major information" that they might need to discuss. Siting the same concern, Ava disclosed her idea of creating a graphic organizer to help her prepare questions for the discussion. She visualized the organizer as having "the big question at the top with possible answers branching down." She could then

follow the logical reasoning through each answer and be able to pose a question for a similar response. Ava commented, "There are two possible downsides to this: one – it might take a very long time to prepare all possible responses, and two – I might rely too heavily on the graphic organizer and manipulate the discussion too much." She added a disclaimer. "But, to my way of thinking, it's better to have some questions prepared with some direction rather than having no questions and no direction" (CR2 VOF).

Planning and practicing instructional moves (IMs). Teachers found that the instructional moves they had derived from their "go to" CR research article (Waggoner, Chinn, & Anderson, 1995) were not as easy to implement as they had first surmised. "I wish I had practiced the IMs in my regular instruction (even when I was more in recitation mode) before I attempted a CR discussion," Ava emphasized during our fifth TSG meeting. She had discovered that the instructional moves (IMs) of prompting, modeling, asking for clarification, challenging, and encouraging could be just as applicable to her "regular questioning." Ava realized that after the TSG had studied the IMs, and she had begun to incorporate these basic instructional moves in her questioning of individuals and groups of students. She acknowledged becoming "more conscious of the types of questions [she] was asking." Cathy wrote, "This was my third CR discussion and I have realized that I underestimated the time it takes to learn the IMs and the appropriate times to use them." One of her goals for the next CR discussion was to pay closer attention to the students' "level of thinking" by listening more closely to whether they were referring to someone else's ideas, supporting others' ideas, or explaining an independent idea. Brooke set a goal for her third CR discussion which required her to be prepared with an IMs "cheat sheet." She entered the following statement after viewing her second CR discussion. "I'll modify my IMs sheet of basic instructional moves to include more examples of questions/statements based on possible ideas/comments from students on the assigned topic." Brooke saw this as a way of "scaffolding" her appropriate use of the instructional moves.

During the sixth TSG meeting the teachers unanimously agreed that knowing when and where to use the IMs requires the facilitator to listen to the student responses, recognize the level of thinking the students are using, and deciding what questions to ask to probe for a higher level of thinking (Fieldnotes, June 18, 2012). After much discussion, the teachers "I had never realized the importance of those follow-up questions I needed to ask until I viewed the CR discussions and really listened to the student responses. Four of the teachers conceded that beginning a CR

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discussion without anticipating "at least some of the ideas" and planning follow-up questions, the teacher risked the development of students' off-focus responses and "widely-spread misinformation."

Modeling think-alouds. One of the most challenging instructional moves recommended in our research literature (Clark et al., 2003; Waggoner, Chinn, & Anderson, 1975) was "modeling." Modeling as defined by the authors involved demonstrating the reasoning process by thinking out loud in front of the students. All of the teachers recognized the importance of modeling the reasoning process for students, yet they expressed their perceived lack of knowledge or feelings of inadequacy. This was exemplified in Emily's reflection, "I suppose that I need to do more modeling of reasoning through an idea for the students, but I'm not sure how to do that." Brooke was exasperated after viewing three CR videos and wrote:

> The explanation we have on our IMs sheet is not helping me to model reasoning for my students during discussion and this is troubling to me because I teach reading. I have no difficulty in conducting think alouds when I model reading comprehension strategies for students. Why can't I model 'giving an example of a reason and an assumption' I've made when deciding upon my next statement during discussion? Is it because modeling reading strategies within fictional text is easier than when in nonfictional text? I learned to model 'think alouds' during teacher training. We had a script to follow – steps in how to use the strategy. Maybe that's what I need to do for modeling reasoning – figure out and write the exact steps in forming an idea about a 'big question' and practice the steps with my students. (May 15, 2012)

Ava described the necessity for modeling reasoning to her students to prevent them from "speaking out before thinking through their reasoning." She noted talking turns in her CR transcripts wherein students would use "holding in place" words (i.e. like, you know, etc.) while holding the floor, but they were still "weighing the alternatives" of a question out loud. "When I prompted the students to clarify their statements," explained Ava, "it was evident to me that those students needed help in knowing how to ask themselves questions to get past the 'alternatives trap' to reach a conclusion" (June 18, 2012). "We've read about 'thinking aloud' in the Gradual Release Model, but I'm not sure that I'm modeling good reasoning during discussion," confessed Dana. She continued:

When you [pointing to Cathy] were talking about pausing during a reading in class and asking students to give you a question they thought of about that part of the reading to help them question their understanding…I do that. I consider that as an essential strategy for understanding the science text. During our discussion – okay, recitative discussion – [she chuckles] when students give me an answer to a question I don't necessarily ask them what 'other evidence' they considered before they arrived at that answer. From what I understand about the type of modeling they describe in CR, it's important that the teacher model how there can be other plausible answers and how she goes about figuring out the best answer (May 14, 2012).

Dana and other members of the group continued to seek more information and guidelines on how to model thinking aloud for their students. By the sixth TSG meeting, members had researched and shared excerpts from research-based best practices retrieved from books, journals, and Internet sources. The researcher and the teachers discovered that resources which gave specific guidelines on conducting think alouds within reading comprehension instruction were plentiful whereas resources within the specific content areas of math, science, and history/social science were not.

The consensus among the teacher study group was that a format or "protocol" for thinking aloud in other content areas would be very helpful in their instruction. Throughout their conversations the group members expressed their need for prompts that they could follow when demonstrating their "thinking through problems" or "posed situations" to students. Near the end of one of these discussions, Dana read this statement from an article she was viewing online, "By verbalizing their inner speech (silent dialogue) on a regular basis…teachers demonstrate how experts solve problems," (TeacherVision, 2012) Dana lightheartedly continued, "If I verbalized my inner speech regularly, I wouldn't have a job at the end of the day!" She followed up by saying in a much more frustrated tone of voice, "There has to be something out there with more explanation on modeling to help us." (May 14, 2012).

<p style="text-align:center">Section 3: Evidence of Progress toward the Pedagogical Goal</p>

Phase Five, Part 1: Unanticipated Positive and Negative effects

  Positive effects of the intervention. In response to the fifth question of the F&DE framework, four unanticipated positive effects of the intervention were identified: (1) teachers' increased knowledge and analysis of questioning and cognitive processes that transferred to other

areas of their instruction; (2) their realization that think- alouds were important to modeling thinking during instruction; and (3) their appreciation for recorded and transcribed lessons/discussions, and (4) the teachers' use of informal practical inquiry. Teachers talked about incorporating the CR instructional moves into their questioning during daily instructional practice. They also began to research information about think alouds on their own and asked the researcher for additional research on this strategy. Teachers made multiple positive comments about having the opportunity to review their instructional practice in both digital and written formats. While the videos provided a venue in which they could readily critique their actions, the transcripts were said to be more useful in analyzing teacher and student interactions. Brooke explained, "I can get a holistic view of my teaching strategies from the video, but when I read and analyze the transcript, I can better determine what moves I could have made and didn't make to facilitate the discussion" (May 14, 2012).

Negative effects of the intervention. No negative effects of this intervention were identified by the participants or the researcher for the intervention. Ava did comment on the "good" negative effect of students' increased understanding of argument schema and its possible "backlash" for teachers. She shared an example in one of her reflections.

> Last week when I announced that we would have a unit test on Thursday of next week, I couldn't have asked my students to model a better example of reasoned argument. Those kids proceeded to state their arguments - opinions, evidence, counterarguments, and rebuttals on the issue of the test being scheduled in the same week as a field trip, baseball game with our biggest rival, and dance recital. I couldn't resist walking over to the Smartboard and pointing to the different argument components listed there as they reasoned why I should postpone the test. And wouldn't you know it? They were in consensus. I postponed the test until the following week. It occurred to me that an outcome of collaborative reasoning among middle-schoolers could be problematic for us! (May 14, 2012)

Phase Five, Part 2: Comparison of Baseline Data to Intervention Data

The sixth question within the F&DE framework asked: "Has the instructional environment changed as a result of the intervention?" Qualitative and quantitative data were collected prior to and throughout the intervention to determine progress toward the pedagogical goal. Pre- and post- intervention quantitative data were compared to complement the qualitative

data in making inferences about teachers' progress in facilitating discussion, as well as students' use of Collaborative Reasoning discussion features. The coding, comparing, and collapsing of themes within the qualitative data identified three areas where impact of the intervention was evident, thus affecting change within the instructional environment within the five classrooms. These changes are illustrated in (1) teachers' awareness of facilitative roles, (2) an increase in teachers' use of CR instructional moves, (3) an increase in students' use of CR features, and(4) an increase in students' higher-order thinking during discussion.

Teachers' increased awareness of facilitative roles. All five teachers spoke of their heightened awareness of the differences between recitation and authentic discussion (Almasi, 1996). Throughout the latter TSG meetings, different teachers were observed chiding themselves for "talking too much," "steering students toward her [teacher's] interpretation," "evaluating responses," or "controlling which students spoke" when coding their transcripts or member checking each other's codes. While the teachers readily reproached themselves for using "too much recitation," they were also pleased to find increasing incidents of "real discussion" within the transcripts. Ava and Brooke would often share "progress reports" with each other following CR discussions.

 "I use more recitation than discussion in my instruction because of TIME. I have very limited class time in which to teach content and assess what the students have learned," commented Emily (April 2, 2012). Cathy spoke of an additional contributor to the "time" factor – the testing schedule which mandated that all content standards be taught by early May.

Two teachers expressed concerns about discussions that became "too open." Brooke described situations in which students began to talk and she lost "control over the discussion" because they had a tendency to "feed on" others' "off-the-wall" comments and "stray from the topic." Ava related a similar incident and maintained that as long as the teacher asked "succinct questions that had a limited number of plausible responses, she could control the information being discussed and students were less likely to hear misinformation about a topic."

In spite of the teachers' awareness of the characteristics of recitation and the desired attributes of CR discussion, the teachers continued to struggle with "the habit" of recitation. "I still have a bad habit of repeating – not restating, because that's okay – but repeating word for word what a student says and trying to get other students to respond to the points being made. I was driving the conversation and talking way more than I should have," wrote Brooke (VOF,

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April 25, 2012). Emily noticed that she switched back and forth between discussion and recitation when she sensed that the student participation was slowing down. She described the wait time for a student's response as tense. Following her first CR discussion Dana wrote: "When I viewed the video of our discussion today, I realized that I repeated each student's response. This caused the students to continue to respond to ME rather than to the student who initially started the talking turn. So again, I was conducting recitation rather than facilitating discussion" (VOF, April 26, 2012). Similarly, during her second CR discussion viewing, Brooke noted that she repeated the student responses to keep the discussion going. The result of her restatements was that the students didn't look at each other, but at the teacher. Students looked at the teacher to determine if their responses were acceptable. "I am in the habit of restating their responses for clarity, and it's a hard habit to break," wrote Brooke (VOF, May 2, 2012). After viewing the video of her second CR discussion, Ava wrote:

> I was still in recitation mode! Today instead of repeating student responses, I observed myself saying, "okay" after each student's response. I don't know if the students are interpreting the "okay" as a signal for "correct" or if it is a signal for someone else to speak. At least I could see that some students are taking part in longer talking turns. That's some progress. (VOF, May 7, 2012)

Cathy noted that she was "driving the conversation" during her CR2 discussion. She explained that the students were not challenging or building on one another's ideas; therefore, she felt that she had to ask questions that required students "to give short answers to get more possibilities out on the floor. I was talking way more than I should have. After I watched the video I saw that what I really needed to do was ask them 'why' to prompt them to elaborate on their answers." Cathy's summation after conducting her second CR discussion was that if she had prompted for more evidence and elaboration from the students, more ideas would have emerged and the discussion would not have become recitation" (Fieldnotes, May 9, 2012).

All of the participants noted what they called their "relapses" to the "default" of recitation during their facilitation of CR discussions as they analyzed transcripts and reviewed data from various sources. Then again, one teacher remarked that recitation was the "hallmark of traditional teaching." The IRE pattern of questioning occurred "naturally" in the teachers' instruction. "Let's face it," remarked Dana, "I was mainly taught through recitation or lecture, and we know that when a method isn't working for us, we're going to revert back to the

traditional method – what we have experienced the most." When discussion among the students (1) "stalled" or strayed from the topic; (2) as limited time and quantity of information became factors; or (3) student responses were not supported by evidence, the IRE pattern of recitation was the teachers' fallback.

Teachers' understanding of CR instructional moves. The teachers extracted the descriptions of teachers' 7 CR instructional moves from the Waggoner et al. article (1995). This list of moves and accompanying explanations served as a CR protocol for teacher questioning and as a coding matrix for discussion transcripts. During the course of the first two CR discussions, the teachers added three instructional moves they had used: repeating discussion rules, explaining text, and restating student responses. The list of instructional moves with brief descriptions follows:

1. Prompting (asking for a reason, position, evidence, or evaluation)

2. Modeling (demonstrating the reasoning process)

3. Clarifying (asking students to explain what they mean when they are imprecise)

4. Challenging (asking students to consider ideas not thought of yet or overlooked/assumed)

5. Encouraging (acknowledging use of evidence of clear expression of argument)

6. Summing up (summarizing what students have said)

7. Fostering independence (getting students to talk to each other – not just the teacher)

8. Restating talking rules (reminding students of class rules of discussion)

9. Explaining text (providing clarification of information in text/situation/problem)

10. Restating response (repeating student responses in more comprehensible terms)

A portion of the last two TSG meetings was dedicated to a teacher share session in which teachers were asked to select a vignette from their CR discussions that reflected their "most effective" instructional moves as facilitators. Sample vignettes exhibiting CR instructional moves with the exception of "modeling" and "summing up" are exhibited below.

IM: Prompting: asking students for a reason, position, evidence, or evaluation. Dana shared the following selection from her second CR discussion about the "big" question, "Should human euthanasia be legal?"

S1: I think it should be legal because if somebody is suffering you should allow them to die easily without pain.

S2: I think it should be legal because you don't want the person to suffer and uhm…I wouldn't want to suffer personally. So just euthanize them.

S3: I think it should be legal. Yeah, it should be legal for a person to make decisions about how they want to die. If they don't want any pain or suffering then they…the doctors can go ahead and take them.

S4: I think yes, because they may not want to keep on living. They might want to just die. If they might still live it could be a lot harder on them.

Dana: It sounds like those who have spoken so far are Pro-Euthanasia. Is there anyone who would like to talk about why euthanasia should not be legal?

S5: Yeah. A person could be in so much pain, that they're not thinking straight. But with the right medicine or surgery or something, they could be okay.

Dana: (*The teacher asks student for evidence.)* Can you give us some evidence as to how that could happen?

S5: Well…in the article we read …uh…*(he shuffles pages of the article)...*right here that…pale…palliative *(the teacher pronounces the word 'palliative' for the student)* "palliative, a medical specialty focused solely on pain, stress, and symptom relief, is so advanced (Center to Advance Pale…oh, whatever, Care, 2009). It says "in most cases the desire to die or suicidal thoughts have been shown to be clinic depression which is treatable." So a person could be depressed because they are hurtin' really bad, and they might tell a doctor they want to die, but they really don't!

S6: I think it depends on the person and the situation. If they are really hurting…like out of their mind with pain…I think the family should help make the decision…

S7: What if they don't have any family?

S6: Well, maybe…they have some close friends who could help…I mean, they could still live and stuff if someone close could help them decide what to do…

S7: I don't want any of my friends makin' that kinda' decision for me! I coulda' made them mad about somethin' and poof! I'd be DEAD! (*Students laugh and many start to talk simultaneously.)*

Dana: Wait! One at a time! Let's go back to S5's reasoning for a minute. Can anyone think of how a person could be protected from making the decision to die too early?

Dana concluded her example with this statement.

If I hadn't had the IMs sheet, I probably wouldn't have pushed him (S5) to find evidence from the text right then. I think I have a tendency to sorta poll the students first, then I ask them to support their answers. I probably would have asked a few more students what they thought before calling for evidence. By prompting him to go back into the article and find his evidence earlier in the discussion, I was able to keep the students more focused on thinking about the scenarios and factual information in the text we had read. They weren't able to just pile on more personal opinion about anti-euthanasia. And that, folks, would have been 'cumulative talk!'

IM: Asking for clarification: asking students what they mean when they use words and concepts in an imprecise way. Emily's example of clarifying came from her first CR discussion in which students were asked the "big" question: "Which do you think is more important – animal rights or animal welfare?"

S1: I think animal welfare would be more important than animal rights. Like with people who fight for animal rights, they don't think animals should be pets or working animals. They don't want people to eat animals, so everybody would be vegetarians. All the animals would just be free. Animal welfare is about treating animals with respect and without cruelty.

S2: What would animal rights people do about animal overpopulation?

S1: I don't know. They just don't want you to kill animals.

S3: I don't think you should eat anything that eats meat, too. There's no harm in being a vegetarian either. You can get all the things – vitamins and minerals and stuff like that from fruits, vegetables, and grains.

S4: But we need trained animals. I mean we need guide dogs for the blind and animals for research and things like that.

S2: Animal research is okay as long as it's done responsibly.

Emily: (*The teacher asks for clarification.*) Exactly how would researchers conduct animal research responsibly?

S2: If you're going to run tests on animals it should be animals where there are lots of them. I'm not saying that it's okay to go out and kill animals for testing just because we want to or think we need to. I'm just saying it's okay with animals that there are more than enough of – like it's not going to extremely hurt the population. Like panda bears, it

would be wrong to run tests on them because they might die and hurt the population that is already endangered. But like rats, we've got billions of them or more running around everywhere. There are enough of them to use for research.

IM: Challenging: Asking students to consider ideas they have not thought of yet or ideas they have overlooked. Brooke's students had discussed the pros and cons of school uniforms from the students' point of view during their third CR discussion. For the fourth CR discussion students had to assume the point of view of the school administrator or parent on the issue.

S7: I'm a parent and I wouldn't want my child to wear a uniform to school because I want my child "to be able to embrace their individualism" like it says in the article. I want them to be different in as many ways as possible and wear different clothes.

S8: I don't think you would really get to know people if they wore uniforms. How you dress characterizes you. That's what I do sometimes. How I dress some days shows people what kind of mood I'm in. You really can't express yourself in a uniform.

Brooke: (*The teacher challenges the thinking of the student.*) Let's say this is a new school and it's the first day of school. We have not met one another before this day. We all come in the building wearing our uniforms and we go to our first period class. How would we get to know each other? How would you make friends?

S9: I think I would talk and listen to see if somebody had similar interests as me….if there were some things we had in common like sports or video games. I'd pick friends by what they said or did.

Brooke explained that she was impressed by many of her students' "mature and thoughtful responses" during this discussion. "I was hoping that they would recognize that we may often 'judge a book by its cover' or in this case, what a person may be wearing, rather than finding out who that person really is." I'd like to believe that my challenge made them think deeper into how they choose their friends.

IM: Encouraging: Acknowledging and praising progress in thinking signified by use of evidence. Ava's fourth CR discussion dealt with cyber bullying and whether school administrators should become involved. She shared this excerpt from the discussion:

S11: I think the school administration should get involved because a person could be an 'all A student' and could start getting bad grades because they couldn't get [bullying] off their mind.

Ava: (*The teacher encourages the student.*) I think that's really good reasoning. [Bullying] can affect your grades and if it is affecting something in school then administrators could help eliminate the problem.

S5: What if the cyber bully is from a different school and the student who is being bullied is from our school? How could our administration do anything about it?

Ava: (*The teacher encourages the student.*) That's a good question. I like the way you're thinking about different scenarios here. Does anyone have an idea of how our administrators could help?

S4: The first thing they could do is talk to the parents of the kid who's being bullied. They might not even know it's happenin' to her.

S14: I'm thinkin' they should call the police and let the police handle it. Isn't that what our Resource Officer is for?

S11: Who is "they"?

S14: I guess the police would pay more attention…um like it would be more official if the principal – that's the THEY I'm talking about – if the PRINCIPAL told the police about the bullying.

Ava smiled after reading this portion of the transcript and admitted, "Seriously, a month ago if a student had asked the question about 'what could the administration do, etc., I would have immediately told him that administrators communicate with each other, etc. and I probably wouldn't have stopped to ask students how administrators could help."

IM: Fostering Independence: Getting students to take as much of the responsibility as possible for carrying out the discussion. Cathy's first CR discussion was based on "The Lottery" (Jackson, 1984). She posed this "big" question to her students: "Why do you think the community continues the lottery?" During our fifth TSG meeting Cathy read this selection from her transcript:

S15: I think it was kinda rigged, because everybody hated Tessie. They all didn't like her because she was like, 'It's not fair! It's not fair! We didn't have time to choose!' And uhm…"

(No one speaks for about 30 seconds.)

Cathy: *After allowing 'wait time' to give students opportunity to think, the teacher prompts using the former speaker's terminology – "rigged" to urge students to continue the line of thinking on their own.* Was there anything else that might support the lottery being rigged? Can anyone else find evidence to support or refute S15's idea that the lottery may have been rigged to eliminate Tess from the community?

S12: Well, it was like, "Be quiet, you know you had as much chance as we did."

Cathy: *(Speaking to S15)* So you're saying that there might be some ill-feeling toward Tessie? *(She addresses the group.)* What do you people think about their idea?

S4: I don't see how it could have been rigged! They didn't put names on the slips of paper. Remember? They just had slips of paper for each family member in the box, and just one of the slips of paper had the black dot on it. How could they have rigged that?

S10: I agree with S4. How could they know that Tess would draw the black-dotted slip of paper? There were four members in her family, and there were four slips of paper in the box. It was just left up to fate.

Later, during group discussion of this vignette, Cathy admitted that allowing for "those silent seconds" was difficult, but she knew that she had to "give the students time to think and respond to each other" rather than to the teacher.

Teachers' increased use of instructional moves. During the course of the intervention, transcripts of the CR discussions and various forms generated by the teacher study group were used to monitor progress in the implementation of the CR discussion model. Quantitative data were also collected from the teachers' coded transcripts and their CR Video Observation Forms (VOFs).

After considering possible approaches to analyzing the quantitative data, the TSG members and I decided that a chronological method of studying patterns of instructional moves throughout the four CR discussions would provide the best depiction of the intervention's progress. It was important to the teachers that they not merely know the types of moves they employed, but what circumstances may have necessitated those moves. The teacher-coded instructional moves in the baseline and CR discussions were converted to percentages by dividing the number of times each instructional move appeared by the total number of teachers'

talking turns occurring within that transcript. The supplemental tables and figures of the data provided to the teachers (Appendix J) depicted the following description of the data.

   Ava's CRD1: "Should students be allowed to pray in public school?" In comparison to her baseline discussion, Ava's use of prompting decreased during her first CR discussion. Instead of constantly prompting students to provide evidence for their responses, she increased her questions that asked them to clarify their remarks in more precise terms. Rather than constantly asking "why" questions, she increased her challenges to students by proposing alternate scenarios or points of view which they had not considered. Ava's praise of students' use of evidence increased slightly compared to her baseline discussion. Though Ava found the CR1 data encouraging, she recognized that many students did not participate while a "handful" of students dominated the discussion (VOF, April 24, 2012). Even though her need to repeat classroom discussion rules decreased, she was concerned that students "talked over each other" and did not observe classroom discussion rules (TSG Meeting, May 14, 2012). The big question, "Should students be allowed to pray in public schools?" had sparked a discussion for which students appeared to have adequate background knowledge and interest, thus the teacher did not have to explain the text (article and video) or repeat student responses. Upon reflection, Ava planned to focus on (1) including more students, (2) preparing a list of teacher questions, and (3) providing more background knowledge for the second CR discussion (VOF, April 24, 2012).

   Ava's CRD2: "Colorado Senate Bill 40: Should coaches be required to receive training in recognizing concussions?" Ava's use of prompting increased compared to her baseline discussion and was also a substantial increase (+28.1%) compared to her first discussion. Her clarifying moves increased, and Ava attributed most of the clarifying moves to "having to bring them back to the concept of sports-related concussions as indicated by the topic" (VOF, May 7, 2012). Her prompts consistently asked for evidence and connections to the big question. Ava described student responses as "warranting no encouragement" as she did not feel that the "students were providing good evidence for their reasoning" (TSG5, May 14, 2012). Researcher's fieldnotes revealed that the students did not have sufficient background knowledge to understand the implications of the topic; therefore, they supplanted their "personal injury" stories for discussion about whether coaches should be trained to recognize symptoms of a concussion in injured athletes (May 7, 2012). Consequently, as students enthusiastically competed in telling their "worst head injury I ever had" story, they had to be reminded of ground

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rules more often than during the baseline discussion. In her reflection, Ava stated that her focus for the third CR discussion would be on selecting a topic that was "more relevant to all students" and one to which they could more "readily apply background knowledge" (May 7, 2012).

Ava's CRD3: "Should students be held legally responsible for cyber bullying and for the deaths of their victims?" Compared to the baseline data, Ava showed a decrease in prompting students for reasoning or opinions during their third CR discussion. There was a slight increase in teacher questions to clarify student responses, and a considerable increase in challenging questions as compared to the baseline discussion. After viewing the video, Ava was concerned that these challenges were worded in such a way that she appeared to have been "giving additional information about the topic," outside of the written text, and "attempting to lead students' opinions" (VOF, May 7, 2012). Despite her perception that she had somewhat led students' opinions, it was the researcher's impression during review of the transcript and the students' written text provided for the discussion, the majority of Ava's challenges were based on the factual information provided in the text. She showed an increase in her efforts to encourage those students who supported their statements with evidence, and expressed their arguments clearly. Ava considered the repetition of "talking rules" and restating student responses "necessities" because "the students were talking while others were speaking." Ava cited her focus for the final CR discussion as, "Teacher will be talking and leading opinions less!" (VOF, May 17, 2012)

Ava's CRD4: "Should school personnel get involved in cyber bullying cases involving students?" The big question driving the CR4 discussion was suggested by one of Ava's students near the conclusion of their CR3 session and was a continuation of the same topic. Results of the discussion revealed that Ava's use of prompting remained 24.4% less than the percentage in the baseline discussion. In contrast, her CR4 questions asking students to clarify meanings of their statements, and statements challenging students to probe their assumptions increased. During coding of the transcript Ava commented that she remained "cautiously optimistic" about the wording in these challenges and her "neutrality" during this discussion (TSG Meeting, May 28, 2012). She did restate responses often during this discussion, but these were not questions; rather, they were restatements of the students' ideas, followed by pauses that invited others' to comment. She also called students' attention to those responses which showed "good thinking" and clear arguments.

Brooke's CRD1: "Can video games be harmful to children?" Brooke's prompting for reasons or evidence during her first CR discussion decreased in comparison to the baseline. Rather than prompting the students, she phrased the majority of her questions to ask students for clarification. Prompting and clarifying moves were needed due to the students' inclination to talk about their personal experiences with video games and not the circumstances described in the video and written article provided. Though Brooke had not challenged students to consider alternate ideas during the baseline discussion, CRD1 data showed that 12.5% of her questions asked students to think about important points they may have overlooked in the texts. Though Brooke did not offer as many encouraging remarks, she intermittently summed up important points, and fostered student independence whereas these instructional moves were not evident in the baseline discussion. Increases were observed in Brooke's repetition of discussion rules and restatements of student responses when students failed to observe talking turns.

During her later viewing of the discussion, Brooke observed, "the same students wanting to comment and call on one another rather than inviting others to join in the conversation" (VOF, April 25, 2012). In spite of the variety of instructional moves evident in Brooke's first CR discussion, wording of the prompts in which she repeatedly asked, "Can anyone think of another reason?" and "Can anyone think of another explanation for why this might be true?" supported her reflective comment, "they wanted to challenge each other, but they didn't want to back their statements with supporting evidence." She continued, "Next time I am focusing on talking less, and encouraging them to back up their reasoning with evidence from the text, not just their personal opinions" (VOF, April 25, 2012).

Brooke's CRD2: "Can a video game lead to murder?" Brooke's second CR discussion was an extension of her students' first discussion. Having provided more background knowledge with additional text and video, Brooke looked forward to this discussion as one in which she could practice "better questions" and students might be "more comfortable with supporting evidence and reasoning through ideas" (Fieldnotes, May 2, 2012). The teacher's prompting again decreased from the baseline while her requests for students to clarify their responses increased. Brooke had to challenge students to provide evidence less than during CRD1. Upon her review of the discussion Brooke attributed the increase in clarifying to a surge in student participation. The decrease in challenging was due to students patterning their responses after those who had participated in CRD1 (VOF, May 2, 2012).

Brooke encouraged students less compared to the baseline and CRD1. However, her moves to periodically sum up students' points increased and her moves to foster independence among the students increased. With more students participating than in CDR1, Brooke slightly increased her moves to remind students of discussion ground rules. This discussion was the first one in which she did not have to explain portions of the text or restate responses for students. When coding this transcript days later, Brooke remarked that the students "did a great job of feeding off each other's comments and backing up those comments with evidence from the video and articles. The topic was "hot," more relative to this age group, and their personal experience combined with the 'story-like' articles boosted their interest and confidence"(TSG5, May 14, 2012).

Brooke's CRD3: "Uniforms in schools: As a parent, why do you think student uniforms would provide for a more safe and bully-free school environment?" **B**rooke prompted students less during this discussion compared to the baseline, but she had to remind students to support their reasoning more than in the second discussion. There was an increase in the teachers' requests for clarification when compared to the baseline data, yet this was the least percentage of the three CR discussions thus far. Brooke's challenging questions increased as compared to no challenges issued during the baseline discussion. Data showed that her moves to encourage students by praising their efforts to use supporting evidence were slightly less than that of her baseline data. Brooke spent less time summarizing during this discussion since she was able to enlist an instructional assistant recorded students' reasons on the whiteboard. As Brooke's reminders to follow talking rules increased so did her need to restate responses of students who were interrupted or "talked over."

During our last TSG meeting, Brooke stated that this was a great topic for the students, and she thought that her big question "was worded better." She added, "I finally realized that if I put 'why' in the question, the students could finally get past the 'yes' or 'no' part of the question to the reasoning behind the concepts of safety and prevention of bullying. I didn't have to ask them to clarify as much" (June 18, 2012). Some of the students struggled with assuming the parent's point of view. "I think if I had modeled a parent's way of thinking or provided a sample dialogue for the students, some of the students could have participated more," wrote Brooke. "I didn't want to begin this topic by asking them to discuss from the student's point of view. I wanted to challenge them to see other points of view" (VOF, May 15, 2012). Brooke's focus for

the group's fourth CRD was on continuing the topic, but asking students to discuss the issues from their personal points of view.

Brooke's CRD4: "Uniforms in schools: As a <u>student</u> or <u>parent</u>, how do you feel about required uniforms in schools." Brooke prompted students 14% of her talking turns during this discussion which was the least percent of all her recorded discussions. Her questions or statements urging students to clarify their responses increased 20.2%. In reference to this increase, Brooke wrote, "Some of those kids had been holding in their opinions for two days, so I was expecting a flood of responses. I had hoped that they would have backed them up more, but for some I think the emotions overrode supporting evidence" (VOF, May 18, 2012). The teacher's challenging and encouraging moves as compared to the three earlier CR discussions increased the most, with percentage increases occurring in challenges (+24.5%) and encouraging comments (+4.1%). Since the students' important points were being recorded on the whiteboard as in CRD3, the teacher summarized their ideas less. The students needed very little encouragement to take responsibility for the discussion as indicated by fewer restatements of student responses by the teacher and fewer explanations of text. As Brooke had observed earlier, some students were emotional and could become very adamant about their reasons against school uniforms; therefore, she had to repeat classroom discussion rules the most (5.2%) during the group's fourth CR discussion.

Cathy's CRD1: "The Lottery": Why do you think members of the community still felt the need to continue the lottery?" Data derived from Cathy's first CR discussion disclosed a decrease in prompting students to provide reasons, evidence, or evaluation in the responses. There was a decrease in the teacher's questions to clarify students' remarks as compared to the baseline data. Cathy's challenging moves increased as opposed to the lack of challenges issued during the baseline discussion. Her encouraging comments increased slightly while her statements urging students to talk to each other showed an increase of 11.1%. It was obvious that students were eager to give their opinions as this led to interruptions of students' talking turns and confrontational talk during the discussion (Fieldnotes, April 25, 2012). Cathy was able to bring order to the discussion by repeating the "rules of discussion" which increased her repetition of guidelines (+12.2) when compared to her baseline discussion.

Cathy had written about her reservations in regard to students adhering to the "talking rules" in her VOF reflection (April 25, 2012). Overall, she was pleased with the student

participation level, and admitted that though she and this group "had many discussions involving literature, this one took a different tone." She wrote, "I felt the discussion took some twists and turns that I hadn't expected."

Cathy's CRD2: "Do you think that producers of video games should be held libel for violent acts committed by players of those games?" Data collected for this discussion disclosed a decrease of 7.3% in Cathy's prompting moves compared to that of the baseline discussion. The teacher's clarifying moves decreased when compared to the baseline, while her statements and questions challenging students' reasoning increased 16%. A decrease in encouraging students was noted in comparing baseline data. Cathy's efforts to foster independence increased to 12.9% where there had been no evidence of fostering independence in her baseline discussion. In spite of the disputational talk, Cathy managed to facilitate the discussion with fewer rules repeated. She restated student responses 16.1% of her talking turns resulting in a decrease compared to the baseline data. Cathy's major concern following this discussion was the confrontational atmosphere exuding from the group. Her focus for the next discussion was on "creating an atmosphere conducive to students respectfully challenging each other's ideas" (VOF, May 16, 2012).

Cathy's CRD3: "Is putting a ban on 32-oz. sodas a civil-liberties issue?" The topic of Cathy's third CR discussion immediately sparked students' arguments and counterarguments (Fieldnotes, May 16, 2012). Cathy's prompting moves continued to decrease (10.1%) compared to baseline data. Her use of questions to clarify student responses increased. Cathy did not use challenging, encouraging, summarizing, or fostering independence moves during this discussion. In comparison, there was one move that reflected change – that of encouraging students when they supplied evidence or clear expression of arguments which decreased 9.4% from the baseline. Even though 14.7% of Cathy's instructional moves were devoted to restating student responses, this showed a decrease of 4.2% compared to the baseline discussion. During the coding of the CRD3 transcript, Cathy explained how she had wanted to "instill responsibility among the students" by reiterating the concepts of argument and counterargument before the discussion. "But my strategy backfired!" she exclaimed. "The terms 'argument' and 'counterargument' seemed to instigate confrontational or disputational talk" (TSG6, June 18, 2012).

Cathy's CRD4: "Could genocide similar to the Holocaust happen today?" This discussion was based on the novel, *Night* (Wiesel, 1982), and a recent field trip to the Virginia Holocaust Museum in Richmond, Virginia. During the discussion, Cathy's use of prompting escalated to 57.7% which was an increase of 12.4% above her baseline data. She asked for more student response clarification and challenged students to consider additional perspectives more than during the baseline discussion. For the first time during CR discussions, Cathy periodically summarized major ideas students had contributed. Her repetition of discussion rules increased 2.8% while her explanation of text decreased 1.3%.

Following this discussion, Cathy remarked, "I was glad to see that the students more closely followed the rules of discussion" (Fieldnotes, May 31, 2012). Later, after viewing the coded data Cathy realized that she had been "more engaged in the discussion than necessary, and there was far too much teacher talk" (TSG6, June 18, 2012). She went on to explain that she had wanted the students to connect the descriptions and events in their recently read novel, "Night" (Weisel, 1996) to their observations in the museum. "This was not the time to do that," she remarked, "I should have had them make those connections to what they saw at the museum before we attempted a discussion on the possibility of other incidents of genocide" (June 18, 2012).

Dana's CRD1: Are forest fires good or bad? Data compiled from Dana's coded transcripts revealed that she prompted students 45.5% of her talking turns resulting in an increase of 18% compared to her baseline. Her moves to persuade students to support their comments with evidence increased 30.7% when compared to her baseline data while a decrease occurred in in her encouraging remarks. Slight increases occurred in her moves to challenge and foster independence among the students. There were no teacher moves to restate students' comments.

Dana voiced her disappointment immediately following her first CR discussion. "I have to break myself from this recitation habit! Did you [researcher] hear how many 'okays' I said and the number of times I followed their remarks with so…?" Later when Dana shared parts of her first two CRD transcripts with the group, she exclaimed, "It looked like I was badgering the poor kids, and I think they have become so used to my interruptions that they wait for my prompts which point out possible assumptions – so they're waiting for me to just think it through – oops, using our cognitive terms – supply the reasoning and evidence for them" (May 14, 2012).

Dana's CRD2: "Should human euthanasia be legal?" Compared to baseline data, Dana's prompts increased as did her questioning for evidence resulting in an increase of 14%. Her efforts to challenge student responses increased while her words of encouragement spoken to those who supported their ideas decreased (4.2%). This was the first CR discussion in which Dana summarized students' ideas (+4.6%). She repeated student responses 19% of her teacher moves which revealed a decrease of 21% from the baseline.

"I was disappointed that the students did not refer back to the article they read about human euthanasia," wrote Dana. "Some of the students had interesting views about how euthanasia should be conducted, but they did want to back up their ideas with available evidence (VOF, May 3, 2012). In retrospect, Dana later commented that she "should have given the students more time to absorb the information in the article before the discussion" (TSG Meeting, May 14, 2012).

Dana's CRD3: "Who should receive organ transplants?" During her third CR discussion Dana's prompting increased 20.4% compared to her base discussion. She asked students to state evidence or reasons to support their opinions 31.3% of her talking turns which was an increase (+23.6%) from the baseline discussion. There was a slight increase in her challenging moves and a decrease (-9.1%) in her efforts to praise those students who showed progress in thinking. Her summing up moves increased slightly from the baseline while her reminders about discussion rules increased 5.9%. Dana's pauses during the discussion to explain the text decreased while her restating of student responses decreased 23%.

After viewing her video for this discussion Dana wrote: "I did not allow enough wait time after my prompts" (VOF, May 17, 2012). During our last meeting, Dana described how she "regressed" during this discussion. "I thought I had a good topic – one that earlier in the year I had promised the students would be a debate topic. The discussion got out of hand with too many students offering an opinion without any providing sound evidence" (June 18, 2012).

Dana's CRD4: "Should genetic engineering of animals be allowed?" Data reflecting Dana's use of prompting revealed an increase of 6.2% from the baseline; however, decreases of 11.8%, and 14.2% were noted when compared to CRD1 and CRD3. Her clarifying moves increased 22.2% from the baseline discussion. She challenged students' to examine their assumptions 11.9% of her total moves, an increase of 9.4%. Dana employed less encouraging moves (-12.1%) during this discussion. Though her repetition of rules showed an increase above

baseline data, she repeated reminders to follow discussion rules less. Her restatements of student responses also decreased 23% in comparison to her baseline data.

Emily's CRD1:"Which do you think is more important – animal rights or animal welfare?" The data from Emily's first CRD revealed a decrease (-23.5) in prompting moves. Her questions asking students for clarification of their remarks increased 15.7%. An increase of 22.1% in challenging students to examine their assumptions was also noted. Compared to her baseline discussion, Emily's encouraging remarks to those students who provided evidence or reasoning increased while her reminders of discussion rules increased 14.7%. A considerable percentage (22.9) of her turns was used to restate student responses. Emily was concerned that some students were monopolizing the discussion, and she had "to prod" others to participate (Fieldnotes, April 26, 2012). When writing her reflection after viewing the discussion's video, she commented, "I was talking more than a teacher should during discussion, but the students tended to stray off the topic. I had to keep bringing them back by asking prompting questions" (May 28, 2012).

Emily's CRD2: "There has been a mandate issued that all farmers in this county must convert to organic farming. How will this impact our farmers?" During her second CR discussion, Emily's use of prompting decreased 15.7% as her questions asking students to clarify what they meant increased 31.3%. She challenged students 8.5% of her talking turns resulting in an 8.5% increase above her baseline. Further data revealed that Emily had begun to use summing up although she had not demonstrated this type of move during the baseline or first CR discussions. Emily's use of restating student responses and waiting for comments increased. Her moves to remind students of discussion rules increased; however, it was noted that this was a 10.4% decrease from her CRD1. She used 23.2% less talking turns to explain the text as compared to her baseline discussion.

Emily noted that a small group of students had become argumentative, thus many of her prompting moves were directed toward students outside of that group to join the discussion. She explained, "I was repeating the responses of this small group of girls and asking challenging questions to involve other students so that new counterarguments would develop" (TSG Meeting, May 28, 2012). Another concern was that students were continuing to rely upon personal experience rather than the factual information contained in the written text. Emily's two

areas of focus for her third discussion was "having students regulate their participation, and use supporting evidence from the text" (VOF, May 10, 2012).

Emily's CRD3: "Has America paved paradise? How?" Emily's use of prompting continued to decrease (-16.1%) as compared to her baseline. Her clarifying prompts increased 37.2% while her challenging moves increased 9.3% from the 0% used during the baseline discussion. Her encouraging moves also increased. It should be noted that Emily wrote students' abbreviated ideas on the whiteboard during the discussion to aid in summarizing students' ideas. Emily explained the text 10.9% in the course of her instructional moves which was a decrease of 13.6%. A decrease of 22.9% in restating responses by was also noted.

In Emily's words, "the students didn't connect to the article or the song, 'They Paved Paradise' the way I thought they would. At one point they weren't referring to the article at all unless I prompted them to do so" (VOF, May 15, 2012). Emily was disappointed during the viewing of the discussion as she once again recognized "circular and disputational talk" throughout her CRD3.

Emily's CRD4: "Which of our national resources are worth saving through conservation?" Emily's prompting again showed a decrease (13.6%) from the baseline. Her clarifying moves increased 28.4%, while challenging moves increased 13.9%. Her efforts to encourage those students who used supporting evidence increased 7.0% along with her moves to summarize (+3.2%) important points during the discussion. Emily reminded students of discussion rules 6.5% of her talking turns and explained information in the text 5.4% of her moves as opposed to the 24.5% of her moves used for this purpose during her baseline discussion.

Emily noted that the students appeared to be more focused on the big question. Students also provided evidence rather than stating "personal opinion." She remained "concerned about the percentage of her prompting and clarifying moves," and felt that students needed to "do a better job of jotting down talking points so that they can formulate a better counterargument" (TSG6, June 18, 2012).

Summary of Teachers' Instructional Moves during Collaborative Reasoning Discussions

The teachers perceived progress in CR facilitation as a movement away from prompting students for evidence to more effective teacher moves that (a) required clarification of evidence, (b) challenged ideas, (c) encouraged students' progress in thinking, (d) summarized what students had said, and (e) fostered independence. It was their goal to use fewer clarifying and challenging questions and less fostering independence moves as students gained experience. Progress would be characterized by less repetition of discussion rules, explanation of text, and restatements of student responses. All five teachers established a shared goal of moving toward a majority of instructional moves in the categories of encouraging students to continue their thinking and summing up student responses. This gradual movement from teacher-controlled facilitation to student-controlled discussion would "signify effective implementation of the model" (TSG5, May 14, 2012).

Combined data from the twenty CR discussions revealed that Brooke and Emily decreased their use of prompting in all four of their discussions. Ava and Cathy decreased prompting in three discussions (75%). Dana did not decrease prompting moves. Four of the teachers had increased in clarifying moves across all four discussions and Cathy increased her use of clarifying during two of the four (50%).

Dana, Emily, and Brooke increased challenging moves during every CR discussion while Ava and Cathy increased their challenges during three of the four discussions. Emily was the only teacher to increase encouraging moves throughout the four CR discussions. Ava increased encouraging moves during three discussions (75%) while Brooke and Cathy showed increases in encouraging students during 1 of 4 (25%) of their discussions. Dana was unable to increase encouraging instructional moves within her CR discussions.

Brooke increased summarizing moves during each discussion (100%). Dana and Emily increased their summarizing during three discussions (75%). Cathy showed an increase in summarizing during a discussion (25%); however, Ava did not employ summing up moves. Brooke's data revealed that she fostered independence in each of her discussions. Cathy and Dana fostered independence in 50% of their discussions while Emily increased in one (25%). Fostering independence moves did not appear in Ava's discussions.

Decreases in teachers' moves to repeat rules, explain text, and restate responses were desired outcomes of the data; however, four teachers continued to repeat rules throughout 75%, and one teacher 100% of the discussions. Ava, Brooke, and Cathy were successful in decreasing their moves to explain text during all discussions. While Dana explained text 25%, Emily paraphrased text at some points in 75% of her CR discussions. Cathy, Dana, and Emily were able to facilitate without restating student responses during all CR discussions; however, Brooke restated responses two out of her four discussions, and Ava restated student responses during one CR discussion. The compiled data for each teacher is displayed in Tables 6 through 10 accompanied by Figures 5.1 through 5.5 in Appendices F through J.

All of the teachers believed that they had shown improvement in their implementation of the CR model over the course of the four CR discussions. When the data collected from the fourth CR discussion was compared to baseline, increases were evident in all of those areas the teachers had designated as effective facilitative moves with the exceptions of modeling and summing up. I addressed the teachers' perception that they had not modeled CR during their facilitation of the discussions during the sixth TSG meeting.

After listening to the teachers' conversations during coding sessions and rereading my fieldnotes and discussion transcript, I predicted that the "modeling move" (teachers' term) might be an issue during the closing meeting. At that point in the meeting I asked the teachers to return to their data and transcripts to look for their coded students' usage of CR features. I then asked them to locate instances where students had used terms such as "show evidence," "prove," "clarify my/your answer," "what do you mean," "argument," "counterargument," "good reason,' or "not a good reason." The resulting conversation revealed that teachers were able to cite numerous instances where students used these terms or phrases or similar words directly or soon following a teacher's CR instructional move. The following vignette occurred during a citing of "clarifying" and "challenging" examples cited by the teachers:

Emily: Here, I've got one. This is in the Animal Rights vs. Animal Welfare transcript. Student: 'Can't you pull parts from both and make it work? Teacher: 'Can you clarify what you mean by parts and use an example from the articles we read?' I won't read those parts, but she did read one section from 'animal rights' and one section from 'animal welfare'. Then another student speaks uhm...two turns later. Listen to this:

S15: 'Can you clarify you statement with something they said in the 'animal welfare' article?' Woohoo!

Dana: I have one for clarify, too. From my Organ Donation transcript. Teacher: 'So, how is what you're saying different from what S3 said? Can you clarify that for us?' Then about three talking turns later S11 says, 'Clarify what you mean by even if the person lost some of his brain power, he could still be useful. What do you mean by useful?'

Ava: Here's one for challenging. Oh, this one is from the "Cyber Bullying" discussion. I said, 'Some people might say that what students write on Facebook is their personal business and not that of teachers or principals. How would you respond to that?' About three, no, four turns later S9 says, 'I think some people might think that, but what if you were a victim of cyber bullying by someone you see on the bus every day, how would you act then?' Is that an example? (TSG5, June 18, 2012).

Teachers decided that though they had not modeled in the sense of "demonstrating the reasoning process by thinking out loud" as written on their CR instructional moves sheet, it was apparent that students were internalizing the vernacular and moves of Collaborative Reasoning.

Students' Use of Collaborative Reasoning Features

Quantitative data were compiled from the teachers' Video Observation Forms to determine if students were exhibiting features of Collaborative Reasoning in their responses. The form listed these possible features the students may have used in their responses within the dialogue:

- asking questions in order to understand text and construct meaning
- responding to others' questions
- challenging ideas by telling whether they agree or disagree, and telling why
- restating or trying to question what others say if it is not clear
- encouraging others to participate
- ensuring that all group members stick to the topic
- ensuring that all group members take turns
- providing evidence from the assigned text to support ideas
- relating topics or issues to their own experiences to assist understanding
- relating topics across other sources of text or experiences outside of the assigned text.

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Teachers also read transcripts and coded each student talking turn in relation to the 10 CR features listed above. The number of times a feature appeared in the students' talking turns was compared to the total number of student talking turns in the discussion resulting in a percentage of use for each feature in that discussion (i.e. during Ava's baseline discussion, 1 student talking turn was coded as "asking questions" among the 25 student talking turns coded in the discussion resulting in 4% of the total student talking turns having been "asking questions"). The percentage of each CR feature exhibited by students was computed for the baseline and each CR discussion. A "range of use" for each CR feature was then tabulated across the four discussions for each of the groups. In Ava's case, students asked questions 31%, 25%, 23%, and 24% of the total student talking turns coded for CRD1, CRD2, CRD3, and CRD4, respectively, resulting in a percentage range of 23-31% for the four CRD discussions as compared to 4% of student talking turns in the baseline. The resulting data is displayed in Table 5.

Table 5

Percentage Ranges of Students' Use of Collaborative Reasoning Features Within Four CR Discussions

Collaborative Reasoning Features	Group A (Ava)		Group B (Brooke)		Group C (Cathy)		Group D (Dana)		Group E (Emily)	
	B	CR	B	CR	B	CR	B	CR	B	CR
	n	%	n	%	n	%	n	%	n	%
Asking questions	4	23-31	0	5-18	2	14-28	2	7-15	7	19-29
Responding to student questions	3	9-13	3	18-40	4	12-17	3	14-20	3	12-14
Challenging ideas	4	8-60	5	22-33	3	10-14	3	17-34	3	11-34
Restating others' ideas	2	2-3	0	0-4	3	5-8	0	3-4	4	3-9
Encouraging others to talk	0	0-3	0	0-5	1	6-8	0	4-15	2	5-9
Ensuring others are on topic	2	0	0	0	2	3-7	0	0	2	0-3
Ensuring turn taking	1	0	0	0	1	3-10	0	6-8	0	0-2
Providing evidence	4	9-15	12	4-16	2	8-17	15	3-24	5	3-18
Relating to personal experience	3	3-41	12	9-27	3	8-12	4	6-20	4	3-29
Relating to other sources	2	9-31	4	10-13	3	7-20	2	8-47	3	5-16

B = baseline discussion, CR = Collaborative Reasoning discussions, n=number of features

When comparing the students' use of CR features with the baseline data and across the CR discussions, it appeared that students had internalized many of the dialogical and argumentative skills. The teachers and I observed that students employed CR features

inconsistently throughout the four discussions. Nevertheless, when considering the <u>range</u> of use for each feature, an increase occurred for all ten features in two (Ava's and Brooke's) of the five groups. One group had an increase in nine of the features, and two groups had an increase in eight of the CR features during the implementation of the intervention.

The teachers attributed the inconsistency of CR features among student talk to two factors. First, as mentioned earlier, teachers recognized the level of interest students might have had in the topic greatly impacted the level of student participation in the discussion. A second factor was the level of background knowledge students might have about individual topics. However, teachers were quick to say that for those topics for which students had ample background knowledge, interest levels were higher, and students employed more CR features.

<div align="center">Students' Use of Higher-order Thinking</div>

Teachers worked collaboratively to analyze students' talking turns in regard to the types of thinking revealed in the student responses. They coded transcripts, re-coded, and member checked each other's transcripts. These results are displayed in Tables 6 through 10.

Table 6

Group A's Levels of Thinking

Cognitive Categories	Baseline		CRD1		CRD2		CRD3		CRD4	
	%	n	%	n	%	n	%	n	%	n
Higher-order thinking	10.7	3	19.9	17	34.7	21	72.9	35	70.3	45
Creating	0	0	0	0	0	0	0	0	14.1	9
Evaluating	0	0	10.5	9	22.5	14	20.8	10	39.1	25
Analyzing	10.7	3	9.4	8	11.2	7	52.1	25	17.1	11
Lower-order thinking	89.1	25	79.8	68	65.0	41	27.0	13	29.6	19
Applying	14.2	4	1.1	1	14.5	9	2.1	1	0	0
Understanding	53.5	15	63.5	54	20.9	13	18.7	9	21.8	14
Remembering	21.4	6	15.2	13	30.6	19	6.2	3	7.8	5
Totals	99.8	28	99.7	85	99.7	62	99.9	48	99.9	64

Note: n = no. of student responses coded in transcript

Group A's student responses exhibited an increase in higher-order thinking in all CR discussions as compared to the baseline of 10.7%. Students' higher-order responses showed a steady increase in the first three CR discussions 19.9% and 34.7%, and 72.9 %, respectively. Slightly less higher-order thinking was apparent in the fourth CR discussion (70.3%).

Table 7

Group B's Levels of Thinking

Cognitive Categories	Baseline		CRD1		CRD2		CRD3		CRD4	
	%	n	%	n	%	n	%	n	%	n
Higher-order thinking	0	0	20.5	7	28.4	16	20.5	7	26.8	25
Creating	0	0	0	0	5.3	3	0	0	3.2	3
Evaluating	0	0	0	0	8.9	5	0	0	3.2	3
Analyzing	0	0	20.5	7	14.2	8	20.5	7	20.4	19
Lower-order thinking	100.0	0	79.3	27	71.3	40	79.3	7	73.0	68
Applying	0	0	0	0	1.7	1	0	0	2.1	2
Understanding	40.0	14	44.1	15	48.2	27	44.1	5	47.3	44
Remembering	60.0	21	35.2	12	21.4	12	35.2	2	23.6	22
Totals	100.0	35	99.8	34	99.7	56	99.8	34	99.8	93

Note: n = no. of student responses analyzed in transcript

Data compiled from the Group B transcripts demonstrated that higher-order thinking increased in all four CR discussions by 20.5%, 28.4%, 20.5%, and 20.8 7% during all CR discussions as compared to the baseline discussion of 0%.

Table 8

Group C's Levels of Thinking

Cognitive Categories	Baseline		CRD1		CRD2		CRD3		CRD4	
	%	n	%	n	%	n	%	n	%	n
Higher-order thinking	9.6	3	22.1	8	35.1	14	32.6	17	26.6	16
Creating	0	0	0	0	2.7	1	0	0	3.3	2
Evaluating	3.2	1	8.3	3	5.4	2	13.4	7	13.3	8
Analyzing	6.4	2	13.8	5	27.0	10	19.2	10	10.0	6
Lower-order thinking	90.2	28	77.7	28	64.8	24	67.2	35	73.3	24
Applying	12.9	4	16.6	6	5.4	2	9.6	5	5.0	3
Understanding	45.1	14	36.1	13	27.0	10	38.4	20	33.3	20
Remembering	32.2	10	25.0	9	32.4	12	19.2	10	35.0	21
Totals	99.9	31	99.8	36	99.9	37	99.8	52	99.9	60

Note: n = no. of student responses analyzed in transcript

Group C's level of higher-order thinking increased in CRD1 (22.1%), CRD2 (35.1%), CRD3 (32.6%), and CRD4 (26.6%) as compared to the thinking levels in the baseline discussion (0%). It was noted; however, that CRD3 and CRD4 responses exhibited declines in higher-order thinking after the second CRD. The highest level of thinking (creating) appeared in CRD2 and CRD4.

Table 9

Group D's Levels of Thinking

Cognitive Categories	Baseline		CRD1		CRD2		CRD3		CRD4	
	%	n	%	n	%	n	%	n	%	n
Higher-order thinking	0	0	3.2	2	6.8	4	12.9	11	20.9	13
Creating	0	0	0	0	5.1	3	3.5	3	12.9	8
Evaluating	0	0	0	0	1.7	1	5.9	5	1.6	1
Analyzing	0	0	3.2	2	0.0	0	3.5	3	6.4	4
Lower-order thinking	100.0	0	96.7	60	92.5	64	86.8	73	78.9	49
Applying	0	0	8.1	5	20.1	12	22.6	19	19.3	12
Understanding	40.0	12	66.1	41	72.4	42	48.8	41	35.4	22
Remembering	60.0	18	22.5	14	0	0	15.4	13	24.2	15
Totals	100.0	30	99.9	62	99.3	58	99.7	84	99.8	64

Note: n = no. of student responses analyzed in transcript

Data for Group D showed an increase in higher-order thinking within student responses in all four CR discussions from the baseline. Increases were reflected in CRD1 (3.2%), CRD2 (6.8%), CRD3 (12.9%) and CRD4 (20.9%). The highest level of thinking (creating) was evident in three of the CRD's

Table 10

Group E's Levels of Thinking

Cognitive Categories	Baseline		CRD1		CRD2		CRD3		CRD4	
	%	n	%	n	%	n	%	n	%	n
Higher-order thinking totals	0	0	51.3	35	39.2	37	44.0	22	35.8	23
Creating	0	0	4.4	3	3.1	3	12.0	6	0	0
Evaluating	0	0	11.7	8	13.8	13	12.0	6	9.3	6
Analyzing	0	0	35.2	24	22.3	21	20.0	10	26.5	17
Lower-order thinking totals	99.1	0	48.4	33	60.6	57	56.0	28	64.0	41
Applying	4.6	2	1.4	1	0	0	0	0	3.1	2
Understanding	20.1	9	33.8	23	40.4	38	40.0	20	35.9	23
Remembering	74.4	32	13.2	9	20.2	19	16.0	8	25.0	16
Totals	99.1	43	99.7	68	99.8	94	100.0	50	99.8	64

Note: n = no. of student responses analyzed in transcript

In comparison to the baseline, Group E's higher-order thinking increased in each of the CR discussions with 51.3%, 39.2%, 44.0%, and 35.8% respectively. 51.3% in the CRD1.

Overall data revealed that higher-order thinking processing had increased among all groups during all twenty CR discussions. Percentages ranged from 3.2% (of 62 responses) to 72.9% (of 48 responses). The lowest percentage occurred during Group D's discussion in a seventh grade science classroom as students mostly recalled and explained their understanding of

an article and video about White-nose syndrome in bats. The highest percentage occurred in among sixth graders during Group A's discussion about an article and accompanying video clip about cyber bullying.

During on-line discussions with the teachers following their receipt of the individual and compiled data, teachers mentioned several reasons for inconsistencies in the students' use of higher-order thinking. Those reasons most cited were: (1) the teacher's difficulty in transitioning from recitation-type questioning to using the CR instructional moves, (2) the choice of topics and materials beyond the students' prior knowledge, and (3) insufficient planning and teacher practice of the CR protocol.

Summary

In this chapter, I have reported the results of quantitative and qualitative data to answer questions 3-6 in the F&DE framework for conducting experiments described in Chapter 4. The data suggested that the primary factors enhancing the intervention's effectiveness fell into two categories: external factors and internal factors. The external circumstances constrained the time needed for teachers' planning for discussion as well as the time to conduct discussion in the classroom. These external factors also created an atmosphere in which the teachers were hesitant to begin the intervention until all curricula had been taught.

One internal factor that inhibited the implementation of the intervention was teachers' use of questioning that prompted recitation rather interactive discussion. Teachers later recognized that recitational discussions prompted mostly lower-order thinking processes of remembering and understanding with limited application of information from text. Once teachers began to use the Collaborative Reasoning protocol (specific instructional moves), an increase of higher-order thinking processes inclusive of analyzing, evaluating, and creating ideas from the text were noted. Teachers became aware of the importance of planning for discussions in light of students' prior knowledge. Teacher planning and practice of the CR protocol was also an important contributor to increased higher-order thinking among the students.

Other inhibiting factors exhibited by the data included students' lack of experience in active listening, following ground rules, and recognizing the differences between acceptable and unacceptable types of talk during discussion. Many students were unaccustomed to actively listening for main ideas or premises in each other's talk. They were also unfamiliar with the

concepts of argument and counterargument; therefore, their talk often became confrontational or disputational.

Information in this chapter disclosed the extent to which the intervention enhanced the pedagogical goals. The quantitative and qualitative data demonstrated teachers' increasing progress toward effective facilitation of Collaborative Reasoning discussions. Consistent growth was not evident in all CR discussions for all teachers; however, qualitative data suggested increased teacher awareness of the questions that promote student interaction and higher-order thinking within authentic discussion.

Chapter 6: Discussion and Conclusions

Professional teachers are those who search for teaching and learning expertise. For some it is a path of gaining experience with each year, content area, and student they teach. They value their experiences and assimilate the challenges and successes into a collection of instructional practices that affect who they become as teachers. The path of experience may be rocky when teachers are expected to teach required content and implement mandated instructional methods while receiving inadequate training and limited follow-up. However, teachers can test the patterns of a present teaching practice and succeed in discovering more of their teaching selves. The path can become less rock-strewn if cooperative relationships with fellow teachers and students are nurtured, and the teachers are willing to understand an instructional practice from both a personal and a scholarly point of view. The five participants in this study sought to test the norms as they assimilated more productive questioning into their facilitation of students' discussion. I sought to gain insight into what effects specific professional development in the form of a teacher study group and a discussion approach, Collaborative Reasoning, might have upon teachers' questioning, and consequently the levels of students' thinking exhibited during discussions about text.

Teacher participation in this study positively impacted teacher questioning, classroom discourse, and student higher-order thinking processes. Teachers learned through studying research, observation, collaboration, self-analysis, data collection, and reflection. As they became aware of their questioning patterns and implemented a discussion approach, they learned to promote students' independent thinking through strategies of prompting, clarifying, modeling, summarizing, and encouraging. They learned to challenge students' reasoning, request evidence for that reasoning, and support sound arguments.

The current study utilized the framework of formative design and experiment (Reinking & Bradley, 2008) to understand how a particular approach to dialogical discourse could improve teachers' questioning during the facilitation of discussion. The primary purpose of formative and design experimentation is to investigate the outcomes of an intervention and to examine the impact of that intervention on the educational environment. Researchers who utilize the formative and design framework implement an intervention and make adjustments throughout the study in response to data analyses. The framework used in this investigation organized the research process into six phases which were in turn guided by six questions that established a

foundation for conceptualizing the investigation, collecting and analyzing data, and interpreting the data.

Data were analyzed within one teacher study group and across time. Quantitative and qualitative data were collected during the baseline phase and throughout the study to determine progress toward the pedagogical goal. Qualitative data were used to understand factors that enhanced or inhibited the intervention while quantitative data provided measures by which teachers could monitor progress. Data sources included observations and field notes, teachers' reflective comments, videos, transcripts, and interviews with the teachers. Quantitative data sources included teacher interviews, teacher-completed observation forms, and coded transcripts.

The Research Questions

The three research questions guiding this study were:

- How will professional development in the form of a teacher study group impact the nature of discussions held in 5 classrooms?

- How will a specific model of discussion affect teachers' questioning to elicit critical reasoning during discussion?

- How will professional development in the form of a teacher study group affect the quality of teachers' questioning during discussion?

The next part of this chapter begins with the researcher's interpretative responses to the research questions. These responses are followed by the researcher's conclusions drawn from the study. Next, implications for teachers, administrators, curriculum specialists, and teacher educators are identified. The chapter closes with implications for future research and the researcher's final comments.

Research question 1. Professional development in the form of a teacher student group impacted the nature of discussions in multiple ways. The phrase "nature of discussions" for this study was interpreted as meaning character or type of discussions (Roget, 2013). As I facilitated teacher study group meetings and observed classroom activities, the character of discussions transformed physically, cognitively, and socially. Classroom seating arrangements became less rigid and meaning making became less teacher-controlled. Students began to develop more socially constructive types of talk and levels of higher-order thinking appeared more often in their responses.

During baseline discussions students were observed sitting in rows of desks or at tables aligned in rows in order to accommodate the teacher's instruction. When engaging in discussion, students faced and spoke directly to the teacher who walked back and forth from her desk to various display boards at the front of the classroom. Students had limited conversation with each other about the discussion topic. When students spoke to each other they either turned in their seats or looked at other points in the room, often failing to make eye contact with other individuals. Following the first TSG meeting, teachers began to rearrange desks and tables in circular or horseshoe patterns for discussions. Students were able to face each other as they conversed. Students were observed leaning toward one another and maintaining eye contact with fellow students as they listened and voiced their ideas. In addition, the teachers no longer stood at the front of the room. They sat among the students in student desks or at a table with students.

Meaning-making or interpretation of information during the baseline discussions rested predominantly with the teacher. In three of the four discussions teachers were observed asking literal questions that required students to recall what they already knew or had previously studied. When this type of discussion takes place, the information that is being discussed is treated as content with particular answers that can be evaluated as right or wrong by the teacher rather than information that can be interpreted for alternate meanings by the students. Whereas students were observed as passive during the initial classroom observations, I noted that they became more involved as they shared their thoughts with others. Students seemed to become more reflective as they voiced those thoughts. This student interaction is considered to be an important factor in promoting the ability to think critically as others' perspectives were considered (Almasi, 1995; Barnes & Todd, 1995; Chinn, Anderson, & Waggoner, 2001; Wegerif, 2006).

Research question 2. The specific model of discussion, Collaborative Reasoning (CR) (Anderson, et al., 1998), appeared to foster students' critical reading and thinking skills about text. This approach was representative of approaches encouraging a critical-analytic stance toward text as it encouraged argumentation and a model for higher-order thinking (Chinn et al., 2001). During this study analysis of qualitative and quantitative data revealed that over the course of CR discussion implementation the five teachers (a) gained more insight into their roles as facilitators of discussion, (b) were able to better relate their purposes for asking questions to students' levels of thinking, and (c) increased their use of questions in the form of CR

instructional moves to prompt higher levels of thinking. The increased use of teachers' instructional moves incorporated questions and statements which served to scaffold student responses as students were prompted to clarify, elaborate, and challenge each other's perceptions of ideas presented within text.

Data from the TSG meeting transcripts, teacher reflections, and video observation forms revealed that teacher questioning was positively affected by the intervention in several ways. Teachers became more aware of their facilitative roles in discussion. Whereas all five teachers had used the traditional recitation discussion approach during their baseline discussions, four of the five teachers demonstrated that they were less likely to default to the recitation model as the intervention progressed. When students were reluctant to participate in the dialogue, expressed unsubstantiated opinions, or ventured off topic the teachers were more likely to use CR instructional moves to encourage students to think out loud and internalize a schema for the most basic form of argumentation entailing "formulating a position, supporting it with reasons, anticipating counterarguments, and offering rebuttals" (Reznitskaya et al., 2009, p. 40).

Four of the five teachers demonstrated that they were less likely to default to the recitation model of discussion when facilitating CR discussions. Two of the teachers were able to decrease their prompting for evidence during all four discussions while another two decreased prompting three out of four discussions. Rather than prompting for evidence, three teachers increased efforts to challenge students to promote counterarguments during every discussion. Two increased their challenges in three discussions. One teacher increased her efforts to encourage students as they developed argument schema during all CR discussions while another teacher increased her encouraging moves in three of four discussions. It should be noted that all of the teachers employed a system of summarizing the ideas during discussion. Idea topics were recorded by students or a teaching assistant and were displayed on Smartboards or whiteboards during discussions. Teachers had not incorporated "summing up" in their earlier baseline discussions. Four of the five teachers increased oral moves to summarize students' ideas at intervals during the discussion while another chose to sum up at the close of discussion. These increases reflected a positive impact upon teachers' questioning in that teachers were able to spend less time prompting students to provide evidence or clarify their reasoning and more time challenging students to critically examine their own and others' ideas.

The analysis of student response data revealed that higher-order or critical reasoning (as addressed in Collaborative Reasoning literature) increased in each of the twenty CR discussions observed during this study. Compared to baseline data, higher-order thinking was evident in student responses beginning with 3.2% in one discussion during the first round of discussions to 72.9% during the latter CR discussions. Teachers were able to attribute the flux of higher-order thinking processing among student response to several sources. One source was struggle several of the teachers had with moving from recitation-type questioning to the instructional moves required within the CR protocol. Another reason given was the lack of planning for topics and practicing the CR moves. Teachers also agreed that the amount of students' prior knowledge of the topic was critical to authentic discussion of that topic.

Research question 3. Professional development in the form of a teacher study group positively affected the quality of teachers' questioning. Though each of the participants demonstrated varying levels of Collaborative Reasoning implementation in their discussions, it was apparent that the study group environment had fostered collaborative reasoning and learning among the teachers. The impact of the professional development and the implementation of the CR approach were best described by two of the teachers during their group post-intervention interview. As Brooke described the effects of the Teacher Study Group on her teaching practice, the remaining members nodded in affirmation.

> I had not participated in professional development like this (Teacher Study Group) before this research study. This experience has really made me aware of how ineffective some of our district professional development sessions can be. We're given a day-long or half-day workshop on an instructional strategy and then we're told to go forth and implement that strategy into our daily teaching practice. We're pretty much out there on our own. Very little coaching is provided, so we don't get any feedback until we undergo a formal evaluation. This TSG provided a learning forum for us. We could share problems we were seeing in our discussion facilitation and brainstorm ways to solve them. I never felt intimidated by any of you [group members] and I knew I could go to any of you for support. (June 18, 2013)

Emily was also appreciative of the type of professional development, yet she benefitted more from another aspect of the study.

I enjoyed the camaraderie of this group. I've worked in other situations where this wouldn't have worked well. For me, the most informative parts of the professional development were the video transcripts and coding. There were so many things I would have missed had I not had the transcripts to study and analyze. By the second CR discussion I'd learned not to worry about being photogenic and to pay more attention to what I and the students were saying. In many cases what I initially thought was a good question or instructional move did not encourage more critical thought. Then at other times, a student's response showed a higher level of thinking than I had realized during the discussion. (June 18, 2013)

Findings of this study demonstrated significant impact of the teacher study group intervention on the quality of teachers' questioning. Members of the study group agreed that the quality of teachers' questioning was dependent upon student cognitive and metacognitive outcomes. These teachers sought tools that would assist them in recognizing cognitive operations in student responses through additional research and review of "thinking" taxonomies (Anderson & Krathwohl, 2001; Marzano, 2000; Walsh & Sattes, 2011). They collaboratively constructed a "thinking levels chart" which identified categories of cognitive processes and provided examples of questions that might elicit those processes. Teachers were observed using this chart during planning and facilitating discussions. Fieldnotes and coded transcripts revealed that teachers' vernacular reflected increasing familiarity with the "language" and identification of cognitive processes within student responses as they shared vignettes and member checked transcripts. Emily shared her analysis of one vignette from the CR1 discussion among her seventh graders, "Animal Rights vs. Animal Welfare." The teacher's comments to the teacher study group are written in italics:

Here's my example of analysis, evaluation, and what I thought to be synthesis.

Emily: These ladies have made a strong statement. 'Humans have more value than animals.' Some people might say that it isn't true. What do you think?

S1: Humans have more value.

S2: Well, animals have value too, just not as much. They are important because they give us meat and clothing. (*I coded this <u>analysis</u> because she's relating how animals relate to us as resources- <u>higher</u> level.*)

S1: Yeah, but we can become vegans and make rayon for our clothes. You just couldn't eat meat or wear cashmere and leather. *(I couldn't decide whether this was applying or analyzing - higher level .)*

Emily: Can you back up that rationale with anything from your research article? *(I know this is a prompt for evidence here, but I wanted them to realize that she wasn't just stating opinion.)*

S1: We researched the PETA.org site. It said … um, hold on just a sec…, 'while strongly espousing a vegan diet (one that includes no animal flesh or byproducts) supports advances in animal husbandry that promote the humane treatment of farmed animals.' *(Exemplifying – understanding – higher level .)*

S3: But who wants to give up eating meat? That's where we get our protein. *(I coded that as understanding – he gave an example – higher level.)*

S4: There are so many more animals than humans, though. They get in the roads, eat food out of our gardens, kill some of our cows, or pets…

                                   S5: But that's because we are infringing on their habitat. They were here first… *(I'm thinking evaluation as in detecting a fallacy in another's thinking – if it is, higher level.)*

S4:   …still, we have the right to kill them when they become pests. *(Maybe create since he did supply a solution – higher level.)*

S5: They don't have anywhere else to go. You can't put an animal preserve or conservation area outside every town, so if they do come into our backyard…*(Evaluating – higher level.)*

                                     S3: We shoot 'em. *(Creating ? If so, higher level.)*

S1: But that's your solution because we know you love to hunt. *(Analysis – we all know he likes to hunt, but she attributed his bias to his statement – higher level.)*

Emily: It sounds as if whether or not you believe in animal rights or animal welfare depends on whether you live in the city or the country. *(I'm challenging here.)*

S6: No, I think it depends on what you know about nature and animals. *(Analysis – higher level.)*

Emily: So, you think it's more about relationships? *(I'm asking for clarification here.).*

S6: Well, it does have to do with where we live a little. I mean…we are in the country, so we see and understand about how too many deer in the herd can cause the herd to become diseased or starve. We know that herds have to be culled out. So, we hunt them not because we hate animals, but because we want to take care of them. I think some of these animal activists don't understand nature – they just see what some sloppy hunters do – I've seen it, too, but they want to ban all hunting. That's not good for the deer or people's property. *(Evaluation – higher level.)*

Even though Emily appeared uncertain of some of her codes for students' thinking levels, she later remarked, "This was so different from my baseline discussion. During that discussion I mostly prompted for answers. There were student recalls, some student understanding, but mostly regurgitation of what we had studied in class. I felt good about this [she points to her transcript on the screen] because I used moves that kept them thinking." Whether or not Emily's analyses of students' cognitive processes were coded precisely, this teacher demonstrated encouraging changes in the questions she posed and the estimation of students' thinking resulting from her questions. The process of reading and analyzing the transcripts provided Emily and her fellow members the opportunity to compare the types of discourse resulting from the intervention (Kucan, 2007; 2009). In addition, Emily's articulation of her understanding of coding was indicative of the safe, supportive environment that emerged among this group as they challenged traditional practice (Clark, 2001).

Teacher Questioning as Primary Initiator

Teacher questions remain the primary initiator of instructional conversation in the classroom. Questions can guide and refine students' construction of meaning and cognitive development if teachers listen carefully to responses in order to engage students in productive conversations. Teachers should listen to determine how students make meaningful connections, monitor their thinking, and use their knowledge in comprehending life situations and solving problems. Teachers should then use those students' connections in their uptake of further questions and statements to other students.

The Collaborative Reasoning approach provided a framework for the teachers of this present study as it assisted them in gaining entrance into students' perspectives and allowed them to observe how students made meaning from informational text. As Duckworth (2006) explained:

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Meaning is not given to us in our encounters, but is given by us – constructed by us, each in our own way, according to how our understanding is currently organized. As teachers, we need to respect the meaning our students are giving to the events that we share. In the interest of making connections between their understanding and ours, we must adopt an insider's view…. (p. 112)

Similar to the findings of Chinn, Anderson, and Waggoner (2001) in their study of two patterns of discourse (recitation and Collaborative Reasoning), this study revealed that recitation was a staple of classroom discussion. The five teachers in this recent study much like those in the 2001 study, "spontaneously used recitation" during the baseline discussions. Prior to the intervention, the student groups had continually experienced a predictable, repeated Initiated-Response-Evaluation pattern of questioning controlled by the teacher. During the intervention students participated in a discussion model that promoted students' interpretive authority as they responded to open-ended questions. The teacher did not evaluate whether student responses were right or wrong. Instead she facilitated student talk by asking questions that engaged students in forming their own judgments and responding to each other's reasoning, thus allowing learners to be active agents in their own learning.

During the present study teachers showed that they could successfully implement Collaborative Reasoning, though not consistently. The teachers were partially successful at giving students greater control over turntaking. Teachers became more comfortable with students' turntaking with minor concessions such as distribution of tokens to limit talking turns and students calling upon students for responses. Teachers related inconsistencies within implementation to (a) the degree of teachers' planning, (b) student interest and level of background knowledge on the topic, and (c) the teachers' ability to use and model certain instructional moves or questions. Nevertheless, coded transcripts of this study revealed greater use of higher-level of cognitive processes of analyzing, evaluating, and creating. The students were observed making more predictions and elaborations, using textual information as evidence more frequently, and articulating their perspectives more often. By encouraging a more critical stance the teachers enabled students to assume more control over the interpretation of the text and turntaking. Overall, the data showed that the teachers were able to facilitate more "intellectually productive" discussions by incorporating the Collaborative Reasoning model into their instructional practice.

Modifications to the Collaborative Reasoning Model

Moving from a recitation-style approach to more student-centered discussion formats can be problematic for the teachers and the students. The difficulties of transitioning to a model may be overlooked by researchers and practitioners in their eagerness to successfully implement it. The researchers (Chinn & Anderson, 1998; Chinn, Anderson, & Waggoner, 2001; Clark, et al. 2003; Reznitskaya et al., 2009; Waggoner, et al., 1995) provided brief explanations of the training provided for their participating teachers and outlined the teachers' facilitative moves for Collaborative Reasoning. Vignettes from CR discussions and illustrations served as examples of successful facilitation of student responses for the participants of this study. However, there was no information in the CR research literature that described how teachers arrived at their successful implementation of this discussion model.

This research study provided an account of how a group of teachers persisted, modified, and changed their approaches to the implementation of CR as a result of their individual struggles and those of their students. As a culminating activity for the teacher study group, the members were asked to construct a personal approach for implementing Collaborative Reasoning in their instructional practice. Later, teachers shared their approaches with group members and then collaboratively constructed a protocol for implementing the Collaborative Reasoning model. The resulting protocol was a combination of guidelines that reflected what they had gleaned from the literature on the topics of CR instructional moves (Clark et al., 2003; Reznitskaya & Anderson, 2002; Waggoner, 1995), questioning for higher levels of cognition (Dantonio & Beisenherz, 2001, Walsh & Sattes, 2011), and types of productive talk that supported reasoning (Mercer, 1996; 2007; Wegerif, Mercer, & Dawes, 1999).

The "Protocol for Implementing Collaborative Reasoning" (Appendix I) differed from the initial CR guidelines used by the group during professional development. The revised protocol reflected steps the teachers had taken to resolve issues they had encountered during CR implementation. Emphases were placed on criteria for selection of the topic, and teachers' careful planning for "Big" and follow-up questions. The protocol emphasized talking <u>with</u> students about the importance of questioning and how we learn by asking questions. Group members suggested that facilitators use action verbs that "signaled" the kind of thinking a question required. (TSG6, June 18, 2012). Teachers were urged to include explanations about types of discussion and their purposes as well as the types of talk that students might experience

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during collaboration discussions (Wegerif, Mercer, & Dawes, 1999). Sample ground rules were suggested; however, group members encouraged teachers to establish "talking rules" with student input. All of the recommendations of the protocol were focused on creating a discourse in which students assumed the responsibility of "maintaining the flow of discussion" (Waggoner, et al., 1995) as students implemented an argument schema (Reznitskaya et al., 2009) to thinking critically about texts.

Implications for Practice

Implications for Teachers

Types of teacher questioning. Certain types of questions are appropriate for arousing interest in a topic for discussion (checking for understanding), but other types are needed to stimulate higher-order thinking or shared inquiry about that topic. There are occasions when teacher-led, questioning that requires feedback is paramount in instruction (i.e. interactive lectures, guided practice, and formative assessment). When the student's response is inadequate, the teacher is able to immediately ask follow-up questions that may reveal the missing pieces of the student's logic. These questions are closely tied to the content (key knowledge and skills) being presented by the teacher. Other occasions call for teacher questions that foster a more dialogic approach to learning in the form of discussion. These questions call for more interpretive, predictive, analytical, evaluative, or creative thinking within student responses.

Higher-order questions are not always better than lower-order, or simpler questions. Varying combinations of lower-order and higher-order questions are needed depending on the goals of the teacher. For example, questioning sequences that begin with higher-level questions that prompt students to analyze (focus or outline) and create (hypothesize) ideas then progress to lower-level questions that ask students to apply and implement those ideas to determine if they work. On the other hand, question sequences that follow a lower- to higher-order questioning are more appropriate when having students attend to relative facts (remember and understand) then guiding the students to integrate these facts to reach a conclusion (analyze, evaluate, create).

Planning questioning. Teachers must decide when and how to use the types of questions as part of lesson planning. Any guidelines for effective teacher questioning should focus on sequences of questions that focus on a combination of higher- and lower-level questions to aid students in developing connected understandings of a topic. Prior to framing questions teachers should make decisions about which mix of questions they intend to use for the lesson. A primary

consideration is the difficulty (cognitive) level of the question and its potential for scaffolding student thinking.

Teachers' questioning behaviors. Research from cognitive science should influence how we, as teachers, perceive effective use of questioning. Four teacher behaviors outlined by Walsh and Sattes (2011) can nurture and support student thinking : (1) expecting thoughtful student responses, (2) affording time for thinking, (3) scaffolding students' thinking and responding, and (4) making thinking visible. Initially, teachers should have conversations with students about how we learn and process information in order to increase students' awareness of their thinking and learning. Secondly, teachers should provide students with time to think (*wait time*). When students actively listen to a question, they move the question to working memory and decode it. The third step is initiated when the brain searches in long-term memory to connect the question to prior knowledge. Once relevant prior knowledge is matched with the question, it is brought into working memory. The fourth step of "formulating the answer" is the thinking through of both prior and new information to make a relevant response. Teachers must remember that answering a question, like thinking, is a multistep process.

The third teacher behavior that fosters students' thinking is preparing and asking questions that scaffold students' responses. As mentioned earlier, when teachers adequately plan their questions they think through possible alternative responses then formulate possible follow-up questions that can scaffold the student's thinking. The fourth teacher behavior is making thinking visible through teacher modeling. This can be achieved by thinking-aloud, incorporating reciprocal teaching, using graphic organizers, or using various thinking routines.

Authentic discussion skills as a curriculum goal. Authentic discussion allows us to speak aloud to clarify our own thinking, to hear others' explanations, and to understand that many questions have no single, correct answer. Unfortunately most students do not have the skills to engage in authentic discussions because they have little opportunity to develop these skills in school. According to Kamil and colleagues (2008), authentic discussion currently accounts for "an average of only 1.7 minutes per 60 minutes of classroom instruction" in language arts classes in middle and high schools. A greater contributor to the problem of limited discussion is that students rarely see discussion modeled skillfully (Almasi, O'Flahavan, & Arya, 2001; Cazden & Beck, 2003; Soter & Rudge, 2005). Students have a tendency to listen with their own ideas in mind – not listening to understand what the other person is saying. Often students

are quick to make judgments of one another's comments rather than probe for deeper understanding. When someone says something with which they agree, they are quick to second the idea, and when someone says something with which they disagree, students argue for their perspective or elect to keep quiet (Walsh & Sattes, 2011). In discussions where there is no protocol or structure, participants tend to be reactive. They become defensive and disputational. Little reflection time is allowed as the participants do not pause to explore differences or check for facts or evidence.

Students first learn "thinking" in the language exchanges in their homes, streets, playgrounds, media, and classrooms. The internal dialogue students experience was once external and the ways that they express their understanding, make decisions, agree, or disagree are shaped by the interactions they have observed in their lives. This is a compelling reason for explicitly teaching students about discussion. As Hess (2009) contended, teachers should teach for and with discussion. Whatever the discussion approach, when teachers take the time to allow students to learn how to engage in dialogical discourse, they must do so by providing direct instruction and scaffolding the talk. To participate effectively in discussion students must be taught skills of how to: (1) actively listen for others' ideas, (2) respect classmates' rights to share their ideas and opinions, and (3) talk and challenge one another in language that is not offensive to individuals. Furthermore, teachers who teach for and with discussion should assess and provide feedback to the students as they learn the principles of authentic discussion.

Assessment of students' discussion skills. Teachers need to work with students to devise ways of observing and assessing their discussion practices. Recording discussions in some manner, whether audio or video, is the best means of affording students and teachers snapshots of their discussions. A simple list of "look for's" compiled by the teacher and students while listening to an audio tape of a discussion could serve as a beginning for group assessment. Later, rubrics or rating scales could be developed for determining whether or not students are gaining competence in discussion skills following a discussion.

These assessments need not be solely specific to one particular discussion model. Possible topics for the rubric could be grouped into general categories of communication skills, listening skills, and evidence of thinking. Evidence of communication skills could include the extent to which students' comments relate to the topic and are supported by evidence. Communication skills could also be measured by the type of talk, voice intonation, use of body

language, and eye contact maintained by the students. Evidence of listening could be gauged by body language and eye contact, as well, with the addition of how closely students are able to paraphrase comments of others, and whether or not students observe wait time and appropriate talking turns. Students' accountability for discussion could be evaluated by the amount of participation, the number of inconsistencies in reasoning identified, and appropriate ways of asking peers for clarification of their reasoning. Such assessments could serve as individual, group, or self-evaluations that may guide students as they practice on areas of weakness in their discussion skills and reasoning.

Assessment of teachers' facilitation. Just as student progress in collaborative discussion is evaluated, teachers' facilitation of discussion should be monitored and assessed. The primary role of the teacher during any authentic discussion is to help students remain engaged in the discussion and attentive to the process and quality of their reasoning. Teachers should conduct periodic evaluations of their progress in scaffolding the development of students' communication, listening, and reasoning skills. Suggestions from the teachers in this present study included five guidelines as criteria for assessment of teachers' facilitation of CR discussion.

Does the teacher:

- Ask questions that require students to explain their positions, and their reasoning (evidence) supporting them?
- Model reasoning processes by thinking out loud?
- Propose counter arguments or positions?
- Recognize and encourage good reasoning when it occurs?
- Summarize the flow and main ideas of a discussion?
- Scaffold students' progress without disrupting the flow of discussion?

Implications for Curriculum Specialists

Student achievement standards, reinforced by serious national, state, and district testing procedures have become "the curriculum" taught in classrooms (Wiles & Bondi, 2007) as teachers stress what is to be tested. Time allocated for discussion can be problematic when curriculum standards require wide coverage of content. Teachers who feel the pressure to teach content within a specified time may limit opportunities for discussion. When pressed for time,

teachers are less likely to bring in additional material on topics that might engage student dialogue.

In light of this dilemma, curriculum specialists might consider collaborating with teachers to (1) incorporate standards for reading, writing, and speaking which address the importance of these types of communication within the context of authentic discussion, (2) identify topics within the present curricular which lend themselves to authentic discussion, and (3) provide resources for these topics which go beyond that of current textbooks that allow for different perspectives. In addition, cross-curricular units of study that integrated topics and skills could be developed to include discussions that encompassed content from more than one core area of study. For example, a unit that integrated literature read in English class could coincide with a particular period of history being studied in history/social science class. Multiple curriculum standards could be simultaneously explored through authentic discussions.

Implications for Administrators

Recognizing the importance of cross-curricular discussion. Administrators are charged with the responsibility of ensuring that all teachers are advancing students' literacy skills and requiring students to use these skills throughout the curriculum (Bottoms, 2006; Fang, 2006; Jacobs, 2008). Research supports the importance of authentic discussion for promoting deep comprehension during classroom instruction (Applebee, Langer, Nystrand, & Gamoran, 2003). Most studies that examined instruction in comprehension strategies pointed out that discussion played an important part in helping students move from a literal and shallower level of knowledge to more thoughtful participation, which served to build their ability to generalize ways of thinking. Wolf and her colleagues (2005) used classroom observations to investigate the effects of the quality of teacher and student talk on the rigor of reading comprehension. Their results suggested the importance of (1) explicit instruction in the use of appropriate turn-taking in classroom discussion, (2) ensuring that all students are engaged, and (3) the need for teachers to increase opportunities for students to elaborate their reasoning during classroom discussion. Instructional approaches such as Reciprocal Teaching (Palinscar & Brown, 1984), Collaborative Strategic Reading (Klingner, Vaughn, & Schumm, 1998), and Collaborative Reasoning (Chinn & Anderson, 1998) have successfully demonstrated the value of extended discussions about text in improving reading comprehension for typical as well as struggling readers. Any or all of these discussion protocols can be adapted to any content area of instruction.

Recognizing authentic discussion. When looking for authentic classroom discussion, a principal should expect to see students having sustained exchanges with the teacher or other students that go beyond simply answering teacher questions with short, factual responses. Students should be observed questioning, clarifying, relating to, challenging or elaborating upon another student's response. As administrators visit classrooms, they should expect discussions in which teachers facilitate the talk and support students as they present and defend their interpretations and points of view using textual content, background knowledge, and reasoning to support conclusions (Chinn & Anderson, 1998; Wolf, Crosson & Resnick, 2005).

Supporting collaboration and professional growth. Educators who teach and learn in an effective learning community recognize that they must build collaborative structures to support them as they share ideas and strategies (NAESP, 2007). Principals can demonstrate their support by providing time for teaching teams to meet. As administrators model collaboration in their dealings with staff meetings, they are taking steps to ensure that collaboration becomes the norm within the school. Teachers are more likely to try new instructional approaches or strategies within this type of supportive environment (Dearman & Alber, 2005).

Staff or teacher team meetings can become venues where discussion approaches could be introduced in the format of a Lesson Study (Stigler and Hiebert, 1999; Lenski & Caskey, 2009). Teacher teams would collaborate to plan a classroom discussion that followed the reading or viewing of text. They would outline the teachers' actions and possible comments to be used during the lesson. In the case of Collaborative Reasoning, teachers would brainstorm possible questions to be used as CR instructional moves at critical points in the discussion. Ways to evaluate teacher and student progress would also be considered. A teacher and her students are observed as she implements the lesson (CR discussion). Following the CR discussion lesson, the teacher team reassembles and reflects upon the discussion. As the observed teacher reflects upon her implementation of the discussion lesson, team members share data from previously agreed-upon criteria collected during the lesson. Modifications are made to the discussion lesson as teachers cite weaknesses and strengths in the observed lesson. The process of teaching and refining the discussion lesson continues as each teacher implements the lesson into her instruction. Once the teachers have fine-tuned the lesson, they share their experiences and results with staff members.

Implications for Teacher Educators

       Asking questions. Unfortunately, teachers are believed to know intuitively how to question students effectively. Perhaps this is based on a premise that the more instruction one receives, the more one knows about questioning. Teachers need to think of questions in terms of the cognitive processes elicited from the student. The cognitive act performed by the student in answering a teacher's question should not be confused with the actual answer to the question. One represents the thinking process undertaken and the other represents the product. Teachers need to know that one of the most important purposes of teacher questioning is scaffolding students' thinking. Scaffolding questions usually follow a sequence which guides the students' thinking in a progression from lower-order thinking (i.e. remembering, understanding, or applying knowledge) to higher-order thinking (i.e. analyzing, evaluating, or creating knowledge). Teacher educators should consider that teachers may have multiple conceptions of questioning. It is important that teacher educators assist pre-service and in-service teachers in qualifying the purposes of both questioning for understanding and questioning for inquiry.

       Recognizing the purposes of discussion. Teachers would be better served if exposed to a host of discussion models and opportunities to implement the models. In addition to knowing how to implement different discussion models, teachers should also know how to select a model that best meets the learning goal. For instance, discussion approaches similar to Collaborative Reasoning including Paideia Seminar (Billings & Fitzgerald, 2002), and Philosophy for Children (Sharp & Splitter, 1995) assume a critical stance and are conducive to querying underlying meaning and evidence in the text. Instructional Conversations (Goldenberg, 1993), Junior Great Books Shared Inquiry (Great Books Foundation, 1987), and Questioning the Author (Beck & McKeown, 2006) represent an efferent stance with the goal of searching text for information. Those approaches that give prominence to an affective stance or expressive level include Book Club (Raphael & McMahon, 1994), Grand Conversations (Eeds & Wells, 1989), and Literature Circles (Short & Pierce, 1990). Teacher knowledge of authentic discussion and various models would enhance teachers' understanding of how effective classroom discourse unfolds and its potential for fostering students' deeper thinking of content.

       Modeling thinking. When teachers verbalize their inner speech as they think through a problem, they model a cognitive process. The purpose of a think-aloud is to demonstrate how an expert synthesizes thinking skills. In order to model thinking aloud teachers must first stop and

ask a question for which they may not readily know the answer, or for which they are considering different possible answers. In constructing think-alouds, Fisher and Frey (2008) describe five key considerations: (a) the focus should be kept tight and brief, (b) particular attention must be paid to unpacking the thinking process step-by-step, (c) the use of "I" statements makes the thinking of the expert transparent and less like direct explanation, (d) authentic thinking aloud involves thinking like an expert in that content area, and (e) labeling the cognitive processes such as problem solving, acquiring new knowledge, or regulating learning is essential. Preservice and inservice teachers in all content areas of instruction can benefit from explicit practice in modeling think-alouds. As the language arts teachers in this study, Brooke and Cathy, concurred, thinking aloud in the context of modeling "reasoning" proved more difficult than thinking aloud during comprehension strategy instruction (May 15, 2012). In Brooke's words,

> You figure out the 'thinking steps' – like the alternative thoughts you consider before you reach an acceptable answer, or solution, or procedure for a question – and then you say them aloud. I find that I have to use written illustrations like drawing a mind web for the students. I have to remind myself that it's okay if I make errors in my thinking, because it makes the think aloud more authentic. (June 18, 2012)

Inquiring and analyzing. Engaging preservice and inservice teachers in the practical inquiry process (Richardson & Swan, 2003) involves systematic collection and analysis of data to inform day-to-day practice. Greenleaf and Schoenbach (2004) worked with middle and high school teachers using the practical inquiry framework to support teachers building an understanding of the challenges students faced as they read required content-based text. The result of the inquiry was the development of a specific shared vocabulary for talking about specific reading processes and strategies with students. Two more examples of practical inquiry involved teachers' transcript analysis for verbal interactions in a reading clinic (Roskos, Boehlen, & Walker, 2001) and a reading tutorial program (Rosemary, Freppon, & Kinnucan-Welsch (2002). As a result of practical inquiry among teachers in the reading clinic setting, a coding scheme was developed for analyzing excerpts of transcripts. As teachers used the coded transcripts to write reflections on their practice, they were observed as being more objective and assuming "a critical stance" toward the collected data (Roskos et al., 2001). Reading teachers engaged as tutors benefitted from practical inquiry as they and their coaches developed an

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instrument (Teaching Learning Instrument) that provided detailed descriptions of how specific instructional strategies were to be implemented.

The five teachers participating in the present study utilized practical inquiry to develop coding matrices for transcript analysis. The coded data collected from the transcripts provided context for reflection and assessment of progress. Transcripts, in addition to audio and video recordings, offer teachers more opportunities to review the communication and thinking that transpires in classrooms during daily instruction. The advantage in studying transcripts is that teachers have more time for thought and metacognition, whereas recordings of lessons require more instantaneous reflections upon practice in real time. Preparing transcriptions is time-consuming; however, technological advantages in voice transcription continue to make transcripts more attainable.

Implications for Further Research

Transferring oral argument schema to new tasks. The evidence on whether knowledge of argument schema can transfer to new tasks remains very weak (Reznitskaya et al., 2012). In some studies, instruction in oral argument appeared to have little effect on the quality of written arguments (Knudson, 1994); however, others have found that peer discussions did strengthen the quality of written arguments (Kuhn, Shaw, & Felton, 1997). In a quasi-experiment using CR with fourth and fifth graders, Reznitskaya and Anderson (2002) found substantial improvements in the argumentative essays of the older students in the CR condition but less improvement for the younger students. In another study, Reznitskaya, Anderson, and Kuo (2007) explored whether students could transfer their knowledge of argument schema to new tasks. Their results were also mixed, and the authors suggested that even with direct instruction and experience with CR, additional practice might be necessary to facilitate transfer of argument schema knowledge. Further research study, both quantitative and qualitative, is warranted to investigate the transfer of argument schema from discussion to writing.

Transferring collaborative discussion to new contexts. Within a traditional classroom environment the instructor has an ability to physically observe the students, their behavior, and their interactions. Within an online classroom environment the instructor may assess performance and progress through the quality of messages posted within an online discussion board, along with the frequency of messages posted. Online discussion boards are frequently used in a manner similar to physical classroom discussions, with a goal of encouraging learners

to work with topics, concepts, and other learners. Further research that examines possible transfer effects of physical classroom discussion to online discussion would be helpful as educators commit to improving students' digital literacies.

Studying intervention implementation. It is not surprising that most of the intervention studies are conducted by the authors or proponents of instructional models implemented as the intervention. Consequently, many of the studies are conducted by the experts who have an in-depth knowledge of the model and the theory supporting it. Teachers outside of the original studies who undertake an intervention may lack the expertise, and therefore need clear guidelines or protocols with examples to follow during initial implementation. Once implemented many instruction models or approaches may be studied or monitored for its effectiveness for one year or two years. Additional longer-ranged external studies of these models would be helpful in revealing possible obstacles encountered and resulting changes made to accommodate more natural settings such as those depicted in this study.

Assessing learning within a teacher study group. This study provided one glimpse into the types of learning that can occur within an informal teacher study group setting. Further research is needed to more deeply understand how different professional development environments best enable teacher learning and collaboration in different contexts. Consequently, more research is needed to determine how professional development structures such as teacher study groups can be evaluated for best fit with particular content areas and school contexts.

Why Ask The Question?

Dewey (1916/1985) emphasized the importance of taking time "to endure suspense and to undergo the trouble of searching" (p. 16). Ava, Brooke, Cathy, Dana, and Emily undertook a search for answers to their questions about how to facilitate more thought provoking and meaning-making discussions. For Dewey the "suggestion, inferences, conjectured meanings, suppositions, [and] tentative explanation" characterized "genuine thoughtfulness" (p. 158). Collaborative discussion within the context of a teacher study group supported the teachers as they asked questions and made differences in their thinking about questioning peers, their students, and themselves. The transformation that occurred is best described in the words of one of the teachers during her final reflection.

The intervention has impacted my instruction by changing how I both ask students questions, and how I answer theirs. I now answer students' questions about an open-

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ended assignment (i.e., analyzing an historical artifact or document) and those about using historical skills (i.e., interpreting the changes over time between two maps) with questions that may challenge them to understand, apply, analyze, evaluate, and create instead of just recall facts. The Collaborative Reasoning intervention taught me how to ask those questions in a discussion, but I have found that I can use the same skills in everyday instruction – when I present information, introduce a new skill, challenge the students to create a project, and especially when they examine artifacts and primary sources. This has been very useful in helping me reach our districtwide goal of gradual release of responsibility to the students. Instead of giving struggling students the answers when they do not understand or are frustrated, I can now use questions to lead them to their own understanding. (Ava, June 18, 2012)

Teachers like Ava should be constantly involved in discussing, questioning, experimenting, reflecting, and examining the outcomes of their teaching and learning activities with their peers. "One-shot" professional development sessions in the form of half-day or one-day workshops) do not provide adequate opportunities for professional educators to question their current beliefs, examine their present practice, and observe the beliefs and teaching practices of others. Teachers should have the opportunity and time to reflect upon their work, whether it be through observation, discussion, or writing as they strive to implement newly acquired knowledge and strategies within their practice.

When teachers are encouraged to dialogue within a community of learners they are afforded an opportunity to learn and assume ownership of a required instructional intervention rather than feeling that a model or approach is being forced into their teaching practice. Collaborative dialogue provides a context wherein teachers can share ideas and generate solutions to problems they encounter during application of new knowledge and strategies. This study exemplified an opportunity wherein teachers were allowed to engage in collaborative discussions as they studied and practiced an approach to learning. As a result of this opportunity, teachers provided a context in which students could develop communication skills and pursue deeper thinking about print and digital text they encounter within their world.

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Appendix A: Seven Kinds of Questions Teachers Used during Discussions of Text

Percentage and Number of Questions Coded in Teachers' Transcript Analyses

Discussions	1		2		3		4		Total	
Kinds of Questions	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*
Retrieve	48	46	28	23	43	29	50	39	43	137
Relate	7	7	9	7	7	5	5	4	7	23
Explain	16	15	20	16	15	10	19	15	17	56
Infer	21	20	30	24	29	20	22	17	25	81
Predict	5	5	4	3	3	2	3	2	4	12
Connect/Compare/Contrast	2	2	9	7	3	2	1	1	3	11
Evaluate	1	1	0	0	1	1	0	0	<1	2
Totals	100	96	100	80	100	69	100	78	100	322

**Appendix B: Informed Consent for Participants in Research Projects
Involving Human Subjects**

Title of Research Project: Why Ask the Question? A Study of Teachers' Questioning During
Discussion of Text
Principal Investigator: Brenda Evans Ball, Department of Teaching and Learning,
                 Virginia Polytechnic Institute and State University

I. Purpose of this Research/Project

The purpose of this study is to investigate teachers' questioning and facilitation during students'
discussion of text. As a teacher participant in this study I will be asked to participate in teacher
study group sessions and implement a discussion model into my teaching practice. I will be
asked to share my thinking and experiences on this topic as I study research on selected topics,
review and analyze video recorded sessions of my classroom discussions, and share portions of
my researcher-transcribed sessions with members of the teacher study group.

II. Procedures

I am willing to take part in the above-mentioned research activity. I am aware that my
participation in this research study will involve sharing with the researcher my thoughts and
experiences during my facilitation of discussion among my students as a part of their discussion
of text. This study will involve an initial interview, one baseline video recording of classroom
discussion, six teacher study group sessions, four recorded classroom discussions implementing
the Collaborative Reasoning mode, five video-stimulated recall sessions, and transcription
review (member checks). I am aware that I will be asked to record reflections in a journal during
the research study. These activities will entail approximately 24 hours of participation.

III. Risks

I have been informed that the risks associated with participating in this study are minimal.

IV. Benefits

I understand that no promise or guarantee of benefits has been made to encourage me to
participate. I am aware that the data collected from the video and audio recorded sessions will be
used solely for purposes of doctoral research study and dissertation purposes. I understand that
the principal investigator will meet with me to discuss the findings and will provide me with a
copy of the written report.

V. Extent of Anonymity and Confidentiality

I am aware that my identity, and that of my students, will be known only to the above principal investigator. I understand that the above-mentioned study will be videotaped and transcribed. When transcribing the taped sessions, the principal investigator will use pseudonyms (i.e. false names) for my name, for the names of my students, and any other individuals or institutions I mention when preparing the written report of the study. Any details in the recorded sessions or researcher's field notes will be altered to maintain anonymity during the transcription process. The principal investigator will be the only person with access to the recorded sessions and this information will be stored securely.

VI. Compensation

I am aware that I will receive monetary compensation in the amount of $20.00 per hour for my participation in the study. The amount is to be prorated to the nearest half-hour in the case of teacher study group sessions.

VII. Freedom to Withdraw

I understand that my participation in this study is entirely voluntary and that my refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled. If I choose to withdraw from the study any information about me and any data that I have provided will be destroyed.

VIII. Participant's Responsibilities

I voluntarily agree to participate in this study. I have the following responsibilities:
  (1) to participate in an initial interview conducted by the researcher to obtain demographic data and teachers' thoughts about reading comprehension, teacher questioning, and discussion,
  (2) facilitate a classroom discussion which will be recorded by the researcher, followed by a video stimulated recall (VSR) session involving only the teacher and the researcher after which I will receive 6 research articles to read,
  (3) to participate in two teacher study group (TSG) sessions that are approximately 2 hours in length during which TSG members will discuss and collect data from research articles (total of six original research articles accompanied by summaries of the research prepared by this researcher),
  (4) to participate in six teacher study group sessions that are approximately 2 hours in length during which the teachers will study the Collaborative Reasoning model of discussion, practice facilitating the model within their group using materials from their respective content areas, and contribute to a group-generated matrix of the characteristics of effective facilitation of the CR discussion model to be used in transcript analysis,
  (5) to facilitate four different class discussions implementing the Collaborative Reasoning model over a period of four weeks in my classroom which will be

(6) recorded by the researcher and followed by a VSR session outside of school contract hours as soon as possible after each classroom discussion.

(7) to review the written transcripts of the videoed discussion and V-SR sessions for the purposes of member-checking for accuracy and analyzing my transcript in accordance with the group-generated coding matrix,

(8) to participate in teacher study group sessions during which I will share vignettes from my CR discussion or V-SR transcripts as to effective and ineffective teacher facilitation "moves",

(10) and to maintain a journal in which I will record my reflections during the research study.

IX. Participant's Permission

I have read and understand the *Informed Consent* and the conditions of this study. I have had all of my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date_____
Signature of Participant

_____
Printed Name

_____ Date_____
Signature of Researcher

_____
Printed Name

Should I have any pertinent questions about this study or its conduct, or participants' rights, I may contact:

Brenda E. Ball, Principal Investigator @ _____or _____@vt.edu.
Dr. Mary Alice Barksdale, Departmental Unit Chair, _____@vt.edu, or Dr. David Moore, 2000 Kraft Drive, Suite 2000 (0497), Blacksburg, VA 24060.

Appendix C: Student and Parental Informed Consent Form

Dear Parent:

We are writing to inform you that your child will be participating in a research study involving teachers' research of their questioning and guiding statements during discussion of written text. The research will be conducted by Brenda E. Ball, a doctoral candidate at Virginia Tech University under the supervision of Dr. Mary Alice Barksdale, Professor of Education at Virginia Tech University. **This research does not require that your child be involved in any activities other than their regular classroom participation. Materials used during the research are those that your child would be using as part of his or her regular instruction.**

During the research, the following will occur:

1. Your child will be participating in four class discussions involving **regularly assigned materials in their subject area.** His or her regular teacher will be guiding the discussion about the material.
2. The class discussions will be video and audio recorded. The small hand-held video camera will be focused upon the teacher. However, it is possible that students may appear on the video recordings as the teacher moves in the classroom during large or small group discussions. The discussion sessions will be audio recorded in case the volume of speaking voices is too low for the video camera's audio to clearly record. The video and audio recordings will be viewed only by the teacher and the researcher, Mrs. Ball, during which they will discuss the types of teacher questions and statements used to guide students' discussion.
3. Your child's name will not be used in the written transcripts or in any resulting write-up of the research. (Any students' identification is represented as Student 1, Student 2, etc. within the written transcripts.)
4. All information collected during this research study will be kept secure in a locked cabinet or password protected computer files in the researcher's office.

These video recorded sessions will not be used to evaluate your child's academic or social progress or the performance of your child's teacher in any way.

Your child may withdraw from the classroom activity at any time. There is no reward for participating or consequence for not participating.

If you have questions about this research please contact Brenda E. Ball, at _____or email: _____or contact _____, Principal at_____. If you have questions or concerns about your child's rights as a research subject, please contact David M. Moore at _____or _____@vt.edu at Virginia Tech University.

Sincerely,

Brenda E. Ball, PhD Candidate
Virginia Polytechnic and State University
Blacksburg, Virginia

Please **circle** your response and sign the appropriate blanks below:

I, _____, **do** or **do not** give my permission for my child, _____,
          (Parent)   (Student's Name)
to be video and audio recorded during these classroom discussions.

Appendix D: Participant Questionnaire for Pre-Intervention Interviews

Participant's Demographic Data

Name:

Pseudonym you would like to use for this study: (first name only)

Level of Education:

Number of years in teaching profession:

Content Areas having taught in previous years:

Content Areas presently teaching:

Grade levels presently teaching:

Number of class groups taught per day and content area taught:

Average size of class groups:

Group Demographic Data

Average no. of students in groups to be involved in study:

Number of males and females in group:

Ethnic breakdown of group(s):

Average reading ability of students in group (in ranges):

Academic achievement range of group (low, medium, high)

No. of students receiving special services in this group:

No. of support personnel working within your room during the research study:

General Questions:

1. What do you perceive to be the three most challenging issues in the curriculum you presently teach?

2. What do you perceive to be the three most challenging issues in your students' academic progress?

Reading instruction:

1. What coursework have you taken related to reading instruction (general titles):

2. What reading strategies do you emphasize within your content area?

Questioning:

1. What do you perceive to be the three most important purposes for teacher's questioning during daily instruction?

2. What do you perceive to be the three most important factors in constructing your questions ?

Discussion:

1. What experience have you had with specific discussion approaches used in your teaching? Please be specific in naming any approaches you have used and their source (i.e. textbook teaching guides, research articles, professional development training, etc.)

2. For what purposes do you use classroom discussion?

Appendix E: Levels of Thinking Chart

1. Remember – Retrieve relevant knowledge from long-term memory			
Recognizing	Identifying	Matching information from long-term memory with provided information. (Presented info. provides a prompt for remembering.) (Recognizing dates.)	What is the definition for…? Which amendment to the U.S. Constitution provided for freedom of speech?
Recalling	Retrieving	Retrieving info. from long-term memory without provided info. (Remembering dates of imp. events.)	In what year did WWII end?
2. Understand – Construct meaning from instructional messages (oral, written, or graphic).			
Interpreting	Clarifying Paraphrasing Representing Translating	Changing from one form of representation (numerical) to another (verbal) or paraphrasing speeches or text.	What does the Preamble to the U.S. Constitution mean to you?
Exemplifying	Illustrating Instantiating	Finding a specific example or illustration of a concept	Give examples of Baroque music.
Classifying	Categorizing Subsuming	Determining that something belongs to a category (concept of principle)	Which item does not belong: apples, peaches, corn, oranges
Summarizing	Abstracting Generalizing	Abstracting a general theme or major points	Write a summary of the events portrayed in the video.
Inferring	Concluding Extrapolating Interpolating Predicting	Drawing a conclusion from presented information.	What spelling rule do you infer from these examples?
Comparing	Contrasting Mapping Matching	Detecting correspondences between ideas, objects, or concepts.	Compare the clothing between residents of Alaska and Hawaii.
Explaining	Constructing	Building a cause and effect model of a system.	What events contributed to the Civil War?
3. Apply – Carry out or use a procedure in a given situation			
Executing	Carrying out	Applying a procedure to a familiar task.	Divide one whole number by another whole number (both with 2 digits.)
Implementing	Using	Applying a procedure to an unfamiliar task.	Use the Pythagorean theorem in this proof.
4. Analyze – **Break material into its parts and determine how the parts relate to one another and to an overall structure or purpose**			
Differentiating	Discriminating Distinguishing Focusing Selecting	Distinguishing relevant from irrelevant parts or important form unimportant parts of presented material	Consider resources of the U.S. during WWII. Which do you think contributed to the U.S. victory?

Organizing	Finding coherence Integrating Outlining Parsing Structuring	Determining how elements fit or function within a structure.	Structure evidence from an article on plants into evidence for and against herbicides.
Attributing	Deconstructing	Determining a point of view, bias, values, or intent underlying presented information	Determine the point of view of the author of an essay in terms of her views about marriage.
5. Evaluate – Make judgments based on criteria and standards			
Checking	Coordinating Detecting Monitoring Testing	Detecting inconsistencies or fallacies within a process or product; determining whether a process or product has internal consistency	Determine if the scientist's theory can be concluded from the data provided.
Critiquing	Judging	Detecting inconsistencies between a process or product; detecting the effectiveness of a procedure as it is being implemented	Rank-order the last 4 presidents using our brainstormed criteria for effective contributions to human rights legislation.
6. Create – Put elements together to form a coherent or functional whole; reorganize elements into a new pattern of structure			
Generating	Hypothesizing	Coming up with alternative hypotheses based on criteria	Generate a theory to explain why students drop out of high school.
Planning	Designing	Devising a procedure for accomplishing a particular task.	Plan a research paper on a given science topic.
Producing	Constructing	Inventing a product	Build a website that will encourage individuals to conserve energy.

Adapted from *The Revised Bloom's Taxonomy* (Anderson & Krathwohl, 2001) and *Thinking through Quality Questioning* (Walsh & Sattes, 2011).

Appendix F: Seven Basic Instructional Moves That Support Collaborative Reasoning

Prompting *Asking students for a reason, position, evidence, or evaluation.* • Is there any **evidence** in the information that tells us that? • Can anyone think of another **reason**? • Do you have any **evidence** of that? • Can anyone think of some **other decision** that the character could make?	**Encouraging** *Acknowledging and praising progress in <u>thinking</u> signified by students' <u>use of evidence</u> and clear expression of <u>arguments</u>.* • I like that you gave a **reason** for your position. • Did you notice the way Sara found **evidence** in the story to support her position? • That was a good **counterargument!** • When you had **trouble saying that**, I like the way **you started over** and made it clear.
Modeling *Demonstrating the reasoning process by thinking out loud in front of the students.* • When I am thinking about the reasons for my position I ask myself, "What am I assuming if I say this is a good reason?" [give example of a reason and assumption]	**Summing Up** *Periodically summarize what students have said. Summarizing helps students keep track of the argument. Later students can help teacher summarize and assume all of the responsibility of summarizing.* • So far you've given two reasons why ….These reasons are… [state students' ideas]. • Recently Jake gave us two arguments why beautiful pictures should be saved. The first …. • So far we've heard four arguments for why Kelly should leave it there. Which of these arguments do you think are strong, and which are not as strong?
Asking for Clarification *Asking students to clarify what they mean when students use words and concepts in an imprecise way.* • I am not sure I understand you. Could you explain that again? • Do you mean [offer a paraphrase]? • What do you mean by saying, "She would be selfish"? • Exactly how is what you said different from what Peter said? • What does it mean to be "responsible" in this case?	**Fostering Independence** *Getting students to take as much of the responsibility as possible for carrying out discussions by <u>getting students to talk to each other – not just the teacher.</u>* • Don't say anything. Don't ask any questions, and don't make any comments. Instead of speaking, just wait silently and see if a student will speak spontaneously. • Instead of asking questions, simply restate ideas. Then stop without asking a question. Example: "So, you think that Kelly was feeling a lot of pressure from her family." • Attach names to ideas. Examples: "What do people think about John's argument?" Does everyone agree that Pauline's reason is a good one?"
Challenging *Asking students to consider ideas they have not thought of yet. Challenge when the students have 1) overlooked an important point, or 2) students are making assumptions not warranted..* • Some people would say [give a reason from the opposing position]. How would you respond to them? • It sounds as if no one is looking at things from Evelyn's point of view.	**You and your students are on your way to effective implementation of CR when:** • **Students begin to formulate reasons and provide supportive evidence without prompting from the teacher.** • **Students respectfully challenge others' reasoning by providing counterarguments.**

Appendix G: CR Video Observation Form (VOF)

Part I: Determine whether your facilitation during the discussion is characterized by any of the descriptors below as you view the video in its entirety. Circle the bullet of the descriptor if it applies to your facilitative actions. If you should find that your actions vary, note the section of talking turns where your facilitative actions change. You will later indicate this on your written transcript.

RECITATION	DISCUSSION
INQUISITOR • Teacher asks most of the questions • Teacher's questions are usually pre-determined and are text-based in nature	**INQUISITOR** • Teacher asks few questions • Teachers may occasionally model good questioning for students by asking an open-ended question that encourages student participation
FACILITATOR OF INTERACTION • Teacher coordinates/determines who responds to questions • Most of the interaction and discourse flows through the teacher	**FACILITATOR OF INTERACTION** • Teacher encourages as much interaction as possible among students • Interaction does not flow through teacher
FACILITATOR OF INTERPRETATION • Teacher's questions often lead students to a single interpretation of text • Teacher often offers insight into own interpretation of the text	**FACILITATOR OF INTERPRETATION** • Teacher remains neutral on interpretational issues
RESPONDENT • Teacher usually does at least 50% of the talking	**RESPONDENT** • Teacher remains silent as much as possible
EVALUATOR • Teacher gives feedback as to the correctness of students' responses almost immediately through either verbal or nonverbal means	**EVALUATOR** • Teacher exploits only the best opportunities to give feedback on interaction or interpretational issues

Adapted from Almasi, J. & Gambrell, L., (1996). *Lively Discussions: Fostering Engaged Reading.*
International Reading Association

Part II: Observe the student responses for CR characteristics during the video. Tally the number of student CR characteristics you observe during the discussion at the end of your viewing.

Students ask questions in order to understand text better and help construct meaning.	
Students respond to each other's questions.	
Students challenge ideas by telling whether they agree or disagree and telling why.	
Students restate or try to question what others say if it is not clear.	
Students encourage each other to participate.	
Students are responsible for ensuring that all group members stick to the topic.	
Students are responsible for ensuring that all group members take turns.	
Students provide evidence from the assigned text to support their opinions/ideas.	
Students relate topic or issue to their own experiences in order to assist understanding.	
Students relate topic across other sources of text or experiences outside the assigned text.	

Part III:

A. Considering the data from Parts 1 and 2, what do you consider to be the strengths and weaknesses in the discussions thus far?

B. What features of CR discussion will you focus upon during your next CR session?

Appendix H: Questionnaire for Post-Intervention Interview

Q1: What has your experience been like participating in this study?

Q2: What activities, strategies, or research information did you find enhanced your
   instructional practice?

Q3: Have you observed any changes in your students' participation in discussion of text
   or communication skills during daily instruction?

Q4: Are there any areas where you felt that you needed more information or assistance while
   implementing the CR model?

Q5: Do you plan to incorporate what you have learned during this intervention for the
   coming school year?

   Please write a description of how you would approach the implementation of the CR
   model of discussion in your classroom next school year.

   Note: Later we will be collaborating and constructing a model for implementing CR as a
   group.

Appendix I: Protocol for Implementing Collaborative Reasoning

- Talk with students and establish the importance of questions. Talk about how we learn from asking questions. Talk about the different cognitive levels of questions. Use verbs that reflect cognitive processes in your explanation (i.e. identify, clarify, categorize, summarize, infer, compare, use, organize, detect, judge, generate, design). Include an explanation about closed and open-ended questions and the types of responses they might generate.

- Talk with students about the types of discussion they will be experiencing during the school year.

- Introduce the concepts of three types of talk: cumulative, disputational, and exploratory, representing different "social modes of thinking" (Mercer, 1996; 2007). Emphasize that exploratory talk is the closest talk to reasoning (Wegerif, Mercer, & Dawes, 1999) and the most productive when people "think together," but not necessarily "think alike."

- Establish ground rules for discussion, with student input, and post them in the classroom. Sample rules may be:

  - Speak to one another, not only to the teacher.
  - Do not interrupt when another person is speaking.
  - Listen carefully to what others are saying.
  - Keep an open mind. Ask yourself, "What can I learn from this person?"
  - Before you speak, summarize what the person who spoke prior to you said.
  - Write key words that represent what that person said.
  - Ask questions to clarify anything you do not understand.
  - Respond to the person's idea and not to the person.
  - Defend your points. Provide reliable evidence.
  - If someone in the group has not spoken, ask that person what he thinks.

- Use interactive processes to help students prepare for group discussions such as Think-Pair-Share, Fishbowl, or Peoplegraph.

- Introduce Collaborative Reasoning model with emphasis on how this approach differs from other approaches in that it utilizes argument schema (Reznitskaya & Anderson, 2002), and model the argument schema for students. Prepare think-alouds for the basic elements of (a) formulating a position, (b) supporting that position with evidence, (c) anticipating counterarguments, and (d) offering rebuttals (Reznitskaya et al., 2009). Provide written CR dialogues as examples and allow students to role play as they read aloud.

- Plan for implementation of the Collaborative Reasoning model by selecting topics that are controversial and can be addressed from multiple perspectives.

- Select topics for which students will have background knowledge and are relative to students' lives. Plan Big questions that address dilemmas associated with the topic. Anticipate possible perspectives that may be presented by students and plan questions to ask as CR instructional moves (Waggoner, et al., 1995).
- Keep in mind that the ultimate goal is to transfer the responsibility for "maintaining the flow of discussion to the students" (Waggoner, et al., 1995).
- Assess the teacher's and students' progress by asking, "How did this discussion work and why?" (Walsh & Sattes, 2011). Work with students to develop a rubric that assesses the group's and individuals' skills and provide feedback to the students. Ask students to give examples of strengths and weaknesses in identified areas. Provide extra practice for those areas which need improvement.
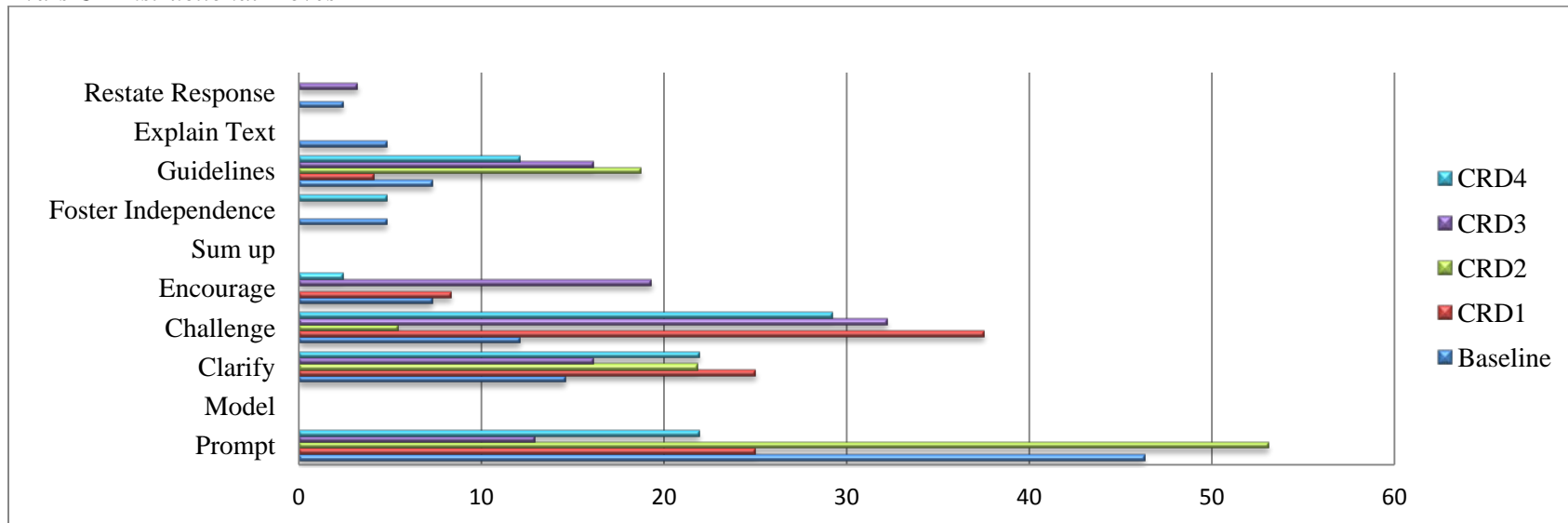
Appendix J: Ava's Collaborative Reasoning Discussion Data

Table 11.

Ava's CR Instructional moves

Instructional Moves	Baseline	CRD1		CRD2		CRD3		CRD4	
Prompting	46.3	25	(-21.3)	53.1	(+6.8)	12.9	(-33.4)	21.9	(-24.4)
Modeling	0	0		0		0		0	
Clarifying	14.6	25	(+10.4)	21.8	(+7.8)	16.1	(+1.5)	21.9	(+7.3)
Challenging	12.1	37.5	(+25.4)	5.4	(-6.7)	32.2	(+20.1)	29.2	(+17.1)
Encouraging	7.3	8.3	(+1.0)	0		19.3	(+12.0)	9.7	(+2.4)
Summing Up	0	0		0		0		0	
Fostering Independence	4.8	0	(-4.8)	0		0		4.8	(-0.0)
Repeating Rules	7.3	4.1	(-3.2)	18.7	(+11.4)	16.1	(+8.8)	12.1	(+4.8)
Explaining Text	4.8	0		0		0		0	(-4.8)
Restating Responses	2.4	0		0		3.2	(+8.0)	0	(-2.4)

Note. The first column under each heading for discussions indicates the percentage of instructional moves while the number in parentheses indicates the differences compared to the baseline data.

Figure J1

Ava's CR Instructional Moves

Table 12

Brooke's Instructional Moves

CR Instructional Moves	Base	CRD1		CRD2		CRD3		CRD4	
Prompting	58.4	22.9	(-33.5)	21.3	(-37.0)	26.0	(-32.4)	14.0	(-44.4)
Modeling	0	0		0		0		0	
Asking for Clarification	11.3	39.5	(+28.2)	36.2	(+24.9)	19.5	(+8.5)	31.5	(+20.2)
Challenging	0	12.5	(+12.5)	8.5	(+4.0)	13.0	(+13.0)	24.5	(+24.5)
Encouraging	16.9	6.2	(-10.7)	2.1	(-4.0)	15.2	(-1.7)	21.0	(+4.1)
Summing Up	0	4.1	(+4.1)	6.4	(+6.4)	2.1	(+2.1)	1.7	(+1.7)
Fostering Independence	0	2.0	(+2.0)	4.3	(+4.3)	10.8	(+10.0)	1.7	(+1.7)
Repeating Guidelines	3.7	4.1	(+.4)	4.3	(+.6)	4.3	(+6.0)	5.2	(+1.5)
Explaining Text	5.6	2.0	(-3.6)	0	(-5.6)	2.1	(-2.1)	0	(-5.6)
Restating Responses	3.7	6.2	(+2.5)	0	(-3.7)	6.3	(+2.6)	0	(-3.7)

Note. The first column under each heading for discussions indicates the percentage of instructional moves while the number in parentheses indicates the differences compared to the baseline data.

Figure K2

Brooke's Instructional Moves

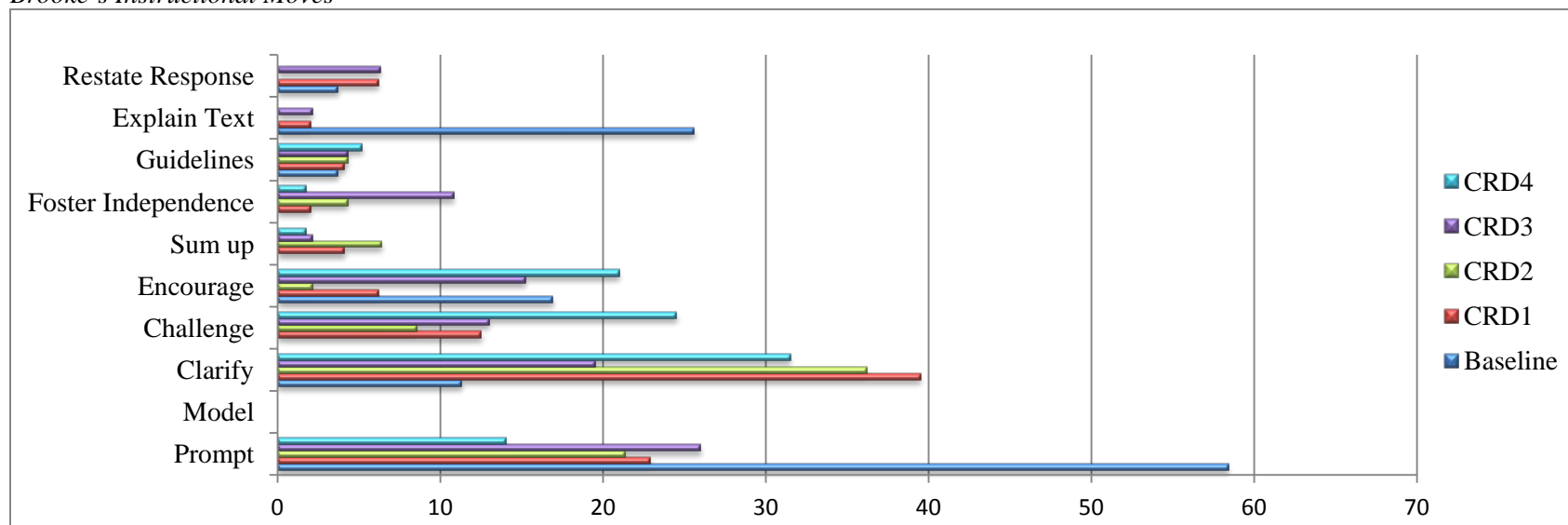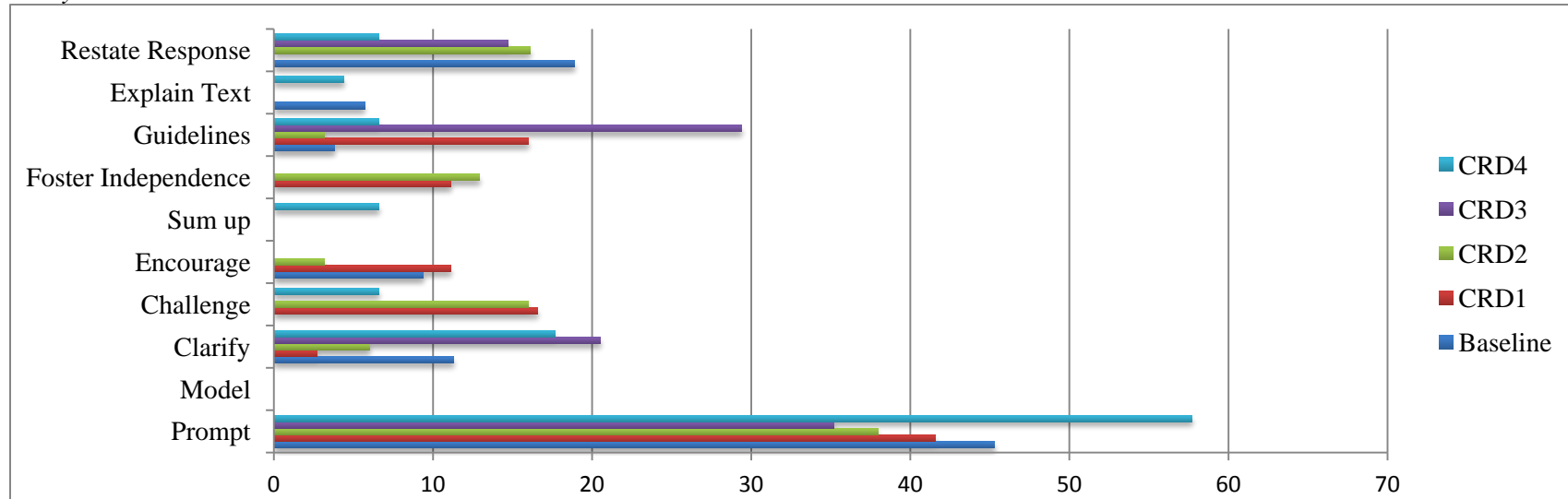## Appendix L: Cathy's Collaborative Reasoning Discussion Data

Table 13

Cathy's Instructional Moves

Instructional Moves	Base	CR #1	CR #2	CR #3	CR #4
Prompting	45.3	41.6 (-3.7)	38.0 (-7.3)	35.2 (-10.1)	57.7 (+12.4)
Modeling	0	0	0	0	0
Clarifying	11.3	2.7 (-8.6)	6.0 (-5.3)	20.5 (+9.2)	17.7 (+6.4)
Challenging	0	16.6 (+16.6)	16.0 (+16.0)	0	6.6 (+6.6)
Encouraging	9.4	11.1 (+1.7)	3.2 (-6.2)	0 (-9.4)	0
Summing Up	0	0	0	0	6.6 (+6.6)
Fostering Independence	0	11.1 (+11.1)	12.9 (+12.9)	0	0
Repeating Rules	3.8	16 (+12.2)	3.2 (-.6)	29.4 (+25.6)	6.6 (+2.8)
Explaining Text	5.7	0	0 (-5.7)	0 (-5.7)	4.4 (-1.3)
Restating Responses	18.9	0	16.1 (-2.8)	14.7 (-4.2)	6.6 (-12.3)

Note. The first column under each heading for discussions indicates the percentage of instructional moves while the number in parentheses indicates the differences compared to the baseline data.

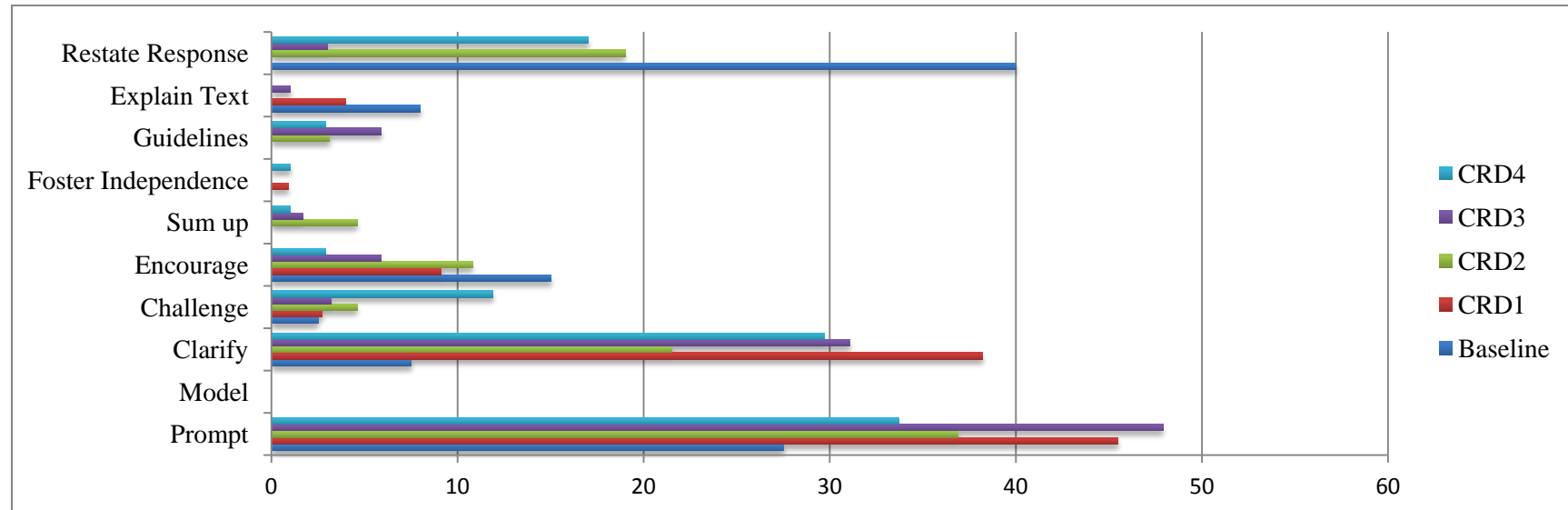Figure L3

Cathy's Instructional Moves

Appendix M: Dana's Collaborative Reasoning Discussion Data

Table 14
Dana's Instructional Moves

Instructional Moves	Baseline	CRD1		CRD2		CRD3		CRD4	
Prompting	27.5	45.5	(+18.0)	36.9	(+9.4)	47.9	(+20.4)	33.7	(+6.2)
Modeling	0	0		0		0		0	
Clarifying	7.5	38.2	(+30.7)	21.5	(+14.0)	31.1	(+23.6)	29.7	(+22.2)
Challenging	2.5	2.7	(+.2)	4.6	(+2.1)	3.2	(+.7)	11.9	(+9.4)
Encouraging	15.0	9.1	(-5.9)	10.8	(-4.2)	5.9	(-9.1)	2.9	(-12.9)
Summing Up	0	0		4.6	(+4.6)	1.7	(+1.7)	1.0	(+1.0)
Fostering Independence	0	.9	(+.9)	0		0		1.0	(+1.0)
Repeating Rules	0	0		3.1	(+3.1)	5.9	(+5.9)	2.9	(+2.9)
Explaining Text	8	4	(+4.0)	0	(-4.0)	1	(-7.0)	0	(-8.0)
Restating Responses	40	0	(-40.0)	19	(-21.0)	3	(-37.0)	17	(23%)

Note. The first column under each heading for discussions indicates the percentage of instructional moves while the number in parentheses indicates the differences compared to the baseline data.

Figure M4
Dana's Instructional Moves

Appendix N: Emily's Collaborative Reasoning Discussion Data

Table 15

Emily's Instructional Moves

Instructional Moves	Baseline	CRD1	CRD2	CRD3	CRD4
Prompting	42.6	19.1 (-23.5)	26.9 (-15.7)	26.5 (-16.1)	29.0 (-13.6)
Modeling	0	0	0	0	0
Clarifying	4.9	20.6 (+15.7)	36.2 (+31.3)	42.1 (+37.2)	33.3 (+28.4)
Challenging	0	22.1 (+22.1)	8.5 (+8.5)	9.3 (+9.3)	13.9 (+13.9)
Encouraging	1.6	10.3 (+8.7%	2.1 (+.5)	6.2 (+4.6)	8.6 (+7.0)
Summing Up	0	0	6.4 (+6.4)	1.5 (+1.5)	3.2 (+3.2)
Fostering Independence	1.6	0	4.3 (+2.7)	1.5 (-.1)	0 (-1.6)
Repeating Rules	0	14.7 (+14.7)	4.3 (+4.3)	1.5 (-1.5)	6.5 (+6.5)
Explaining Text	24.5	0	1.3 (-23.2)	10.9 (-13.6)	5.4 (-19.1)
Restating Responses	22.9	13.9 (-9.0)	5.1 (-17.8)	0 (-22.9)	0 (-22.9)

Note. The first column under each heading for discussions indicates the percentage of instructional moves while the number in parentheses indicates the differences compared to the baseline data.

Figure N5

Emily's Instructional Moves

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