THE EFFECTS OF THREE INSTRUCTIONAL METHODS ON THE READING COMPREHENSION AND CONTENT ACQUISITION OF NOVICE READERS

by

KATHERINE A. DOUGHERTY STAHL

Under the Direction of James F. Baumann

ABSTRACT

This study was designed to explore the effects of three instructional methods, the Directed Reading–Thinking Activity (Stauffer, 1969), KWL (Ogle, 1986), and picture walks (Clay, 1991; Fountas & Pinnell, 1996) on the reading comprehension and science content acquisition of novice readers. The participants were 31 second-graders with an instructional reading level that was approaching grade level. Each of 4 groups received each treatment. A replicated Latin Square, within subjects repeated measures design was employed that examined 4 Treatments: 3 intervention groups (DRTA, KWL, PW) and a Control group. The replicated Latin Square increased the validity of the design by increasing the number of groups and minimizing the chance for differential crossover. The primary analysis evaluated Treatment effects by conducting one-way repeated measures analyses of variance (ANOVA) on all measures using the group as the unit of analysis. A series of repeated measures pairwise and complex contrasts were used to address three research questions. Results indicated that the picture walk and DRTA yielded statistically significant effects on fluency as measured by a timed maze task. Analysis of Cued Recall indicated that the DRTA yielded statistically significant effects

in reading comprehension and science content acquisition. KWL was motivational, but did not yield significant effects on measures of comprehension or content acquisition. There were no statistically significant differences for Treatment effects on measures of vocabulary and free recall. A secondary analysis, ANOVA for Text effects, indicated that the children possessed more knowledge about life science topics (spiders, insects) than physical science (water changing form). Student interviews provided evidence that the participants possessed declarative, procedural, and conditional knowledge of the strategic processes that are the foundation for the three interventions, activation of prior knowledge and prediction. However, the likelihood of the participants putting that knowledge to effective use seemed to be dependent upon the amount of teacher scaffolding provided by the instructional procedure. The components of DRTA, generating and justifying predictions, verifying predictions after reading, engaging students in a social context around a text, seemed to provide the necessary scaffolding for facilitating the reading comprehension and science content acquisition in novice readers.

INDEX WORDS: Reading comprehension, Content literacy, Primary grades, Informational text, Directed Reading-Thinking Activity (DRTA), KWL, Picture walk, Maze, Vocabulary Recognition Task, Activation of prior knowledge, Prediction, Comprehension strategies

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DEDICATION

This dissertation is dedicated to my grandmother, Doris McClain, for providing the inspiration and desire for a life of teaching and learning, and to my husband, Steven Stahl, for sharing that life with me. Steve's belief in me, support, and encouragement made this dissertation possible.

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CHAPTER 1

IMPORTANCE OF THE STUDY

There have been increasing calls for use of informational text in earlier grades. Historically, a stage model of reading acquisition that advocates that children should learn to read before they read to learn has influenced classroom instruction (Chall, 1996). Today some researchers are concerned that this model and the associated instructional practices may be contributing to the "fourth grade slump" (Duke, 2000; Palincsar, 2002). Children have not had opportunities to interact with the kind of text that makes up the largest portion of reading material in the intermediate grades and beyond, exposition. Teachers are being encouraged by researchers (Duke, 2000, 2002; Moss, 1997; Pappas, 1993) and publishing companies (as indicated by the influx of easy readability informational "little books" being marketed) to incorporate instruction in informational texts in their primary reading programs.

Informational texts are increasingly being used as a component of developmental reading instruction as opposed to the delayed introduction in upper grades during content area instruction. I define *developmental reading instruction* as reading instruction that guides and assesses students' reading development over time in relationship to three general reading areas: automatic word recognition, comprehension, and motivation (Stahl, 1998). Stahl (1998) reported that teachers balance these three areas in planning an instructional diet for their students. The balance of instructional time in each area is likely to shift depending on the age and needs of the students. For example, younger readers are more likely to spend a larger percentage of their instructional time learning about the alphabetic system and reading to achieve fluency than older readers.

Informational text is more challenging for readers and places additional demands on the readers and their teachers than narrative text (Horowitz & Samuels, 1985; Kucan & Beck, 1996). The unique characteristics of the genre make it more difficult for children to comprehend. Duke (2002) defines *informational text* as:

> Text with the function of conveying information about the natural or social world, typically from one presumed to be more knowledgeable on the subject to one presumed to be less so, and having particular features to help achieve that purpose, such as timeless verb constructions, graphical devices, and certain text structures (slide 4).

Adding the challenge of informational texts requires a shift in the instructional balance in primary-grade classrooms. The purpose of reading informational text is to learn from the text or to expand the reader's mental representational system (Weaver & Kintsch, 1991). Novice readers rely more heavily than older readers on their prior knowledge and experience in constructing meaning from text (Willson & Rupley, 1997). It is unknown how this overreliance on prior knowledge is likely to influence the comprehension of informational text by novice readers.

Little is known about the efficacy of particular instructional methods for introducing informational texts to novice readers or how to successfully incorporate informational texts in a developmental reading program. It seems important to investigate whether different instructional methods commonly used in today's classrooms result in similar or dissimilar outcomes with novice readers interacting with informational text. Particularly for young readers, it is important to determine any differences in how each instructional method fosters the acquisition of effective reading competencies, such as fluency and comprehension, while insuring that the informational concepts are acquired.

The purpose of this study was to explore how three instructional methods influence the developmental reading abilities and new content acquisition of second-grade students who read informational text in a small group context. The instructional

methods were the Directed Reading-Thinking Activity (Stauffer, 1969), Know-Want to Learn-Learn (Ogle, 1986), and the guided reading book introduction or picture walk (Clay, 1991; Fountas & Pinnell, 1996), The methods differ in the ways that prior knowledge is activated and predictions are generated. I did not expect to find a "best way" to teach informational texts. Rather, I suspected that these three common methods used in primary reading groups would yield different outcomes in reading fluency, reading comprehension, and content acquisition. Teachers need information about how particular instructional moves contribute to student achievement. This knowledge will enable teachers to make instructional decisions targeted to their specific goals.

CHAPTER 2

LITERATURE REVIEW

This literature review consists of four sections. First, I present the theoretical framework for this investigation. Second, I provide a description of each of the instructional methods and review the research base for each. Third, I discuss the common theoretical features of the three instructional methods. I conclude the review with a rationale for the study and my hypotheses, and my research questions.

Theoretical Frame

General Theory of Comprehension

The ideas proposed in this paper are based on three related theories, those of Nelson (1996a), Kintsch (1998), and Donald (1991). Nelson's (1996a) experiential theory and Kintsch's construct-integration theory (1998) form a developmental continuum that propose how representational systems might be formulated over time in an individual using oral and written language. These theories are used in parallel with Donald's (1991) phylogenetic theory of the hybrid mind. Donald (1991), Kintsch (1998), and Nelson (1996a) assert that ontogenetic development parallels phylogenetic development.

In school-age children, one major function of instruction is to provide access to the advanced systems of understanding, remembering, and retrieving information. In this dissertation, I explore the techniques used by teachers of young children to facilitate their shift from a narrative, experiential culture to the theoretic culture described by Donald (1991). The theories of Nelson (1996a, 1996b) and Donald (1991) are important to this dissertation because they address the important cognitive and developmental shifts

required for a successful move from a narrative, experience-based representational system to a theoretic or information-based representational system. They both also emphasize the importance of the socio-cultural context in influencing the meaning-making process (Donald, 1991; Nelson, 1996a, 1996b).

Several key points reflect the theoretical foundation driving the literature review, research, and discussion. The instruction of novice readers is addressed within a theoretical framework that is based on the following ideas.

- Comprehension is developmental and historical. Changes over time in children's bio-sociocultural development and ever-increasing bank of experiences result in changes in reading comprehension abilities (Kintsch, 1998; Nelson, 1996a).
- Reading comprehension demands capable decoding, language processes, and domain knowledge (Kintsch, 1998).
- Proficient readers tend to engage in some common behaviors or strategies before, during, and after reading that enable them to integrate the material from the text with prior knowledge and experience. Part of the integration process involves the reorganization of cognitive representations to enhance memory of the material and to provide access to the information in novel situations (Donald, 1991; Kintsch, 1998; Nelson, 1996a).
- One role of school is to provide the instruction, experience, and the socio-cultural context that will promote student competency in utilizing external systems of knowledge for their own purposes and personal growth (Donald, 1991; Kintsch, 1998).

Strategies Leading to the Construction Meaning

Activating prior knowledge. According to Anderson and Pearson (1984) "It is the interaction of new information with old knowledge that we mean when we use the term comprehension" (p. 255). The activation of prior knowledge seems to be essential in the

recollection of a text and certainly in the reorganization required for new learning. In Anderson's and Pearson's review of the literature on *schema*, knowledge already stored in memory, they reported studies that demonstrated how readers' background knowledge and perspective influenced reading times, outcome perceptions, and ability to recall particular portions of text as well as the global interpretations of text. More recent research has examined the influence of emotional development and cultural factors on comprehension (Narvaez, 2002).

Kintsch's (1998) construction-integration (CI) model explains *how* existing representational models (the aggregation of experience and prior knowledge) are mediated in interactions with written texts. This theory supports the notion of the cyclical nature of representational systems and the ways in which lower and higher systems inform and extend each other. All of Kintsch's work has been done with adults and "developed" readers.

During *construction*, concepts from the text are activated to produce a network of activated mental concepts. In the second stage, *integration* within the network concepts that are compatible with the context enhance the activation of one another, while concepts that are not compatible with the context lose activation. "Thus, comprehension arises from an interaction and fusion between text information and knowledge activated by the comprehender" (McNamara & Kintsch, 1996, p. 251).

The product of the CI process is a unitary mental representation, called the *situation model*, which is composed of the text base and contributions from the reader's prior knowledge and experience. The *textbase* consists of elements directly derived from the text. This is a propositional network that would yield an impoverished and incoherent network without the addition of the links brought by the readers, based on their prior knowledge and experience (McNamara & Kintsch, 1996; Kintsch, 1998). Without adequate background knowledge, the textbase will predominate in the comprehension process. The more knowledge and experience brought to the text, the greater its influence

on the situation model. This influence can take the form of elaborations and cognitive integration of the text or a disregard for the text. Ideally, there is a balance of text-derived and personal contributions to comprehension.

Both the work with older readers and investigations of teacher read-alouds might provide some insight into successful strategies for helping young children effectively use prior knowledge during reading. Jetton, Rupley, and Willson (1995) concluded that general content knowledge contributed the strongest effect to successful reading of narrative text across Grades 4-6. However, for successful reading of expository text, knowledge of text structure and strategies were the strongest contributing factors. In a later study, Willson and Rupley (1997) determined that phonemic knowledge and background knowledge played the largest role in the comprehension of narrative texts by second and third graders. Developmentally, the shift to greater reliance on strategy and text-based knowledge seemed to come into play in fourth and fifth grade (Jetton et al., 1995; Willson & Rupley, 1997). However, from these studies it is impossible to determine whether this shift is caused by cognitive or instructional factors. The lack of exposure to expository texts and strategy instruction in the lower grades could be contributing to these effects (Duke, 2000).

Beck and McKeown's (2001) work with interactive read-alouds in kindergarten and first grade actually limits discussion of background knowledge to fit tightly around the topic of the text. In studies leading to development of their "Text Talk" read-aloud procedure, Beck and McKeown found that often the activation of prior knowledge of young listeners and the ensuing discussion led the youngsters far from the text, and what was recalled was based on shared recollections rather than the text. Extensive discussions around student experience led to inaccurate text recollections or limited recollection of the text.

Currently the evidence indicates that young children rely heavily on background knowledge in their interactions with text. Helping young readers activate relevant

background information is an important support, but teachers must be sensitive to dialogue that indicates that a child may be relying on inaccurate or irrelevant prior knowledge. Ideally, instruction should help children learn to use their prior knowledge of both content and genre to effectively to make specific connections to text, while teaching strategies that will help them navigate multiple genres of text about which they may have varying degrees of background knowledge.

Prediction. The strategy of prediction is directly related to the activation of prior knowledge and familiarity with narrative or non-narrative structures. A prediction activity may take a variety of forms and may be tacit or explicit. For the mature, proficient reader, prediction occurs after an initiating activity, such as a conversation with a friend, reading the title, flipping through the book, or reading the book jacket. (Look at the cover of a romance novel for an example of how the mature reader can use picture, title, and genre generalizations for some fairly automatic predictions about a text.)

Typically, in a school setting, the teacher engages the children in a dialogue that activates prior knowledge (Clay, 1991; Fountas & Pinnell, 1996; Ogle, 1986; Stauffer, 1969). That background knowledge is used to generate questions and anticipate what will happen in a narrative or what information can be found in an informational text. The predictions cause students to become engaged as they actively test their predictions during reading. This engagement and evaluative reading facilitates the development of a modified mental representation, which is ideally an integration of information from the text and prior knowledge (Kintsch, 1998; McNamara & Kintsch, 1996).

Several studies have determined that teacher predictions are less powerful than student predictions in facilitating comprehension (Davidson, 1970; Davidson & Wilkerson, 1988; Lia, 1988; Petre, 1969; Wilkerson, 1984). Personal predictions create motivation to find out if the generated hypotheses are correct, and they enable readers to relate their personal mental representations to the text (Foley, 1993). This personal

integration and reorganization is essential for comprehension and new learning (Kintsch, 1998; McNamara & Kintsch, 1996).

Instructional Procedures

Three instructional methods are commonly used in classrooms today as a frame for small group reading instruction. Stauffer's (1969) Directed Reading-Thinking Activity (DRTA) and Ogle's (1986) Know-Want to Learn- Learn (KWL) technique designed for use with informational text have been mainstays in classrooms for many years. More recently Clay's (1991) book introduction or picture walk (PW) procedure has gained popularity in primary classrooms. The picture walk is commonly used with *leveled texts*, small paperbacks that have been leveled using a narrow gradient readability scale based on qualitative text features (Fountas & Pinnell, 1996). These three procedures have been chosen for this study because of their popularity and their commonalities. All three procedures engage the readers in activating prior knowledge and generating predictions. However, there are procedural differences that are described in the following sections.

Directed Reading-Thinking Activity

The DRTA is an instructional framework that views reading as a problem-solving process best accomplished in a social context (Stauffer, 1969). As students in a group work through a piece of text, the divergent thinking of students tends to converge as more information from the text is encountered. However, the influence of individual's prior knowledge causes the outcomes of the reading experience to be slightly different for each reader. Students are responsible for establishing their own purposes for reading, generating predictions, justifying those predictions, independently reading the text, and verifying or revising predictions based on evaluations of information in the text. The teacher's role is to select an instructional level text, divide the text into meaningful sections, and facilitate the discussion in a cyclical manner as the teacher guides the students through the text. Stauffer (1969) recommended the DRTA for use with narrative

or non-narrative text at all grade levels. I have summarized Stauffer's (1969) DRTA procedure in the following four steps.

1. Identify purposes for reading: The teacher facilitates a discussion on possible purposes for reading the text. Attention is drawn to background experience and clues in the text. Students might discuss the title, illustrations, text headings, and as reading progresses, the previously read text. Purposes are often stated publicly as predictions. Purposes for reading may be established by the group or individuals. The teacher may also initiate a discussion on matching reading rates to reading purposes at this time. (Stauffer presents the adjustment of reading rate as a separate step, but I have incorporated it with setting purposes for reading.)
2. Reading the text: Before reading, the teacher segments the text into meaningful sections with stopping points for discussion. Students read a section of text independently. The teacher monitors and assists students' reading as needed. Stauffer asserts that the youngest readers can engage in reading as an independent, problem-solving process when teachers have selected texts at the instructional reading level.
3. Develop comprehension: The teacher facilitates a discussion that requires the students to verify or revise their predictions based on an evaluation of text and prior experience. Students are held accountable for using evidence to support their claims in their discussion with the group. This process continues with each section of text.
4. Skill training: This could include writing, seeking additional sources of information, or providing instruction in competencies that the teacher perceived as student needs during monitoring student reading.

More research has been conducted on the effectiveness of the DRTA than the other two instructional frames. However, relatively little of the research has appeared in

peer-reviewed journals. One of the few studies reported in a journal involved first- and third-grade Title I students reading narrative texts. The participants in the DRTA treatment groups were able to recall significantly more story elements than the groups that listened to the story without discussion (Biskin, Hoskisson, & Modlin, 1976).

Most of the research on DRTA is in the form of dissertations and conference presentations (see Davidson & Wilkerson, 1988). The majority of studies compare DRTA to the Directed Reading Activity (DRA) or other teacher-driven instructional models (Davidson, 1970; Davidson & Wilkerson, 1988; Lia, 1988; Petre, 1969; Wilkerson, 1984). The preceding set of studies indicated that DRTA is effective in promoting inferential and evaluative responses to text, compared to the factual responses promoted by DRA, with readers at all ability levels. In a DRA lesson, the teacher is responsible for introducing vocabulary and activating prior knowledge before reading and asking comprehension questions after reading. A major difference between DRA and DRTA is that the teacher establishes the purposes for reading in the DRA, and the student assumes that responsibility in the DRTA. The researchers postulated that the increased student responsibility before and during the reading process yielded deeper processing.

Despite Stauffer's emphasis on critical reading in the primary grades, the majority of studies investigated the use of DRTA with older students. However, a longitudinal study by Stauffer, Hammond, Oehlkers, and Houseman (1976) did investigate the procedure with younger students. They found significantly higher achievement gains in reading comprehension and word study on the Stanford Achievement Test in first and second grade, but not as children progressed in the intermediate grades. Stauffer and the students' teachers speculated that the achievement test was not sensitive to the critical reading capabilities that DRTA had fostered in the students.

Two studies that were primarily interested in other techniques, secondarily (and perhaps surprisingly to the researchers) also found that DRTA could be an effective instructional method. Baumann, Seifert-Kessell, and Jones (1992) reported that an

experimental group of fourth graders engaging in DRTA outperformed a think-aloud group and the control group on general comprehension measures and an error detection measure.

Reutzel and Hollingsworth (1991) found that there was no significant difference between first graders in the DL/RTA (Directed Listening/Reading-Thinking Activity) group and a literature webbing group when answering comprehension questions about the story. They determined that children in the webbing condition had the highest scores in predicting the structure of a scrambled story and significantly outperformed the DL/RTA and control group on the retelling task. There was a large effect size favoring both groups over the control group. DRTA was less effective in two studies that compared DRTA to literature webbing using miscue analysis (Fawson & Reutzel, 1989; Reutzel & Fawson, 1991). However, in the series of studies comparing DRTA and literature webbing, Reutzel and his colleagues (Fawson & Reutzel, 1989; Reutzel & Fawson, 1991; Reutzel and Hollingsworth, 1991) did not adhere to DRTA procedures as described by Stauffer (1969). The effectiveness of DRTA in these studies made it important to revisit DRTA with different questions than were asked during its inception. These studies made exclusive use of narrative fiction. Stauffer (1969) claimed that DRTA was appropriate for use with informational text, but it has never been demonstrated.

The DRTA contains several characteristics that make it as relevant today as it was over 30 years ago. In many ways, Stauffer (1969) was a visionary. It seems important not to forget older practices that have demonstrated effectiveness as we explore new practices. Engaging students in a social context around a text, bringing personal experiences, knowledge and purposes to the meaning-making process, and scaffolding to facilitate independent reading in a variety of genres are worthwhile ambitions for any classroom. There is also evidence suggesting that DRTA is a procedure that requires less professional development than some of the more complex strategy repertoire programs (Stieglitz & Oehlkers, 1989; Duffy, 1993). This could make DRTA an important

instructional tool for teachers as we increase reading demands for novice readers with the inclusion of informational text in our curricula.

KWL

The KWL strategy was originally developed by Ogle (1986) to enable teachers to access the prior knowledge of students and to help students develop their own purposes for reading expository text. Ogle (1986) recommended using a KWL strategy worksheet to record the student thought processes. Ogle and others have added modifications to the basic KWL procedure (Bryan, 1998; Carr & Ogle, 1987; McAllister, 1994; Shelley, Bridwell, Hyder, Ledford, Patterson, 1997; Van Sledright, 1992). The original procedures are recorded below.

1. What I Know (K). The teacher records on a chart, board, or overhead all information that the students share in a prereading brainstorming session around a specific text topic. Teachers may ask, "Where did you learn that?" or "How could you prove that?"
2. Ogle (1986) also asks the students to list categories of information likely to be included in the text they will be reading about the topic. For example, if the students were going to read about whales, they would indicate that text would be likely to include a description of whales, what they eat, and where they live (Carr & Ogle, 1987). This step is often omitted in methods textbooks and classroom implementation of KWL. After the group brainstorming session, students record their knowledge and anticipated categories on their worksheet.
3. What do I want to learn? (W). First, the teacher helps the students generate questions as a group. The questions are often related to information listed in the first section of the chart (Bryan, 1998; Carr & Ogle, 1987). Before reading the students write their own questions on their worksheet. Next, the students read the text, which may be divided

into sections if it is long or complex. New questions may be added during reading (Carr & Ogle, 1987).

4. What I learned (L). After reading, the students record what they learned from the text in the last column of their worksheet and discuss it with the group. Questions are reevaluated, and additional sources of information may be pursued to answer those that were not addressed in the class text.

Ogle recommended using KWL with informational text in any grade level and in any content area. She also found it adaptable to the reading group or content area setting. The simplicity of the procedure has made it popular with teachers.

There is a paucity of research investigating KWL procedures. Only four studies (Cantrell, Fusara & Dougherty, 2000; McLain, 1993; Piper, 1992;Van Sledright, 1992) appear in Educational Resources Information Center (ERIC) or are cited as references in an article on KWL (Shelley et al., 1997). None of the studies involve students in the primary grades. The only published study was conducted with seventh-grade students. Cantrell et al. (2000) found that when used in a journal format, KWL procedures were more effective than summarization in promoting social studies content knowledge.

Mixed results have been obtained in studies investigating the metacognitive value of the KWL. Piper (1992) found that KWL enhanced the reading comprehension of social studies texts by sixth graders. However, McLain (1993) was unable to find any significant effects in her comparison of written KWL charts, a Predict/Evaluate checklist and a control group that read the same expository texts without any instruction. McLain used a metacognitive awareness index and a reading achievement test to assess the effects of the procedures on the third- and fifth-grade subjects. She postulated that lack of sensitivity in assessment instruments may have prevented the reflection of differences among the groups or that the students were too young to demonstrate the metacognitive awarenesses fostered by the treatments.

Van Sledright (1992) used KWL to evaluate the differences in the teaching practices of two fifth-grade social studies teachers. He made a comparative analysis of student KWL forms to measure the influence of a teaching context that emphasized history as important in its own right compared to a teaching context that viewed historical knowledge as a problem-solving tool. The KWL charts from the latter class reflected higher levels of thought and richer learning opportunities. For the purpose of this investigation, this demonstrates that the teacher plays a key role in the effectiveness of the KWL in promoting higher levels of thinking.

Picture Walk

The picture walk is a guided reading book introduction based on the work of Marie Clay and her descriptions of effective book introductions for novice readers (Clay, 1991, 1993). Fountas and Pinnell (1996) have provided more explicit procedures and examples of how to structure an effective new book introduction. These introductions will be referred to as *picture walks* (PW) in this paper, because the conversations typically occur as the teacher and students preview each page or few pages of the new book before reading. The pictures are used as a catalyst for discussion of what the book is likely to be about. Unlike the DRTA and the KWL, the picture walk does not have a specific set of procedures. It is used flexibly and in response to the students' needs and the challenges of a particular text to promote fluency and comprehension. Teachers follow a few guidelines to ensure that students have a successful, independent first reading of the text (Clay, 1991; Fountas & Pinnell, 1996).

- The teacher conducts a new book introduction as a conversational, social interaction around the text.
- The conversation prompts student engagement in activating background knowledge and experiences that relate to the text.
- The teacher provides an overview of the plot, theme, or important ideas.
- The teacher directs the children's attention to text structure and language structure.

- Teachers use the book's language structure (e.g. verb tense, predictable patterns) and vocabulary in the conversation about the book.
- Teachers may direct attention to using letter-sound relationships in one or two places in the text.

The extensiveness of the introduction depends on the expected challenges caused by content or text readability. However, the children are always left with opportunities for problem-solving both at the level of word attack and meaning construction during their first independent reading.

Picture walks are widely used in today's classrooms to introduce new texts, but I was unable to locate any research investigating the practice. I was unable to find quantitative studies that measured their effectiveness in promoting fluency and comprehension. I also searched, unsuccessfully, for qualitative studies that described picture walk procedures and adaptations to meet the demands of readers with varying capabilities or different types of text. However, in Taylor's (2002) extensive work with effective practice and school reform, she found that classes with low performance outcomes more commonly used picture walks than classes with high performance outcomes where teacher questioning focused on high-level ideas and themes.

Common Theoretical Principles

All three instructional methods in my study, DRTA, KWL, and the picture walk, are based on three, common theoretical principles that are viewed as necessary to the meaning-making process. These commonalities are (a) an emphasis on reader engagement and involvement, (b) activation of prior knowledge, and (c) the generation of predictions.

First, they all emphasize reader engagement and involvement. In all three models, the students propel the text discussion and the teacher acts as a facilitator. Stauffer (1969) states a justification for the active role of the student in his classic introduction to the DRTA process.

> By contrast, an active search for meaning is best fostered in a situation in which the pupils are encouraged to declare their own questions for reading. The lively give-and-take of ideas, experiences, and knowledge in the prereading session produces questions to be answered. Formulating and answering questions requires of the reader an ordering and reordering, and a testing and retesting of his own ideas as he deals with the knowledge and experiences reported by the authors (Stauffer, 1969, p.10).

This quote also specifies the second commonality of the three instructional frames, the important role of the prereading experience. All three methods are based on theories that emphasize the role of prior knowledge in the process of constructing the meaning of text. All three methods have procedures, albeit different ones, for activating prior knowledge. Students are encouraged to bring their experiences to the text. Those experiences are honored and viewed as an important tool in comprehension, as recently defined in the Rand report as "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow, 2002, p. 11).

A third commonality in the instructional methods is the generation of predictions by the readers. These predictions may be based on a particular student's prior knowledge, shared experience of group members, and text content. Generally, all three approaches use the activation of prior knowledge and prediction as comprehension strategies. The unstated premise is that children who actively engage in these two cognitive strategies are likely to understand and recall more of what they read. Particularly, in interactions with informational text, these strategies can be tools in the assimilation, refinement, and use of content. It is assumed that as children practice these strategies in a group setting, they will habituate them and transfer them to other appropriate settings independently.

Despite the theoretical commonalities of these approaches, there are several procedural differences that have the potential to influence the construction of meaning by

students. This is the first study to examine the types of achievement differences that exist among the approaches. It is particularly important with novice readers to determine how instructional procedures are influencing their ability to read the text fluently, and comprehend. In interactions with informational text, it is important to determine whether the children are acquiring the content knowledge that is in the text. Therefore, as we move informational texts into the primary reading group, it seems an opportune time to investigate what each of these methods has to offer the teacher of novice readers.

Rationale, Hypotheses and Research Questions

The review of research has exposed some commonalities in DRTA, KWL, and the picture walk. They all emphasize reader engagement, involvement, and fostering independence. The research on DRTA has suggested that its use promotes inferential and evaluative responses to text, as opposed to factual responses (Davidson, 1970; Davidson & Wilkerson, 1988; Lia, 1988; Petre, 1969; Wilkerson, 1984). Supporters of KWL report high levels of motivation and increasing student engagement over time (Bryan, 1998; Carr & Ogle, 1987; McAllister, 1994; Shelley et al., 1997). There are no data to document the efficacy of PW.

Generally, all three approaches use the activation of prior knowledge and prediction as comprehension strategies. All three methods have procedures for encouraging students to bring their experiences to the text. Prediction generation is based on a particular student's prior knowledge, shared experience of group members, and book content. However, a review of the extant research does not reveal specific ways that these strategies are influencing student reading outcomes or content acquisition with informational text. It was also surprising that despite the regularity of each of these approaches being recommended in educational journals and methods textbooks, the research base is minimal, particularly at the primary level.

The effectiveness of the instructional approaches, especially with novice readers, had not been investigated before this study. I anticipated that all instructional treatment groups would outperform a noninstructional control group on each assessment task,

indicating higher levels of reading comprehension and content acquisition. I also anticipated that the procedural differences between the three methods would be enough to result in some variation in comprehension outcomes with novice readers, who are more likely to rely and respond to the strategy scaffolding provided by the teacher than older readers who have internalized strategic processes.

In summary, the purpose of this study was to explore how DRTA, KWL, and the picture walk might influence developmental reading abilities and content acquisition when used with informational text in the primary reading group context. The focus of the investigation was on the ways that differing procedures for the activation of prior knowledge and the generations of predictions within each model influenced the construction of meaning by novice readers. Three research questions were posed:

1. What are the effects of the DRTA, KWL, the picture walk and control procedures on the reading fluency and general reading comprehension of informational texts?
2. What are the effects of the DRTA, KWL, the picture walk and control procedures on the acquisition of informational content?
3. How does each set of instructional procedures facilitate the transition from an experience-based representational system to an information-based representational system?

CHAPTER 3

METHOD

Design and Overview of the Study

My purpose was to investigate how novice readers who have not yet internalized efficient strategies with informational text would respond to different instructional approaches with informational texts. In order for each group of students to receive each of 4 treatments (3 interventions, DRTA, KWL, PW, and a Control), I employed a replicated Latin Square within-subjects repeated measures design.

A replicated Latin Square design, based on the procedures outlined by Maxwell and Delaney (2000, p. 486), was used to determine the order of treatment for each group. Table 3.1 displays the schedule of interventions for each group. The replication of the Latin Square using a different order of treatment increased the validity of the design by increasing the number of groups and minimizing the chance for differential crossover.

Table 3.1

Schedule of Interventions

Group	Week 1 of Cycle	Week 2 of Cycle	Week 3 of Cycle	Week 4 of Cycle
1	KWL	DRTA	Control	PW
2	PW	Control	DRTA	KWL
3	DRTA	PW	KWL	Control
4	Control	KWL	PW	DRTA
5	KWL	PW	Control	DRTA
6	PW	KWL	DRTA	Control
7	DRTA	Control	PW	KWL
8	Control	DRTA	KWL	PW

This design is suited to the research questions because a within-subjects design enabled me to see whether different instructional procedures that prompted the same

strategic processes on the same groups of children yielded similar or dissimilar task outcomes. A between-subjects design was not chosen because I was not investigating a particular treatment's long-term effect on strategy use. In particular, it would not be appropriate to use KWL every day. Rather, the intervention conditions might be viewed as a menu of treatments to be selected by teachers as part of a long-term strategy program.

I gathered data over ten weeks. Two four-week periods of intervention were conducted within that time frame. Groups 1 through 4 from School A received the intervention during the first cycle and Groups 5 through 8 from School B received the intervention during the second 4-week cycle.

Following two days of individual preexperimental screening to ensure that readers shared a common instructional level, there was a 45-minute orientation session with each group. During this session control group procedures were used with an informational text to familiarize the children with the small group procedures and assessment tasks. There were 12 days of intervention in each cycle (3 consecutive days for each of 4 consecutive weeks). Each group received each treatment for 3 days with data being collected only on the third day. Days one and two were to familiarize the children with the routine of the treatment procedure. On the day following the conclusion of the intervention cycle, students were interviewed about the comprehension strategies and instructional preferences.

Participants

The study was conducted with 31 second-grade students who were reading three to six months below grade level (Reading Recovery Levels 12 to 16 or Guided Reading Levels G to I). These students were selected for several reasons. Most second graders would be considered *novice readers*. I define *novice readers* as readers in the primary grades (K, 1, 2) who are still developing fluency and insights about the alphabetic-orthographic system. There is little known about how the development of these processes influences reading comprehension, only that it seems to (Camp, Winbury, & Zinna, 1981;

Schwanenflugel, Stahl, Kuhn, & Wisenbaker, 2002). It was important to me that this study examine student reading, not listening. Typically, texts below this reading level do not have enough grist for discussion or content information.

Also, limited prior knowledge and outside experiences with non-narrative forms make low-income and minority children particularly likely to struggle with informational text (Duke, 2002; Palincsar, 2002). An analysis of the state school report cards for the participating schools revealed widely different ranges of achievement in the percentages of White students and minority students meeting state performance standards in both reading and science. For example, in School A 83% of the White students met state reading standards for third grade, and 87% met the state science standards in fourth grade. Only 31% of African Americans and 33% of Latino students met the state reading standards. In science only 18% of the African Americans and 67% of the Latino students met the state standards. Providing struggling readers with small group strategy instruction with content area texts may be a first step in narrowing this achievement gap. The participating schools viewed this project as an early intervention for those students who were reading slightly below grade level in second grade.

Second-grade classes from two schools in the same school district in a medium-sized Midwestern city participated in the study. The samples were selected from schools with populations described as follows. There were three participating second-grade classes in School A, in which the school population consisted of 52% European-American, 40% African-American, 2% Latino, and 5% Asian/Pacific Islander. There were no Limited-English Proficiency students, and 44% of the students qualified for free or reduced lunches. There were two participating second-grade classes in School B, in which the school population consisted of 24% European-American, 42% African-American, 23% Hispanic, and 11% Asian/Pacific-Islander. There were 23% Limited-English Proficiency students and 54% of the students qualified for free or reduced lunch.

Teachers recommended students from their classes who had an instructional reading level three to six months below grade level (Reading Recovery Levels 12 to 16 or Guided Reading Levels G to I). The teachers determined student reading levels by classroom testing in the fall using the Rigby Assessment System and weekly running records. Parent permission notes were sent home with potential subjects two to three weeks before the screening (see Appendix A). I confirmed student reading levels by taking running records of each child reading two informational texts, one level G and one level H, one week before the treatments began. During this screening, the project was described to the students and their assent to participate was obtained (see Appendix B). These selection and screening procedures were replicated for the second cycle of the study. The demographics of the samples selected from each school are displayed in Table 3.2. Although English was the second language of the Latino student, she was proficient in English. English was the first language of all other students.

Table 3.2

Participants by School, Ethnicity, and Gender

School	Ethnicity								
	African-American		European-American		Latino		Asian/Pacific Islander		
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Total
A	7	5	2	0	0	0	1	0	15
B	4	9	1	0	0	1	1	0	16
Total	11	14	3	0	0	1	2	0	31

Four groups of four students were formed for each intervention cycle. Students from each homeroom were placed in the same intervention group to accommodate the homeroom schedule. In School A, 3 groups were formed from the students in each of 3 homerooms. Group 4 was formed with 1 student from two homerooms and 2 students from the third homeroom. These students were the students who had scheduling conflicts during the time their homeroom group met (e.g. speech class, America Reads tutor,

reading class). In School B, Group 5 and Group 8 were formed from one homeroom and Group 6 and Group 7 were formed from the other homeroom. Again, schedules for special classes were the major considerations in the formation of groups. Thus, there were 8 groups of 4 students participating in the study, four in each of two cycles of instruction. The cycles were conducted consecutively during the first half of the second grade year with a three-week break between the two cycles.

Texts

Informational texts on topics that were likely to be familiar to second-grade students were selected for each lesson (see Hansen, 1981, p. 410). The texts involved science topics that had been taught to the students in their first- or second-grade science curriculum as part of the state science content standards. The specific topics and sequence of instruction for all groups, cycles, and students were spiders, the moon, how water changes form, and insects. A set of three different informational texts on the same topic was used each week as a mini-unit resulting in a total of 12 texts or leveled little books.

Duke (2000) defines *informational text* as text that has many or all of the following features:

> (a) a function to communicate information about the natural or social world, typically one presumed to be less so; (b) an expectation of durable factual content; (c) timeless verb constructions; (d) generic noun constructions; (e) technical vocabulary; (f) classifactory and definitional material (g) comparative/contrastive, problem/solution, cause/effect, or like text structures; (h) frequent repetition of the topical theme; and graphical elements such as diagrams, indices, page numbers, and maps (p. 205).

To minimize the possible effects of different text structures, all texts came from the same subgenre, enumerative. These texts go by many names depending on the researcher (B. B. Armbruster, personal conversation, September 1, 2002). They might be called descriptive, list, attribution, or definition and example. N. Duke (personal

communication, August 27, 2002) and Armbruster both recommended the use of this text structure for the same reasons.

- Examination of a variety of published leveled books and trade books on science topics yields a wide selection of texts with this "primary" structure.
- Enumerative texts are commonly found both in the adult world and in texts at the easiest, beginning levels of text readability. Enumerative texts can be found in all subject domains.
- They contain characteristics that represent a "prototypical form" of informational text and usually exhibit many of the features listed in Duke's (2000) definition stated above.
- Other more complex, difficult-to-find text structures may be embedded in the basic enumerative text. The compare/contrast or cause/effect structures may be found explicitly or implicitly in these texts. For example, in a text that describes the forms of water we are exposed to cause and effect relationships. Changes in temperature cause water to change form. Explaining the difference between solids, liquids, and gases provides a vehicle for comparing and contrasting. Despite the inclusion of these secondary structures, this text is primarily an enumerative text.
- It is difficult to find these alternative structures as primary structures, especially for young children. They are typically integrated with other structures.

All texts ranged from Reading Recovery Level 11 to Reading Recovery Level 16 (Peterson, 1991) or Guided Reading Level G to Level I (Fountas & Pinnell, 1996). A list of the texts and their characteristics is found in Table 3.3. Descriptions of instructional procedures for DRTA and the picture walk advocate that students read instructional level texts with as much independence as possible (Clay, 1991, 1993; Fountas & Pinnell, 1996;

Stauffer, 1968,1969). Instructional procedures for KWL do not specify recommendations for reading levels or reading procedures (Ogle, 1986).

Table 3.3

List of Texts

		Words		
Text and Publisher	Level	Text	Captions	Total
The Spider Steck-Vaughn Co.	I_a	274	--	274
Mighty Spiders Scholastic: Hello Reader	H_a	183	105	188
* *Spinning A Web* Newbridge	G_b	177	14	191
On the Moon National Georgraphic: Windows on Literacy	G_b	77	--	77
"The Moon" in *Looking At The Sky* Grossett and Dunlap	H_a	216	--	216
* *The Moon* Wright Group: TWIG	H_b	310	79	389
Amazing Water Newbridge	H_b	111	--	111
Where Does The Water Go? Newbridge	H_b	144	--	144
* *Water: Liquid, Solid, Gas* Wright Group: TWIG	I_b	208	73	281
Insects National Georgraphic	I_a	426	--	426
Ants, Cockroaches and Mosquitoes in *Looking At Bugs: My First Field Guide* Grossett & Dunlap	H_a	323	21	344
*Introduction (pp. 1-5) to *Looking At Bugs* Grossett & Dunlap				

Note. All levels indicated are Guided Reading Levels (Fountas & Pinnell, 1996).

$Level_a$ indicates that the publisher did not assign a Guided Reading Level and the level listed is my estimation based on Fountas and Pinnell criteria (1996).

$Level_b$ indicates that the publisher assigned the Guided Reading Level.

*Texts were used on Day 3 of instruction and assessments.

Interventions

I conducted all interventions and data collection in each group. This helped control for teacher effects. I have 25 years of teaching experience. In 1975, I was taught to teach reading using DRTA procedures, which I did for many years in Grades 2 through 6. I taught Reading Recovery for four years, during which time I was trained and evaluated on the utilization of Clay's (1991, 1993) book introduction procedures. As a classroom teacher, I have frequently used KWL to frame instruction for informational texts or content units. All lessons were recorded on audiotape.

Based on the recommendations of the developers of the procedures and the deliberate matching of texts with student reading levels, all reading of the texts was done independently by the students as mumble reading. *Mumble reading* is independent reading with a soft voice. Children were familiarized with mumble reading during the preintervention orientation session. It was chosen because many children at this level are more accustomed to oral reading than silent reading. It also enabled me to monitor student reading. Help with decoding was provided upon request and as needed based on my observations. The study was designed to replicate, as much as possible, the small group reading instruction typically provided to readers that are approaching grade level. In School A, sessions were held at a table in a hallway. In School B, sessions were held at a table in the school's kitchen or at a table in a partitioned room shared with other teachers working with small groups of children.

Preintervention Orientation Session

One day after screening, but before interventions, a 45-minute orientation session was held with each group. This orientation was conducted to practice logistical routines

such as management procedures, mumble reading, scheduling confirmation, and assessment tasks. We used control group procedures for text reading. I gave a brief book introduction to an informational text. Children were taught to mumble read and to ask for help if they needed it. After reading they had an opportunity to write about and illustrate information in the book that they would like to share with a friend. Each child shared his or her product with the group.

Children were told that, at the end of our weekly sessions, they would be asked to use the information from the books they had read that week in several different ways. We discussed for the first of many times that the purpose of reading information books was to gain new information. Then, we did a collective retelling of the book. During the retelling we talked about the value of retelling as much information as possible from the book, organizing our ideas to help us remember more, and making connections between the text and prior knowledge, including our own experiences or other books that we had read.

Next the children did an abbreviated Maze (timed, multiple-choice cloze task), Vocabulary Recognition Task, Web, and Written Recall (see descriptions of assessments in subsequent section and Appendices C, D and E). The children did Maze independently, but we checked it together. They were coached through the Vocabulary Recognition Task and Web because of the novelty of both tasks to the children. A few minutes were spent answering questions about the text, after which they produced a Written Recall. I stressed with the children that I valued their ideas and that spelling was not our priority for this task. Also the students were informed that the written retelling was to be a reflection of everything they knew about the topic and was not to be limited to information in the text.

General Intervention Procedures

Each day, all of the children were introduced to the same new book. As a result, the children read a total of 12 text selections during the intervention. Because the

assessments were only conducted on Day 3, the treatments were tested using four different texts.

On Day 1, all groups began their session with a brief introduction to the topic for the week (i.e., spiders, moon, water's changes, or insects). Then they completed the Vocabulary Recognition Task (VRT) and Interest Register. Students were always reminded not to be alarmed if they did not recognize many of the vocabulary words. They were not expected to know them on Day 1, for they would be learning about many of these words during the mini-unit throughout the week. After completing the VRT and Interest Register, the treatment groups discussed the value of activating prior knowledge and making predictions before reading. We also discussed how to generate predictions. Then, I briefly described to all groups the instructional method that would be used that week with their group and its unique features. For example, the DRTA group was told that we would be making predictions and reading the text section by section, not straight through the text as they did during the other treatments.

On Day 1 and Day 2 we read a new text following the prescribed procedures for the assigned intervention. Aside from the VRT and Interest Register administered on Day 1, no other assessments were administered on Day 1 and Day 2. (During week 1, the children in all four groups practiced a collective retelling task after each reading, so that students would have a common understanding of the task.) The purpose of these first two sessions was to familiarize the children with the procedures. These sessions lasted 20-30 minutes depending on book length and method. KWL often took five to ten minutes longer than the other three methods. The instructional procedures are discussed fully in Chapter 2, and the next section, "Specific Intervention Procedures," provides an explicit description of how each procedure was implemented in this study. Table 3.4 provides information about the ways the four intervention procedures, as implemented in this study, incorporated comprehension processes.

Table 3.4

Comprehension Process Instruction By Method: Before, During, and After Reading

Process	DRTA	KWL	PW	NC
Activate Prior Knowledge	Before During	Before	Before	Before
Generate Predictions	Before During	Before	Before	-
Justify Predictions	Before During	Before	Before	-
Verify Predictions	During	After	After	-
Organize Information	Before During	Before	Before	-
Vocabulary Development	During	Embedded in discussion, before or after	Before	-
Summarizing	During	After	After	After
Integrating Text and Prior Knowledge	During	After	-	After
Format	Group Discussion	Group Discussion, Writing	Group Discussion	Writing, Illustrating, Group Discussion

On Day 3, each group read the same new book adhering to their designated treatment. After concluding the instructional procedures, a series of assessments were administered. These sessions lasted 50-60 minutes, depending on the length of student recalls and instructional procedures. Again, KWL sessions tended to take more time than the other 3 methods. All assessments were administered in the same order each week. That order was (a) Maze, (b) Interest Register and VRT, (c) Vocabulary Web, (d) Free

Recall, and (e) Cued Recall. Written Recall was completed individually while I conducted the individual conferences with children to hear their free verbal recall and cued recall. Table 3.5 displays a sample weekly schedule.

Table 3.5

Sample Weekly Schedule

Procedures	Day 1 30 minutes	Day 2 30 minutes	Day 3 50 minutes
Group 1	KWL	KWL	KWL
Group 2	PW	PW	PW
Group 3	DRTA	DRTA	DRTA
Group 4	NC	NC	NC
Tasks and Texts	VRT Apply instructional method as students read: *The Spider*	Apply instructional method as students read: *Mighty Spiders*	Apply instructional method as students read: *Spinning A Web* Maze Task VRT and web Retelling Cued Recall Written Retelling

Specific Intervention Procedures

DRTA. Before reading, the students formulated and justified predictions about the text based on the title, cover, prior knowledge, and if available, table of contents. I had divided the text into several 2-3 page sections. Students formulated and justified predictions for each section of text. Then they mumble read that section of text. After reading the section of text, a brief discussion was held to verify predictions, summarize

the information in the text, and generate new predictions for the next section of text based on the discussion about the text, pictures, and headings, if available. At the conclusion of the entire text, discussion was minimal about the overall text.

KWL. On Day 1 and Day 3, we made a group KWL chart interactively. After introducing the topic, I generated a discussion about what the children already knew about the topic. I wrote their input on the chart in the Know column. Children were also asked *how* they knew the information. Information that was questioned by other members of the group, me, or was unable to be justified was circled, and an arrow was drawn to the next column, "What I Want To Learn." This signaled (and our discussion would emphasize) that we wanted to learn more about this idea in our reading. On day 2, the children wrote what they knew on a personal KWL chart. Then it would be shared, and I wrote their information on our large group chart.

Next, we categorized the information that we knew. Although Ogle (1986) suggests that the children generate these categories, the children struggled with efforts to do this. In the interest of time, and I thought to the advantage of the children, I prompted the children to categorize their information using the same categories that would be on the Day 3 assessment web.

Third, the children generated questions about the topic. Before generating questions that were placed in the "What I Want To Learn" column, I provided the same brief summary of the book that the other groups received before reading. I also displayed the Table of Contents of the book, if it had one. I had hoped that the children would generate questions that might actually be answered in their book. I wrote their questions and "want to learn" statements on the group chart each day.

After our prereading discussion, the children mumble read the entire text. After reading, we began our postreading discussion by considering whether the text had provided answers to any of our questions. If so, I recorded the information in the "What I Learned" column. Then we discussed other new learning and recorded it

on the group chart. On Day 2 and Day 3, the children had an opportunity to record their new learning on their personal KWL chart before we shared as a group.

Picture walk. During the picture walk I followed the guidelines recommended by Clay (1991) and Fountas and Pinnell (1996) as described in Chapter 2. Before reading I presented a brief summary of the text. We engaged in an interactive discussion about the book as we worked through the book page-by-page talking about the pictures, the text structure, the student's prior knowledge and generating predictions based on that information. Topic headings were addressed, when available. To generate a discussion of the pages, I frequently said to the children, "What words would you use to describe what you see happening on this page?" or "What do you think the writer is going to be teaching us about on this page?"

This method was the only method that specifically introduced new vocabulary before reading the text. Within the picture walk, I introduced two to four new content vocabulary words. Attention was drawn to the meaning of each word as well as how to decode the word, perhaps chunking or using a common rime.

After the picture walk, the children mumble read the text independently. After reading, we discussed whether our predictions were verified. We also collectively summarized the information from the text.

Non-instructional control group (NC). A non-instructional control group was used to compare the effects of providing reading opportunities in informational text versus providing a social context for the activation of prior knowledge, setting personal purposes for reading and generating and verifying predictions for a text. The children had an opportunity to read the same informational texts that were read by the intervention groups.

Before reading I presented the same brief summary of the text that had been provided to the treatment groups. Then the children independently mumble read the new text. Independent reading was always followed by drawing a picture and/or writing about

something they would like to share with the group based on the text. During week 1, the children also collectively practiced the retelling task after reading, so that all students had the same common understanding of the task.

Measures and Scoring

Vocabulary Recognition Task (VRT) and Concept Web

The VRT was administered on Day 1 and Day 3. The VRT is a task that I designed as a classroom teacher to estimate prior knowledge and vocabulary recognition in a content area. It is based on the same theory as the Title Recognition Task (Cunningham & Stanovich, 1991) and the keyword sorting tasks used by McNamara and Kintsch (1996). The task consisted of a list of 25 words; 18 of the words were related to the content in the informational texts and 7 words were unrelated foils (see Appendix C). The task was group administered. The directions that were read to the students and printed on the response sheets were as follows:

> This week we will be reading books about *spiders*. Below you see a list of words. Put a circle around the words that you are able to read and are certain have something to do with *spiders*. Do not guess, because incorrect answers will lower your score.

On Day 3, the students also received a concept web with headings (see Appendix D). Words they selected with a circle were to be placed in the correct category on the web.

The VRT was scored using the same procedures described by Cunningham and Stanovich (1991). The proportion of correct targets circled minus the proportion of foils circled provided the VRT Total. The VRT Gain was calculated by subtracting the VRT Pretest Total from the VRT Posttest Total.

For example, a child may have only selected 8 of the 18 correct words on the VRT. However, that child may have known enough about the words to correctly categorize all 8 of them on the web. That child's two scores would be 8 (Web#) and 100% (Web%). However, another child may have correctly selected 16 of the 18 VRT

words, but only categorized 8 of those 16 words correctly. That child's score would be 16 (Web#) and 50% (Web%).

Interest Register

At the bottom of the Vocabulary Recognition Task, I included a survey of interest in the topic. I read each sentence aloud and the students each chose one of three sentences:

_____I am very interested in reading and learning about *topic*.

_____I am interested in reading and learning about *topic*.

_____I am not interested in reading and learning about *topic*.

Maze

The maze task was a multiple-choice cloze modification (Appendix E). It was a timed (3-minutes), group-administered task. The Day 3 texts were retyped for the students in a large font (Times, 14) with only minor word changes to facilitate task formatting. Longer texts were ended at a sensible stopping point and redundant information was omitted. I deleted 10 content words from the texts. All maze texts ranged from 254 words to 267 words. The use of the complete text provided the students with a familiar, cohesive passage. There was always a 3 to 5 sentence lead-in without omissions. I used the guidelines established by Parker and Hasbrouk (1992) in constructing distractors for each item. They recommend that test designers choose four

> distractors that are (a) the same part of speech as the deleted word, (b) meaningful and plausible within one sentence, (c) related in content to the passage (when possible), (d) as familiar to the reader as the deleted word, and (e) either clearly wrong or less appropriate, given broader passage content. (p. 216).

The investigation of maze as a valid, reliable, sensitive assessment of younger students was conducted by Shin, Deno and Espin (2000). The minimal demand placed on working memory is advantageous for younger students. A timed task promotes focused attention and reflects fluency. While most of the other assessments in my study reflected comprehension of macrostructures, this provided insight into microlevel processing,

fluency, and monitoring for meaning. The score on the maze task was the number of correct responses.

Free Recall

After the administration of the maze task, I met individually with each child. First, the child was asked to provide a free recall of that day's text using the following prompt, "Please tell me everything you can remember about the book. Also, tell me anything the book made you think of." I recorded the children's responses manually on paper and on audiotape.

The free recall was analyzed using a method similar to that used by Elster (1998) in his analysis of emergent kindergarten readings. The primary analysis consisted of clausal units. First, I analyzed the four texts used on Day 3 and came up with a rubric of clausal units for each text (Donovan & Smolkin, 2002). Each clause consisted of groups of words that contained a subject and predicate. However, when more than one idea unit was contained in a clause, both ideas were separated into distinct clauses.

Next the clausal units were placed on a tree diagram to represent the text organization and hierarchy (Donovan & Smolkin, 2002; Kintsch, 1998). Based on the levels of the tree diagram each clause was coded as a main idea, high subordinate idea, subordinate, subordinate level 4, or subordinate level 5. All text analyses were conducted by two independent raters, myself and a researcher with expertise in text structure. There were few differences in the clausal analyses. Those differences were adjusted based on discussion and mutual agreement. Our discussion of the tree diagrams for two of the texts with clear text organization also enabled us to come to a clear consensus on minor independent differences. However, for two of the texts with less friendly organizations and implicitly stated main ideas, *Spinning A Web* and *The Moon,* a third rater was consulted. The judgment of the third rater, a literacy researcher, was used to make a decision on the hierarchy placement of the controversial clauses.

All the clausal and hierarchical information, including picture and diagram captions, for each text was placed on a retelling coding sheet (see Appendix F). There

were empty lines beneath each text analysis for adding student importations and intrusions. Importations are " text-related information, but information that is not explicit in the words of a book" (Elster, 1998, p. 54). Importations were categorized as inferences and extensions of text, information from pictures, prior experience, information from other texts in the mini-unit, or class discussion. Erroneous importations, unrelated information, and personal narratives were categorized as intrusions (Hansen, 1981).

The retellings were scored using the coding sheet. Clauses in each child's retelling were recorded on the coding sheet. Each student recall received four scores, (a) Text Free Recall (explicit text information recalled), (b) Importations, (c) Free Recall Total (a total score for text-based clauses and importations), and (d) Intrusions. I scored all papers. Approximately 20% of the papers were also scored by a graduate student who currently teaches second grade. There was .95 interrater agreement in the scoring of the retellings.

Cued Recall

After the free recall, the child was asked to answer six open-ended questions based on that day's text (see Appendix G). Three questions were able to be answered using information explicitly stated in the text (Explicit Cued Recall). Three questions required inferences or application of prior knowledge and experience (Implicit Cued Recall). The responses were recorded manually on paper and audiotape. I scored all answers using two sets of analyses. First, all answers were recorded and coded as correct or incorrect. For the second analysis, the following four-point scale (adapted from Hansen, 1981, p.405) was used to produce weighted scores for the questions.

3-Correct answer: The student provides a specific, complete answer with justification.

2-Correct answer: The student's answer is partially correct. (For example, there are 3 criteria in determining if a creature is an insect; the students received 1 point for each.)

2-Incorrect answer: Although the answer was not correct, the student's response was related to the topic and some logical justification was provided for the answer.

1-Correct answer-The student's answer was partially correct as described above.

1-Incorrect answer: The student's answer was a wild guess or unjustifiable, incorrect response.

0-No response

Approximately 20% of the cued recall transcriptions were also scored by an independent rater, the second grade teacher described earlier. Based on an item-by-item analysis, there was .96 agreement on correct/incorrect scoring and .87 agreement for point designation.

Written Retelling

In the oral retelling, the children were asked to retell information from that day's text and what it made them think of. However, the informational writing task was designed to allow the children to address the topic more generally. It was proposed that the writing prompt had potential to reflect broader content acquisition across the weekly readings. For example, the writing prompts were "Amazing Water" and for the other topics "All About *Topic*." Students worked on this task independently after completing the web task, while I conducted interviews. As a result, there was inconsistency in the administration of the task. Often children who had recognized many words and had to web many words were left with less time for writing than children who recognized fewer words. The task also came at the end of a 50-minute session and some children were tired. Or in many cases, these approaching-grade-level readers found writing difficult and unpleasant. For the sake of my relationship with the child and the larger goals of the project, I was unwilling to insist on a writing sample from each child each week.

Most of the written retellings were sparse and there were several pieces of missing data. As a result, the tasks were analyzed using clausal units in the same way that the text was analyzed. The written retellings were each given a score for number of clauses contained and a score for number of intrusions. However, they are more

interesting to look at individually in terms of how children organized their knowledge, their adherence (or lack of adherence) to informational genre characteristics, and use of illustrations.

Postintervention Interview

At the conclusion of each research cycle, I conducted individual strategy interviews with the students in that cycle. Interviews were audiotaped and transcribed. All three instructional techniques focus on the activation of prior knowledge and the generation of predictions as strategic aids in extending an existing representational system, forming new representations, and remembering what was read. I used the interview developed by Duffy (1993) to determine if students gained knowledge of the two strategies. The questions survey three types of strategy knowledge, (a) declarative (what the strategies were), (b) procedural (how to perform the strategies) and (c) conditional knowledge (when and why the strategies are useful) (Paris, Lipson, & Wixson, 1983). Question 1 was designed to tap declarative knowledge. The two parts of Question 2 assessed conditional knowledge and Questions 3 and 4 provided an opportunity for the children to demonstrate procedural knowledge. An informational text was available to make the discussion less abstract. Question 5 and Question 6 related to the instructional methods. These two questions were asked after reviewing the four interventions with a poster that briefly described the steps in each "way of reading." Before answering Question 6, the children were explicitly reminded to select from all four intervention choices, not just the interventions they had not picked for Question 5.

Students were interviewed individually and asked the following questions.

1. What was I teaching you to do during all of our time together?
2. If you were reading this book, why would it be important to think about what you already know about *the topic of the book*? Why is it important to make predictions?
3. How would you make predictions about this book?
4. What would you do to get ready to read this book?

5. Which of the 4 ways of reading did you like the most?
6. Which of the 4 ways of reading helped you read most easily and learn the most?

It was my intention to interview all students since all students were reading at approximately the same level, and I believe that both verbal and less verbal students should have opportunities for talking about text and cognitive processes. The interview is less complex and more time-efficient than many other verbal protocols that might require a training period or the exclusion of less articulate students. However, due to a family health emergency I was only able to conduct abbreviated interviews (question 2 was omitted) with 6 students in Cycle 1. The interviews with Cycle 2 students were conducted as originally planned. A descriptive analysis of information gathered in the interviews was performed.

CHAPTER 4.

RESULTS

This chapter reports the results of this dissertation. I begin with an overview of the analysis process and procedures. Second, I present results for the primary analyses, the effect of Treatment, which address the 3 research questions. Third, I report results of analyses using Text as a factor, which proved to be significant and hence required further investigation and explanation. Fourth, I report results on the students' responses to the Interest Register. Last, I present results from the student interviews.

Analysis Overview

One-way repeated measures analysis of variance (ANOVA), using the group as the unit of analysis, were conducted on all measures. Despite the conservative nature of using the group as unit of analysis, this was selected due the important role of social interaction in each intervention. The primary analysis investigated the effect of Treatment, with each of the 4 interventions acting as levels. The secondary analysis involved possible effects of Text, with each of the 4 test texts as levels. Finally, a series of repeated measures pairwise and complex contrasts were used to analyze specific differences for Treatments and Texts. I employed a Bonferroni adjustment for multiple comparisons to familywise contrasts that compared Treatment effects or Text effects. Only contrasts that were found to be statistically significant are reported. Although my theoretical framework and classroom experience led me to make some general projections about the results about the results of the contrasts, I did not propose formal hypotheses; thus, all statistical tests were two-tailed.

Mauchley's test was applied to all analyses to confirm the assumption of sphericity (Huck, 2000). When this assumption was not satisfied, adjustments were made to the ANOVA results using the Huynh-Feldt correction as indicated (Huck, 2000). All analyses were conducted using SPSS for Macintosh 10.0.

Effect sizes are reported using the eta squared (^{2}) index. *Eta squared* is defined as "the proportion of variance in the dependent variable that is explained by the study's independent variable" (Huck, 2000, p. 205). The criteria recommended by Cohen (as cited in Huck, 2000, p. 457) for interpreting eta squared is as follows: .01 is considered a small effect, .059 is a medium effect size, and .138 is a large effect size. Power is also reported for statistically significant main effects. *Power* is defined as the risk of Type II error in a study (Huck, 2000). A good measure of statistical power is considered to be equal to or greater than .8.

Treatment Effects

The purpose of this study was to explore how three instructional methods influence the developmental reading abilities and new content acquisition of second-grade students who read informational text in a small-group context. I anticipated that postreading measures on the dependent variables measuring fluency, general comprehension, and content knowledge would reflect differences in the intervention procedures with novice readers.

Results for Treatment effects are presented for each of the three research questions. Table 4.1 presents means and standard deviations by treatment group, for all dependent measures. Because particular dependent measures informed each research question, results for only certain dependent measures are presented for each question. My analysis process for each measure involved three steps. First, I conducted a one-way ANOVA to test for omnibus Treatment main effects, all of which are presented in Table 4.2. Second, when an omnibus test was significant for a dependent measure, I conducted the three within-subjects pairwise contrasts comparing each treatment to the control (i.e.,

DRTA vs. Control, KWL vs. Control, PW vs. Control). I also conducted pairwise contrasts comparing all Treatments to each other, with a Bonferroni adjustment for multiple comparisons. Pairwise contrasts enabled me to look at the relative strengths of individual treatments. Third, for each measure, I conducted those complex contrasts that evaluated my theoretically based hunches. The complex contrasts enabled me to cluster treatments with similar characteristics to see if they yielded significant effects on particular measures. Each research question section concludes with a summary of results for that research question.

Table 4.1

Treatment Means and Standard Deviations

Dependent Measure	Treatment							
	DRTA		KWL		PW		NC	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
VRT Pretest	.21	.19	.13	.22	.14	.19	.13	.19
VRT Posttest	.49	.21	.44	.23	.53	.26	.43	.23
VRT Gain	.29	.14	.30	.20	.39	.15	.30	.18
Web Number	6.73	1.66	6.5	2.01	6.87	2.75	5.18	2.32
Web Percent	68.38	19.13	66.68	17.28	61.65	22.99	57.13	20.63
Maze	5.88	1.71	4.93	1.50	5.98	1.88	4.66	1.21
Cued Recall Total	4.95	.55	3.54	.76	4.18	.79	3.33	1.08
Cued Recall Points	15.02	1.64	11.56	1.86	13.36	1.59	11.21	2.13
Free Recall Total	13.72	5.64	10.06	2.55	9.39	2.95	10.39	4.37
Written Recall Total	5.76	2.08	4.32	1.82	3.92	1.84	3.80	1.93

Table 4.2

Analysis of Variance for Treatment Main Effects

	F (3,21)	^{2}	*p*
VRT Pretest Total	.190	.026	.902
VRT Posttest Total	.489	.065	.693
VRT Gain	.504	.067	.683
Web Number	1.065	.132	.385
Web Percent	.413	.056	.745
Maze	3.254*	.317	.042
Cued Recall Total	5.971*	.460	.004
Explicit	3.391*	.322	.040
Implicit	2.981	.299	.055
Cued Recall Points	7.107*	.504	.002
Free Recall Total	3.372[a]	.509	.070
Written Recall Total	1.669[a]	.193	.204
Intrusions	3.685[a]	.345	.076

Note. [a]Huynh Feldt adjustment to degrees of freedom.

*$p < .05$.

Research Question 1: What are the effects of the interventions on reading fluency and reading comprehension?

The VRT, Maze, and Cued Recall measures were used to examine Treatment effects on fluency and reading comprehension. The relationship between fluency and comprehension is just beginning to be investigated. However, it is important to look at fluency because it is more likely to play a part in the comprehension of novice readers who are still developing fluency and automaticity (Schwanenflugal et al., 2002). Fluency also is an important instructional goal in developmental reading instruction in grades 1 and 2. Teachers need to know how different instructional procedures may influence reading fluency.

Vocabulary Recognition Task (VRT). There were three variables directly derived from the Vocabulary Recognition Task. They were VRT Pretest Total, VRT Posttest

Total, and VRT Gain. Additionally, two webbing tasks utilized the vocabulary selected by each child on the VRT. The number of words correctly webbed and the percentage of posttest VRT total correctly webbed were both analyzed.

None of the Treatment main effect ANOVAs for the three VRT variables attained statistical significance. As expected, students did not differ significantly on their pretest VRT scores by Treatment (p = .902). Likewise there were no statistically significant main effects for either the VRT Posttest Total (p = .693) and VRT Gain (p = .683) measures. Although gains were indicated for all groups on the VRT (see Table 4.1), there were not significant effects for Treatment (see Table 4.2).

Maze. The one-way repeated measures ANOVA found a significant effect for Treatment on Maze (p = .042). Power was .66. Pairwise contrasts indicated that both the PW treatment, F (1, 7) = 14. 019, p = .026, ^{2} = .531 and DRTA treatment, F (1, 7) = 11.883, p = .048, ^{2} = .450, scored significantly higher on the maze task than participants in the control group.

It was theorized that DRTA and PW have a strong reading emphasis procedurally and would be likely to yield greater outcomes on reading measures than KWL. A complex contrast comparing (DRTA + PW/2 – KWL) resulted in a statistically significant effect favoring DRTA and PW over KWL, F (1, 7) = 9.432, p = .018, ^{2} = .574. The observed power was .75. Additionally, the complex contrast comparing all three treatment conditions to the control (DRTA + PW + KWL/3 – NC) was statistically significant, F (1, 7) = 6.697, p = .036, w^2 = .489.

Cued Recall (Explicit and Total). Four variables were derived from the Cued Recall (see Appendix G). Explicit Cued Recall and Cued Recall Total were considered reading measures. The dependent variables Implicit Cued Recall and Cued Recall Points will be considered when reporting results on science acquisition, Research Question 2, since they both reflect deeper knowledge of science concepts. Explicit Cued Recall and Implicit Cued Recall are the numbers of correct explicit or implicit questions answered

on the Cued Recall task (see Appendix G). They were used as separate dependent variables to determine if different instructional procedures yielded different results on explicit and implicit questions.

Treatment main effects were found for Explicit Cued Recall (p = .040) and Cued Recall Total (p = .004). Power was .67 for Explicit Cued Recall and .91 for Cued Recall Total. Only the DRTA procedure yielded statistically significant effects in pairwise contrasts with the control group. Statistically significant differences were observed on Explicit Cued Recall, F (1, 7)= 8.546, p = .022, ^{2} = .550, and Cued Recall Total, F (1, 7)= 11.373, p = .012, ^{2} = .619. Pairwise contrasts, with a Bonferroni adjustment, also indicated a significant difference between KWL and DRTA on the Cued Recall Total, F (1, 7), p = .042. Power to detect effect sizes exceeded .70 for Explicit Cued Recall and .80 for the Cued Recall Total.

Complex contrasts comparing DRTA and PW to KWL (DRTA + PW/2 – KWL) revealed significant differences on explicit questions, F (1, 7)= 6.027, p = .012, ^{2} = .095, and total recall, F (1, 7)= 6.291, p = .041, ^{2} = .473. On Cued Recall Total, the complex contrast comparing all three treatment conditions to the control condition, DRTA + PW + KWL/3 – NC, yielded statistically significant Treatment effects, F (1, 7)= 5.631, p = .049, w^2 = .446.

Summary of results for Research Question 1. In summary, DRTA + PW > KWL on reading measures was supported by contrasts for Maze, Explicit Cued Recall, and Cued Recall Total. Table 4.3 presents a summary of the contrast results for Treatment effects. On both Maze and Cued Recall, DRTA and PW yielded consistent statistically significant results compared to KWL and the control group. On Maze, a comparison of effect sizes suggests that a slightly larger proportion of variance is explained by PW than DRTA. On Explicit Cued Recall and Cued Recall Total, the DRTA yielded the strongest results.

As could be expected, there was no statistically significant effect for Treatment on the VRT pretest total. I failed to find statistically significant Treatment effects on the VRT Posttest Total or VRT Gain. As a result, my expectation that the picture walk would yield the strongest results on the VRT was not supported, despite the fact that during the picture walk the students were explicitly taught the words on the VRT.

Table 4.3

Summary of Treatment Effects

	Complex Contrasts	Pairwise Contrasts
Research Question 1: Effect on Fluency and Comprehension		
Maze	DRTA + PW > KWL DRTA + PW + KWL > NC	PW > NC DRTA > NC
Cued Recall Total	DRTA + PW > KWL DRTA + PW + KWL > NC	DRTA > NC DRTA > KWL[a]
Explicit Cued Recall	DRTA + PW > KWL	DRTA > NC
VRT	NS	NS
Research Question 2: Effect on Acquisition of Informational Content		
Vocabulary Web	NS	NS
Cued Recall Points	DRTA + PW > KWL DRTA + PW + KWL > NC	DRTA > NC DRTA > KWL[a]
Implicit Cued Recall	NS	NS
Research Question 3: Transition from Experience to Information		
Free Recall	NS	NS
Written Recall	NS	NS

Note. N.S. indicates that statistically significant different effects were not found for Treatments.

[a]Adjustment for multiple comparisons: Bonferroni

Research Question 2: What are the effects of the interventions on science content acquisition?

Vocabulary Web. The children, especially in cycle 1, experienced extreme difficulty sorting the words conceptually. The children had to be consistently redirected to systematically work column-by-column on the vocabulary sheet when placing words on the web. In addition to words being placed in an incorrect category, it was not unusual for children to omit relevant words they had selected for the VRT and occasionally, they added their own words or sentences to the web instead of using the VRT list. The web yielded neither a main effect for treatment in the total numbers of words correctly sorted into the correct category ($p = .385$) nor a main effect for percent of words correctly sorted in the analysis ($p = .745$) (see Table 4.2).

Cued Recall (Implicit and Points). The Treatment main effect was not significant for Implicit Cued Recall ($p = .055$). However, there were significant Treatment effects for Cued Recall Points ($p = .002$). Pairwise contrasts comparing each treatment to the control revealed statistically significant effects for Cued Recall Points for DRTA over NC, $F(1, 7)=18.104$, $p = .004$, $^2 = .721$. Power was .95. Pairwise comparisons of all Treatments also revealed a significant difference between DRTA over KWL, $F(1, 7)$, $p = .042$.

It was anticipated that the characteristics of KWL promoted a broader and deeper knowledge of science content than the reading-based methods of DRTA and PW on implicit questions and total points on the cued recall, which relied on integration of personal experience and the ability to explain or elaborate on text information. However, a complex contrast comparing KWL to DRTA and PW (DRTA + PW/2 – KWL) did not support the expectation for implicit questions, $F(1, 7)= 1.766$, $p = .226$, $^2 = .201$ or total points scored on cued recall. $F(1, 7)= 6.291$, $p = .041$, $^2 = .473$. Surprisingly, an examination of the means reveals that the significant effect in the last contrast actually favored DRTA and PW on the Cued Recall Points. The complex contrast comparing all

treatment interventions to control (DRTA + PW + KWL/3 – NC) yielded statistically significant results on Cued Recall Points, F (1, 7)= 9.073, p = .020, w^2 = .564

Summary of results for Research Question 2. There were unexpected results for Research Question 2. Because the procedures in KWL focus on content knowledge and the organization of that knowledge it was expected that KWL procedures would facilitate the ability to organize information on a concept web more effectively than the other two procedures. There were no significant Treatment effects on the Vocabulary Web variables.

It was anticipated that the open-ended nature of KWL would enable children to be more successful on Implicit Cued Recall and Cued Recall Points. There were no significant Treatment effects on the implicit questions. However, the most unexpected finding involved the significant Treatment effects on Cued Recall Points favoring DRTA. On Cued Recall Points, DRTA students scored significantly more points than the control group and the KWL group. Also, results on the Cued Recall Points indicate that KWL < DRTA + PW.

Research question 3: How does each set of instructional procedures facilitate the transition from an experience-based representational system to an information-based representational system?

The free recall measures provide a window to observe this transition. Each child's free oral recall of the text or written recall of content information enabled them to emphasize what they remembered and viewed as important without the external structure provided in the cued recall.

Four variables were derived from the oral retelling. Those four variables were described in detail in Chapter 3. They are Total Free Recall (Sum of Text Free Recall and Importations), and the three subscale variables, (a) Text-Free Recall (statements that were directly stated in the text), (b) Importations (other related statements, such as inferences or prior knowledge) and (c) Intrusions (erroneous or unrelated information).

Free Recall. For most children, only a small percentage of the information in the text was recalled, although there were individual exceptions. The Mean number of clauses retold by all treatment conditions was 10.89 (see Table 4.1). This is rather sparse considering that we are looking at approximately 120 retellings of texts that ranged from 46 to 70 clauses. There were not significant treatment effects for Total Free Recall (p = .070).

PW procedures, page-by-page book discussion, would seem to yield a more text-based retelling and that DRTA and KWL procedures would yield retellings that were less text-based, with the inclusion of greater numbers of importations. This supposition was not supported based on a complex contrast comparing the PW to DRTA and KWL (DRTA + KWL/2 – PW) on the Text-Free Recall means, F (1, 7) = .084, p = .780, ^{2} = .012. Additionally, the results of the second complex contrast comparing importations for PW to DRTA and KWL did not yield significant results either, F (1, 7) = .5.270, p = .055, ^{2} = .430, although an examination of the means does reveal that students in the PW treatment had a tendency to include fewer importations (M = 2.678) than all other groups (KWL, M = 4.198; DRTA, M = 5.751; NC, M = 4.489) in their free recall of the text.

It was also anticipated that KWL and NC would yield higher numbers of intrusions. It was proposed that without the specific text support provided in the DRTA and PW, participants in KWL and NC interventions would be more likely to rely on their experience and prior knowledge, including erroneous information, tangentially related information, and personal narratives. This was the case for particular students, however in a comparison of group means there were no significant differences F (1.394, 9.757) = 2.217, p = .167, ^{2} = .241. The repeated measures ANOVA analysis revealed a slight departure from sphericity for this variable; therefore, Huynh-Feldt epsilon was applied to the degrees of freedom. A look at group means does reveal some tendencies, however. In the oral retelling, DRTA students were least likely to include intrusions (M= .68). PW (M

= 1.01) and KWL (*M* = 1.17) were about equally likely to include them. NC students were most likely to include intrusions (*M* = 2.79) in their written retellings.

Written Recall. As noted previously, there was inconsistency in the administration of the written recall task and the writing was sparse (see Table 4.1). The Mean number of clauses for all groups was 4.45. Significant Treatment effects were not found for Written Recall (.204) or for Written Recall Intrusions (*p* = .076). However, group means of written recall intrusions reflect some tendencies. DRTA students were least likely to include intrusions (*M*= .08). KWL (*M* = .25) and PW (M = .31) were about equally likely to include them. NC students were most likely to include intrusions (*M* = .96) in their written retellings.

Summary of results for Research Question 3. Research question 3 explored the transition of children from a reliance on experience as a basis for knowledge to the use of text for knowledge acquisition. This incorporates not only what is known but also how it is organized to facilitate retrieval. The oral and written retelling provided the participants with opportunities to share what they remembered and valued as important about the text and topic. There were no statistically significant differences among Treatment groups on any free recall dependent variables, including subscales.

However, an examination of subscale means in both the oral and written retellings reveal some tendencies. The students that participated in the picture walk had a tendency to include fewer importations than all other groups in their oral retellings. In both the oral retelling and written retelling, the DRTA group was least likely to include intrusions. The control group was most likely to include intrusions.

Text Effects

The primary goal of this dissertation was to evaluate the effects of instructional method on students' reading comprehension and content acquisition. It was the objective to have Text be a fixed factor and be as consistent as possible. To achieve this goal, I chose texts within a narrow range of readability and organized with the same text structure. I also chose topics that were in the students' science curriculum. They had

studied the moon in first grade. Insects and weather were required units by the state and district in second grade. The students had completed the insect unit before the study. The students had not yet participated in the weather unit that addresses changes in water. Although spiders were not a part of the state science curriculum, I found texts about spiders that would address the state's general life science objectives. Thus, it was anticipated that text would not affect instructional method.

Analysis of variance for the main effects for Text, however, did reveal statistically significant differences on all dependent measures except the free recall and written recall variables (see Table 4.4). However, it remains unclear whether these differences were actually based on text differences or topic differences. In the VRT Pretest and Interest Register, we are clearly addressing topic. However, in Posttest assessments the distinction becomes blurred. Text and topic were confounded in this study. However, these effects are referred to as *Text* effects in this dissertation.

Based on pairwise contrasts between texts (see Table 4.5), students had statistically significant higher Pretest Total scores on words related to weather and changes in water than words related to spiders. On the VRT Posttest Total, students recognized significantly more water words than spider or moon words. However, they were able to categorize significantly more spider words than water words. They were able to web significantly more insect words than words from the other three topics. This could indicate that children were more familiar with insects than the other topics. It might also indicate that the information about insects (body parts, kinds of insects, places to find insects) was more concrete conceptually than knowledge surrounding the other topics (i.e., water in nature, forms of water, things you do to change water).

The students were also able to answer significantly more questions correctly (Cued Recall Total), with more correct details for their answers (Cued Recall Points) when asked about insects than the other three topics. Pairwise contrasts indicated that students scored significantly fewer points for their answers to questions about *Water:*

Liquid, Solid, Gas than *Looking at Bugs*, indicating that the physical science concepts in the former text were more challenging than the life science concepts in the latter text. This difference between life science and physical science was also reflected on Maze. Students scored significantly more points on *Spinning a Web* than they did on *Water: Liquid, Solid, Gas*.

Overall, the concepts presented in *Water: Liquid, Solid, Gas* seemed to be more challenging than the more familiar life science concepts presented in *Spinning a Web* and *Looking at Bugs*. The exception was the VRT, pure vocabulary recognition, where the children did recognize familiar vocabulary associated with the changes in water. The difficulty for all students with the two retelling tasks may have accounted for the lack of Text effects on these two measures.

Table 4.4

Analysis of Variance for Text Main Effects

Dependent Variable	F	^{2}	*P*
VRT Pretest Total	4.819**	.408	.010
VRT Posttest Total	20.708**	.747	.000
VRT Gain	5.209**	.427	.008
Web Number	7.132**	.505	.002
Web Percent	11.056**	.612	.000
Maze	4.361*	.384	.015
Cued Recall Total	5.140**	.423	.008
Cued Recall Points	5.045**	.419	.009
Free Recall Total	.726	.094	.548
Written Recall Total	.236	.033	.870

Note. *$p < .05$. **$p < .01$.

Table 4.5

Summary of Text Effects

Dependent Variable	Complex Contrasts		Pairwise Contrasts	
	Differences	*p*	Differences	p^a
VRT Pretest	NS	NS	Water > Spider	.043
Total				
VRT Posttest	NS	NS	Water > Spider	.002
Total			Water > Moon	.033
Web	Insects > All	.002	Spider > Water	.001
Percentage			Insects > Water	.004
Maze	NS	NS	Spider > Water	.039
Cued Recall	Insects > All	.008	Insects > Water	.014
Points				

Note. N.S. indicates that statistically significant different effects were not found for Treatments.

[a]Adjustment for multiple comparisons: Bonferroni

Interest Register

The students were asked to register their interest in each topic both before and after each intervention. There was no statistically significant effect for Treatment, F (3, 21) = .234, p = .872, or Text, F (1.537, 10.756) = 2.14, p = .170, w^2 = .234, on the preintervention interest register. In other words, there was not a significant difference in level of interest expressed for the topics spiders, the moon, changes in water, or insects. Postintervention registers also did not yield significant effects by Treatment, F (3, 21) = .577, p = .637 or Text, F (1.488, 10.414) = 1.429, p = .274, w^2 = .170. The Huynh-Feldt epsilon was applied to the degrees of freedom to account for violation of the sphericity assumption on the Text analyses.

Postintervention Interview

During the postintervention strategy interview the majority of students demonstrated strategic awareness in a variety of ways. The two major commonalities of the Treatment procedures were the important role of activation of prior knowledge and generation of predictions. For the most part, the interview provided evidence that the children in the study possessed declarative (what the strategies were), procedural (how to perform the strategies) and conditional (when and why the strategies are useful) knowledge following intervention. The interview evidence indicated that, at the end of each intervention cycle, all interviewed students had a strategic awareness of the utilization of activation of prior knowledge and prediction as tools in the reading process. Many of their answers were quite impressive, especially for children who have an instructional reading level that is considered "approaching-grade-level."

Results are reported question by question. Student responses are summarized. Since each child may have made multiple comments and some comments were repeated by more than one student, the total number of responses is not likely to equal the number of participants interviewed for each question.

What was I teaching you to do during all of our time together?

The most common student response (8/22) was that students learned to make predictions. Equally common (8/22) was that students learned to take a picture walk before they read the book. Another comment that reflected a commonality of all the procedures was that it is important to talk about what we read (4/22). Some children also learned that you should look through the book and think about what it's going to be about and what you know (4/22). Two children each responded that they learned to look at the cover or pictures before reading, learned to mumble read, and learned to sound out or fix words. Only one child said he forgot what he learned.

Why is it important to think about the information you already know before reading an information book?

Only the 16 participants from Cycle 2 answered this question, and I received a wide range of strategic answers. "If you know a little bit, then you can put it with what is in the books. You can put it together and learn more," was the gist of what I was told by five students. Another student mentioned that prior knowledge is what helps you make predictions. Two students mentioned that what you know could be in the book and help you to read the book. Another student stated that if you do not know about something, the book could help you learn about it. Five students provided information that was not related to the question.

Why is it important to make predictions?

This was the other question that was only asked of Cycle 2 participants. Eight of the sixteen children stated that making predictions is a good way to learn more from the book. Four children stated that making predictions helped them think about the book or think about what they knew during reading. Three children stated that making predictions before reading helped them to "know the words" and tell about the book. One child stated that predictions helped her decide whether or not she wanted to read a book.

*How would you make predictions about this book (*Weather Words and What They Mean by Gail Gibbons*)?*

The majority of children said they would look at the pictures to make a prediction (20/22). Equal numbers of children (9/22) mentioned using the title on the cover and subheadings. The popular use of subheadings was impressive to me because it was knowledge that was derived solely from our strategy work. Early lesson transcripts (week one and week two of each cycle) provide evidence that the students were not aware of subheadings as a key to text organization and their role in activating prior knowledge and generating predictions.

Two students said that they would use their questions about the topic to generate predictions. Despite eight students reporting that they had learned to take a picture walk,

only one child responded that he would use a picture walk to generate predictions. Although more students might take a picture walk before reading (as the next question indicates), the students seemed to be able to identify the specific behaviors required to generate useful predictions during the picture walk. Only one student responded that he was unable to make a prediction about the book because he had not read it.

*What would you do to get ready to read this book (*Weather Words and What They Mean by Gail Gibbons*)?*

Equal numbers of children (5/22) said they would look at the title or take a picture walk. Four students would they would think about weather. Three students each said they would look at the pictures or make predictions before they read the book. One child mentioned that she would use the headings, while another said he would ask questions about weather. Three children mentioned behaviors that indicated a preoccupation with successful decoding. Their responses ranged from overall monitoring and adjusting, "I would think about what to do if I get stuck," to the very specific, "I would get my mouth ready."

Which of the 4 ways of reading did you like the most?

Each intervention was found to be most enjoyable by some students (see Table 4.6). However, KWL was by far the most popular. The children reported enjoying the social aspects of the procedure. They felt that their knowledge was honored when it was recorded on the group chart. They also liked having a written record of our work together; it gave them a sense of accomplishment and agency. KWL was extremely motivational.

Although all students were at similar reading levels, some students were clearly more fluent than others and needed less "reading" assistance. These were the children that tended to select the control intervention as most enjoyable. They liked being able to read and work independently. Two of the students also mentioned that they enjoyed being able to draw a picture after reading as a way of reporting new learning. Although

social interaction was an important after-reading component of this procedure, no one mentioned that they liked sharing with others as they had for KWL.

Which of the 4 ways of reading helped you read most easily and learn the most?

The largest number of students (10/22) clearly felt that engaging in the picture walk procedure before reading helped them read the books more easily and learn the most from the books. Most children simply stated that a picture walk helped them predict what the book was about. However, several children alluded to the fact that talking about the books before reading helped them read the hard parts. For example, one child told me, "Talking about the pictures helped me know how to read the hard parts." They did not mention the specific vocabulary instruction. It seemed more that using the words from the text in our prereading conversation helped the children retrieve the words more easily when they came upon them in text.

The children who selected DRTA (4/22) all explicitly stated that they liked getting help right away, during reading, instead of waiting until the end of the book. One child said that stopping during reading helped her remember more, because when she waited until the end she forgot some of the book.

Table 4.6

Student Selections For Enjoyment and Efficacy

Intervention	Enjoyment	Efficacy
DRTA	4	5
KWL	9	5
PW	5	10
NC	4	2

Summary of Postintervention Intereview

Although the last two questions focused on preferences, the students' justifications for their selections were further verification of their ability to talk about the use of strategies during the reading process. These interviews provided evidence that novice approaching-grade-level readers can successfully engage in metacognitive talk,

talk about cognitive reading processes. The participants' responses demonstrated declarative, procedural, and conditional knowledge of the two comprehension strategies that were components of all three instructional interventions, activation of prior knowledge and the generation of predictions (Paris et al., 1983).

Although some of the responses did focus on lower level processes, these were distributed among all the children in the study. Each child made some metacognitive statements. No child made all word level statements, suggesting that all children gained some metacognitive insights.

Students also made clear discriminations between which interventions they liked and which interventions were most supportive. KWL was highly enjoyable and motivating to the largest number of children, while the picture walk received the most votes for providing the kind of support that made it easier to for them to read and remember the information.

CHAPTER 5

SUMMARY, DISCUSSION, LIMITATIONS, AND IMPLICATIONS

This chapter includes a summary of the findings, a discussion of the results organized by the three research questions, and a consideration of limitations and implications of the research.

Results Summary

Primary findings of the study, organized by the three research questions can be summarized as follows:

1. *Effect on fluency and reading comprehension:* The picture walk yielded the strongest effects in facilitating reading fluency. The DRTA also yielded significant effects in reading fluency and reading comprehension, as measured by the total number of correctly answered cued recall questions. The interviews also indicated that the majority of students (14/22) reported that the picture walk and DRTA helped them to read more fluently and remember more. The specific introduction of vocabulary words during the picture walk did not lead to significant vocabulary gains.
2. *Effect on acquisition of informational content:* DRTA students scored significantly more points than the control group and the KWL group on the Cued Recall. The points on cued recall reflect comprehensive and deep content knowledge. There were no differences by Treatment on ability to organize information on a concept web.

3. *Transition from experience-based to information-based representational system:* The free recall measures were used as indicators of reliance on experience versus reliance on information presented in the text. The considerable individual variation on these measures was evident by the violation of sphericity on both the oral recall and written recall measures. There were no significant differences between Treatment groups, although the means indicated some tendencies. DRTA students tended to include higher numbers of clauses in both oral and written retellings. The students that participated in the picture walk had a tendency to include fewer importations than all other groups in their oral retellings. In both the oral retelling and written retelling, the DRTA group was least likely to include intrusions. The control group was most likely to include intrusions.

Additional findings were important to this study. First, there were significant Text effects on most measures. In general, the children possessed more knowledge about life science topics (spiders, insects) than physical science (water changing form). Second, despite these differences in difficulty, student reports on the Interest Register did not show significant differences in interest by topic. Third, the interviews provided evidence that the children in the study possessed declarative, procedural, and conditional knowledge of the strategic processes that are the foundation for the three interventions, that is, activation of prior knowledge and prediction. However, the likelihood of the participants putting that knowledge to effective use seemed to be dependent upon the amount of teacher scaffolding provided by the instructional procedure.

Discussion

Research Question 1: What are the effects of the instructional procedures on fluency and reading comprehension?

Both the picture walk and DRTA yielded significant effects on the reading measures. The picture walk was slightly more effective than the DRTA at promoting fluency, as indicated by the timed maze task. The DRTA was slightly more effective than

the picture walk in facilitating the ability to respond correctly on the cued recall task. Both procedures were more effective than KWL or the control procedures in facilitating reading competencies.

As far as I can determine, this is the first research investigating the picture walk. However, the results of the present study do substantiate the claims of Clay (1991) and Fountas and Pinnell (1996) that a conversational social interaction around the text with the introduction of difficult vocabulary and text structure does facilitate fluent, accurate reading. The results of this study are also consistent with earlier studies that provided evidence of the success of DRTA on general comprehension measures, including answering comprehension questions and error detection (Baumann, et al., 1992; Reutzel & Hollingsworth, 1991).

The page-by-page walk-through of the text either before reading, as in the picture walk, or during reading, as in DRTA, seemed to encourage a close reading that enabled students to reflect micro-level comprehension measured by the maze task. Although all choices on the multiple-choice maze task were related to the topic, students in the DRTA and picture walk groups were more likely to complete the sentences with the most sensible word choice.

The cued recall tested a broader definition of comprehension. Both the DRTA and picture walk were significantly more successful than KWL and the control group in answering questions about the text correctly. This also may be the result of the close reading facilitated by those two instructional procedures. Although the students in all four groups were monitored during mumble reading to be sure that they could read the text and were reading the text, the conversations during the picture walk and DRTA tended to guide the children's attention to the important ideas and assist with difficult text concepts in a way that was not provided for in KWL or the control intervention.

In a study on first grade read-alouds of informational text, Smolkin and Donovan (2001) address the power of teacher or parent scaffolding, modeling, and direct

instruction. Donovan, as the teacher, uses these three teacher moves to increase her students' understanding of the concepts in the informational texts during the read-alouds. Smolkin and Donovan found these moves to be essential to the meaning-making process due to the density and complexity of ideas presented in informational texts. Although the young children enjoyed the informational texts, teacher moves and social interaction (often initiated by the children) were essential to understanding the read-aloud. Although in my study the children demonstrated an ability to read the texts, the ability to use prior knowledge and predictions to promote comprehension seemed to require these three teacher moves in direct relationship to the text.

All intervention groups made vocabulary gains. This demonstrates that the use of informational texts with novice readers does extend their vocabularies. It seemed likely that the picture walk group would make greater vocabulary gains than the others because they were explicitly taught two or four words in each text that were on the VRT. However, there were no statistically significant Treatment effects. Thus, although, the Treatments did not differ significantly in their influence on the VRT, there were Text differences and individual differences.

Although written responses to text have been found by some researchers to enhance reading comprehension (Cantrell et al., 2000; Saunders & Goldenberg, 1999; Taylor, 2002), this was not the case in this study. Students in the KWL group wrote what they learned on their personal KWL charts and the control group wrote a few things they learned or found interesting after reading each day. Writing was always shared with the group. In this study, the Treatments that incorporated writing did not yield significantly greater effects on reading measures.

Research Question 2: What are the effects of the instructional procedures on the acquisition of informational content?

The KWL strategy was originally developed by Ogle (1986) to enable teachers to access the prior knowledge of students and to help students develop their own purposes for reading informational text. A study by Cantrell et al. (2000) provided evidence that

KWL led middle school students to both broader and deeper knowledge of content material. In the current study, KWL students had the opportunity to broadly discuss their topic knowledge and related experiences, to see it written on a group KWL chart, or to independently write about experiences or new learning on a personal KWL chart. They also organized this knowledge using the same categories and format that would later be used to organize the tested vocabulary. Surprisingly, these seeming advantages for KWL did not yield superior Treatment effects on measures of content knowledge, which consisted of the Vocabulary Web, implicit cued recall items, or points on cued recall items for completeness and justification logic. Two other advantages for KWL, the slightly longer lessons and the students' reported enthusiasm for the procedure, did not contribute to making it the most effective means of science content acquisition. In fact, DRTA yielded the strongest effects on Cued Recall Points. This supports and extends the earlier research that indicated that DRTA is effective in promoting inferential and evaluative responses to text (Davidson, 1970; Davidson & Wilkerson, 1988; Lia, 1988; Petre, 1969; Wilkerson, 1984).

Vocabulary Web. There were Text, but not Treatment effects on the web measures. Children found it easiest to categorize the vocabulary related to insects and spiders. Both the vocabulary words and the organizational headings related to familiar concepts, such as body parts, actions, and surroundings (see Appendix C and D). Although the vocabulary words related to water were easiest to read, they were significantly more difficult to sort conceptually. It was difficult for the children to distinguish between water that could be a form of weather, a scientific term for a form of water, or actions that caused water to change form. The students found it somewhat easier to sort the moon words, but these concepts were more difficult than the life science concepts. Despite, the direct instruction and practice provided to the KWL group in placing their ideas in a similar web, no significant Treatment effect resulted.

The concept web is a fairly simple, concrete means of organizing words or ideas. The difficulty that the children had with this task provided some evidence that they were unaccustomed to organizing information by category, heading, or main idea. Classroom observations and discussions with classroom teachers confirmed that their instruction rarely incorporated webs or other graphic organizers. According to the theoretical framework of this paper, the ability to organize and reorganize information from text in a way that is meaningful, retrievable, and supports understanding is an important benchmark in reading comprehension and the transition from the experiential, narrative culture to the theoretical, text-based culture (Donald, 1991; Kintsch, 1996; Nelson, 1996a). This task was administered as a test. However, the evidence indicates that this group of novice readers may have benefited from performing this kind of organizational task in a setting that provided more support in the form of modeling (teacher demonstration with varying levels of student participation) or scaffolding (teacher or peer assistance or collaboration).

Cued Recall Points. The hunch that KWL students would outperform DRTA and PW students was not supported by inferential statistical tests for Cued Recall Points. In fact, the opposite was true, (i.e., KWL < DRTA + PW). The instructional procedures in DRTA have several components that seemed to lead students to give the most complete answers with the most logical justifications. Stauffer (1969) states that DRTA interactions teach students "to examine, to hypothesize, to find proof, to suspend judgment, and to make decisions" (p. 57). The practice provided during reading in actively justifying and verifying predictions, integrating text-based information with prior knowledge, and having an immediate opportunity to discuss new concepts seemed to help children when they were called on to respond to questions about the text. They were able to provide more information and more sensible justifications for their answers, even if they were not completely correct. For example, when a DRTA student was asked why the female spider might be likely to be larger than the male, he responded, "They have to do

a lot more stuff, like protect the eggs." Other DRTA students reported that the female's size was associated with motherhood. Two KWL students responded that female spiders ate more, one responding that "They just sit there all day." Another KWL student responded that "The females are the dads and the males are the moms."

Although DRTA was the most longstanding intervention investigated, it has several components that recent studies have associated with higher levels of achievement (Beck & McKeown, 2001; Gaskins, Anderson, Pressley, Cunnicelli & Satlow, 1993; Gaskins et al., 1994; Guthrie & Cox, 1998; NRP, 2000; Palincsar, 1986; Palincsar, Magnusson, Collins, & Cutter, 2001; Snow, 2002; Taylor, 2002). DRTA procedures tended to demand higher levels of thinking by the students than the other three procedures by requiring justification and verification of predictions (NRP, 2000; Palincsar et al., 2001; Snow, 2002; Taylor, 2001). Both the students and the teacher initiated the conversations (Gaskins et al., 1993, 1994; Guthrie & Cox, 1998; Palincsar, 1986; Palincsar et al., 2001). Tangential information rarely entered the conversations, because the conversations occurred immediately before or after reading a section of text (Beck & McKeown, 2001). The immediate interaction around the text also helped promote consistent engagement, clarify confusions, and provide a vehicle for creating an accurate representation of text as well as assimilation with prior knowledge (Gaskins et al., 1993, 1994; Guthrie & Cox, 1998; Palincsar, 1986; Palincsar et al., 2001).

DRTA also shared commonalities with the instructional model used by Donovan in her read-alouds of informational texts (Smolkin & Donovan, 2001). Modeling, scaffolding, and direct instruction were interwoven in the conversations about the text. These teacher moves seem to have helped, perhaps even been necessary, for these novice readers to gain or assimilate the content knowledge contained in the informational texts they read.

Research Question 3: How does each set of instructional procedures facilitate the transition from an experience-based representational system to an information-based representational system?

It was anticipated that the KWL group and the control group would rely more heavily on experience than on text in both the oral and written free recall. As a result, it was anticipated that their retellings would contain more importations and intrusions. It was hypothesized that the picture walk group would recall more text-based information, since their strategy instruction adhered closely to the text. There were not significant Treatment effects on any of the free recall variables. DRTA students tended to include higher numbers of clauses in both oral and written retellings. The students that participated in the picture walk had a tendency to include fewer importations than all other groups in their oral retellings. In both the oral retelling and written retelling, the DRTA group was least likely to include intrusions. The control group was most likely to include intrusions.

The violation of sphericity assumption reflected the wide range of individual differences on these two open-ended tasks. These differences were seen across a broad spectrum of abilities. First and most striking were the individual differences in the ability to recall information in the Day 3 text, or all three of the texts collectively. Despite the prompt, "Tell me everything you can remember from the book and what it made you think of," the retellings were generally quite sparse, particularly considering that the children had been reading about the same topic for three days. As indicated from the coding sheets, much of what was recalled was information from the pictures of the text. Little information from the books read on Day 1 and Day 2 was included or integrated in the retellings.

Similar to the Vocabulary Web, the lack of cognitive organization seemed to be an inhibitory factor in the ability to create a retelling. All oral retellings were placed on a coding sheet to indicate the sequence of the retelling, as well as the hierarchy of ideas. Occasionally a student would retell the ideas in an order that was similar to the sequence

of presentation in the text. A few students consistently used one or two main ideas from the text to organize their retelling. B.'s retelling of *Spinning a Web* demonstrates the effective use of organization as an aid to retrieval. B. had recieived the DRTA treatment, but her retellings were consistently well-organized. However, I suspect that the DRTA treatment and the life science topic both played a part in making this her most detailed retelling.

> How the spider lays eggs…The male sees the female spider. They get married and the female has babies. She has an egg sac. It's like a ball with eggs in it. Little baby spiders are in it. After a few days the baby spiders go out to be on their own. Then they find their own houses. They might be a boy or girl.
>
> [There are] Different kinds of spiders like: wolf spider, tarantula, trap-door spider, blue and black back spider.
>
> The widow eats the husband. That's why they call her a widow.
>
> Some spiders can swim. Some spiders live in water. Some spiders eat fish and other insects, and spiders, and birds.
>
> Some spiders live…The wolf spider lives in a hole. The black widow lives where it is dark. Some spiders live underground. Some spiders live in a garden. Some spiders live in a house.

However, most consistently, ideas were told in a random fashion as the retelling below. Compare the organization of B.'s retelling to the one below. R. had received the KWL treatment. However, as stated earlier, the retellings varied more organizationally by individual than treatment.

> Lots of spiders spin webs. Some eat fish. The trapdoor spider has a tunnel. Spiders eat insects. The web helps catch insects. Some spiders have eight legs and eight eyes. The sheet web…Some spiders can jump. The orb web…Some spiders can swim.

As stated in the discussion surrounding the students' difficulty with the Vocabulary Web, an important key to success in dealing with information is the ability to organize the information, so that retrieval is possible. This need to develop a system of organization is one of the major differences between the narrative culture and theoretic culture (Donald, 1991). In the narrative culture there is typically a causal or sequential organization that propels the memory and retelling. Some non-narrative genres, such as life cycle, do possess a sequential order that aids the memory, but more often, exposition is organized hierarchically, like the texts chosen for this study. In order to maximize what novice readers can remember from informational text more instruction and practice may be needed on how to use main ideas or superordinate concepts, including headings in texts, as an aid to remember and retrieve information. Although, the comprehension strategies of activating prior knowledge and predicting text content and events taught in all the treatment interventions may facilitate reading competencies and content acquisition, to truly be able to retrieve the knowledge and apply it in flexible, independent ways additional comprehension strategies, such as summarization may need to be added to the strategy repertoire.

Research Conclusions

The results of this study lead to four conclusions:

1. Instruction of the strategies activation of prior knowledge and prediction is efficacious when supplemented with teacher support. Novice readers demonstrated declarative, procedural, and conditional knowledge of the strategies (Duffy, 1993; Paris, Lipson, &. Wixson, 1983). However, they tended not to implement the strategies without the teacher scaffolding provided in DRTA and to a lesser degree, picture walk.

2. DRTA was powerful in promoting fluency, reading comprehension, and content acquisition.
3. The picture walk promoted fluency.
4. KWL was motivational, but did not facilitate reading comprehension or content acquisition.

Limitations

When considering the results and conclusions of this study, one must keep in mind the limitations of the study. First, to enhance experimental control, I conducted all interventions. As a result, it was not a blind study. It remains to be determined whether similar results would be replicated by classroom teachers, who are unaware of the research questions.

Second, there were several inconsistencies that may have influenced the results. The students were grouped by classroom, not randomly. Each classroom, even within a school, operated very differently. Although all classrooms conducted small group reading instruction, the procedures and dynamics within that structure were each unique. Some children were more or less familiar with picture walk procedures, others had never heard of a picture walk. However, even the picture walks were not consistent from classroom to classroom. Occasionally, the guidelines from Clay (1991) and Fountas and Pinnell (1996) were adhered to, but more often they were not. (My group schedule was developed to accommodate each teacher's schedule. As a result, I was at each school for most of the day. Between group sessions, I assisted in the classes.)

Most classrooms encouraged process writing with an emphasis on ideas and fluency. However, several students were preoccupied with mechanics, which may have contributed to some of the inconsistency on the written retellings. As stated earlier, the administration of the written retelling was also inconsistent from student to student. Students did the written retelling independently after their Vocabulary Web. I was conducting the individual oral retellings and cued recall while the students did their

written retelling. This resulted in variations in the amount of time and focus allocated to the activity.

Finally, other measurement limitations need to be considered when interpreting results. In particular, the VRT and Vocabulary Web were new tasks. More research is needed to evaluate reliability, validity, and scoring procedures.

In spite of the limitations, the present study provides insights into the efficacy of three instructional procedures with a limited research base. Despite the previous research base supporting DRTA (Baumann, et al., 1992; Draheim, 1984; Reutzel & Fawson, 1991; Reutzel & Hollingsworth, 1992; Stauffer et al., 1976), it had not been tested with novice readers engaging with informational text. As a result of the current study, we have increased insights about the strengths and weaknesses of each of the instructional procedures when used with novice readers reading informational texts.

Implications

Implications for Instruction and Professional Development

The focus of the investigation was on the ways that differing procedures for the activation of prior knowledge and the generations of predictions within each instructional model influenced the construction of meaning by novice readers. The series of measures and analyses of results did reveal specific ways that these instructional procedures appear to influence student reading outcomes and content acquisition. These results have implications for classroom instruction and professional development.

The results of this study and the implications are limited to novice readers, readers that are still learning about the alphabetic and orthographic system. There may be differences in outcome and implications for readers in later developmental stages. For example, KWL could be more effective with older children who do not need the reading support provided by the DRTA and picture walk.

These children were approaching-grade-level readers with limited experiences reading informational text. Most classroom experiences were centered around narrative text. None of the classrooms incorporated an integrated, theme approach to instruction.

The children also came from low-income homes that would not be likely to have access to a wide variety of texts (Neumann & Celano, 2001). The outcomes and implications could be different for children with prior experience with informational texts, either in their classrooms or homes.

This study was designed to replicate small group reading instruction conducted in many primary classrooms. Text effects were representative of prior knowledge differences that could be expected to be found in most groups of children. Those differences always need to be considered. The support provided by DRTA and the picture walk was able to compensate for those differences, and the children in those groups were able to be more successful on the maze task and cued recall measures than children in the other groups in spite of text differences.

Instruction. This research provides insights that enable teachers to be more precise in selecting instruction that is matched to particular instructional goals for novice readers engaging with informational text. If fluency is the primary goal, then support exists for the selection of either a picture walk or DRTA. Although the picture walk was found to promote the highest levels of fluency, the teacher might consider topic knowledge before making an instructional decision. For texts that are more difficult conceptually, the teacher may want to choose the DRTA because it seems to provide slightly more support.

For informational texts, teachers may need to provide more highly scaffolded picture walks than required for narrative texts. For example, I always engaged the students in the study in a page-by-page picture walk, discussing the text structure, the students' prior knowledge, and generating predictions based on that information. Topic headings were addressed, when available. I would frequently say to the children, "What words would you use to describe what you see happening on this page?" or "What do you think the writer is going to be teaching us about on this page?" to generate a discussion of the pages. If I had been reading narratives with readers at this instructional level, the

students would have been expected to be more independent in initiating the picture walk conversation.

When reading informational texts, the line between reading comprehension and content acquisition can become blurred. The primary goal of reading informational texts is to make meaning of the information contained in the text and to assimilate it with prior knowledge. This study determined that DRTA was the most effective teaching procedure of the three evaluated for accomplishing those aims. The probing discussions within short sections of text seemed to be the components of DRTA that facilitated deep and integrated understandings of even the most difficult topics. In a small group context, these discussions foster continuous student engagement and provide a scaffold for self-monitoring. Children have an opportunity to discuss their understanding, clarify confusions, and relate text information to prior knowledge and predictions. If the student discussion does not clarify misconceptions, then the teacher is able to step in to provide additional information. If the teacher's primary goals for reading the leveled informational text are for students to comprehend and acquire accurate science knowledge, then this study supports the use of the DRTA.

Motivation cannot be ignored as an important component of reading instruction (Guthrie, 1998; Guthrie, Schafer, Wang, & Afflerbach, 1995; Guthrie & Wigfield, 2002). Based on the student interviews and the lesson transcripts reflecting enthusiastic conversations, we can conclude that teachers striving for a means of motivating students could do so successfully utilizing the KWL procedures. This supports prior research with older students and the claims of the procedure's originator (Bryan, 1998; Carr & Ogle, 1987; McAllister, 1994; Shelley et al., 1997). For novice readers, KWL might be used in conjunction with either DRTA or the picture walk to support their reading and content acquisition.

Professional Development. As stated in the introduction to this dissertation, until recently, comprehension instruction has not been emphasized in the primary grades.

However, new research is making clear that what we do in the earliest grades has a clear impact on later reading success (Snow, Burns & Griffin, 1998). As a result, both teachers and researchers are looking for ways to enhance comprehension instruction in the primary grades. Strategy instruction, although found to be effective in a few studies, is difficult for teachers to perform successfully and difficult to integrate into an existing program (Brown & Coy-Ogan, 1993; El-Dinary & Schuder, 1993; Gaskins et al., 1993). On the other hand, there is evidence suggesting that DRTA is a procedure that requires less professional development than some of the more complex strategy repertoire programs (Duffy, 1993; Stieglitz & Oehlkers, 1989). DRTA could act as a bridge between the strategy-based teacher read-alouds (Beck & McKeown, 2001; Palincsar, 1991; Smolkin & Donovan, 2001) and the more complex strategy repertoire programs that occur during student reading, such as reciprocal teaching (Palincsar & Brown, 1984) and transactional strategy instruction (Brown & Coy-Ogan, 1993; Brown, Pressley, VanMeter & Schuder, 1995; Schuder, 1993).

The recent work of Smolkin and Donovan looks at the various aspects of the development of narrative and informational text comprehension from kindergarten to sixth grade (Donovan, 2001; Smolkin & Donovan, 2001). That body of work focuses on the role of teacher read-alouds in facilitating comprehension development of multiple genres in the primary grades and student writing as a vehicle to display the development throughout the grades. If we look at that body of work, the results of this dissertation and the prior work on reciprocal teaching and transactional strategy instructional, we begin to see the potential for teachers to develop a continuum of research-based strategy instruction within a school-wide curriculum.

Implications for Future Research

Although the work described in the last section does have a research base in literacy specific domains, such as writing, reading, or listening, or in particular grade levels, research is needed to determine the effects of a comprehensive comprehension program. By comprehensive, I mean a program that incorporates in a cohesive manner

the instruction of listening and reading comprehension using narrative and non-narrative texts beginning with the youngest students. A comprehensive program would also incorporate opportunities for students to respond to multiple genres in speaking and writing. To determine progress and development in these forms of comprehension, sensitive measures are required. More research is needed in this area. Future studies also must explore ways to make teachers comfortable and competent in helping students make the shift from reliance on an experiential model to effectively using various forms of text to acquire, assimilate, and retrieve information.

In order for students to make the shift from the narrative, experiential culture to the theoretic culture, they must be able to organize and retrieve the information they have acquired. This inability was a handicap for the novice readers in the current study. The use of informational texts in the primary grade is a fairly recent innovation. Until now, there was little call for young children to develop summarization skills or knowledge of expository text structures. However, with the introduction of informational texts the demands on young readers have changed. As researchers, we need to explore developmentally appropriate ways for novice readers to organize the content knowledge that is presented in their informational texts. It is only in this way that they will be able to assimilate the information, retrieve it, and apply it, thus becoming active participants in the theoretic culture, our world of information.

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APPENDIX A

PARENT CONSENT

Parent Consent

I agree to allow my child _____ to take part in a research study titled "The Effects of Three Instructional Methods on the Reading Comprehension and Content Acquisition of Novice Readers." This research is being conducted by Katherine Stahl (Department of Reading Education, UGA, 217-244-9698), under the direction of James Baumann (Department of Reading Education, UGA, 706-262-3811). I do not have to allow my child to take part in this project; my child can stop taking part at any time without giving any reason, and without penalty. I can ask to have information related to my child returned to me, removed from the research records, or destroyed.

Little is known about the best way to introduce second graders to informational books. The purpose of the study is to learn how different types of instruction result in different reading outcomes. As part of the study, my child will read informational books about science topics. My child will engage in reading assessment tasks to determine the instructional reading level, tasks to measure understanding of the informational texts, and after the project my child will participate in an interview to discuss the different types of reading. My child will receive additional reading instruction for 30 minutes, three times a week for a month. Once a week my child will spend an additional 20 minutes demonstrating his or her understanding of the texts in reading and writing tasks. This instruction will be conducted by a trained reading specialist/researcher in a quiet place at the school at a time selected by the classroom teacher, so that other instruction will not be missed. My child may benefit from the small group instruction in various aspects of reading and science knowledge. I may observe my child at any time during his or her reading group.

My child will be praised for his or her performance. No discomforts, risks,or stresses are expected. The only people who will see the results of my child's testing are the researchers unless it is required by law. The researchers are not interested in my child's specific performance, but in figuring out how children learn to read. The researcher will answer any further questions about the research, now or during the course of the project, and can be reached by telephone at: 217-244-9698 or e-mail at kaystahl@uiuc.edu.
My signature below indicates that the researchers have answered all of my questions to my satisfaction and I agree to allow my child to participate. **I have been given a copy of this form**.
Circle one and sign below.

I DO give my consent OR I DO NOT give my consent.
As part of the study the researcher will audio-tape lessons. These lessons will be transcribed for the purpose of examining the instruction. They will not be played in public, nor will the transcripts be published in a form in which my child could be recognized.

I DO give my consent OR I DO NOT give my consent.

Signature of Researcher. Date

_____

Signature of Parent or Guardian Date

For questions or problems about your rights please call or write: Chris A. Joseph, Ph.D., Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.

APPENDIX B

ASSENT SCRIPT

ASSENT SCRIPT

The following script will be read aloud and presented to the second grade potential participants after parent consent forms have been signed and returned to the classroom teacher. I will read this to the children individually.

Hi! I am here from the university to do a project with the second graders. I will be working with four small groups of second graders during the next four weeks. I am trying to learn more about how boys and girls learn about things like plants, animals, and the earth from reading little books. If you do this project, you will read with me in a small group for about 30 minutes, 3 days each week. We will be reading little books about spiders, insects, the moon, and water using four different ways of reading. One day a week, we will be writing about what we learned from the little books and answering questions about the books. At the end of the project, I will ask you for your thoughts and feelings about the different ways of reading.

Your can decide whether or not you would like to participate in this project. If you want to stop doing this project at any time, you can stop. I will be tape recording our work together, but the tapes and all the other work we do together will be kept private. This project will not go on your school record, count toward your report card or cause you to miss special, fun times with your class.

If you have any questions, you can call Kay Stahl at 244- 9698. You can also talk to your teacher or ask me questions when I am in your classroom.

_____

Student Signature Date

APPENDIX C1

VRT-SPIDERS

VRT-SPIDERS

This week we will be reading books about spiders. Below you see a list of words. Put a circle around the words that you are able to read and are sure have something to do with spiders. Do not guess, because wrong answers will lower your score.

swim	sheet web	egg sac
arachnid	buzz	tunnels
triangle web	black widow	spiderling
sand	thread	bones
blue-back spider	spin	funnel web
silk	acorn	wolf spider
hide	spinneret	orb web
trees	tarantula	sea
	hop	

_____ I am **very interested** in reading and learning about spiders.
____ I am **interested** in reading and learning about spiders.
____ I am **not interested** in reading and learning about spiders.

APPENDIX C2

VRT-MOON

VRT-MOON

This week we will be reading books about the moon. Below you see a list of words. Put a circle around the words that you are able to read and are sure have something to do with the moon. Do not guess, because wrong answers will lower your score.

Earth	rock	orbit
volcano	phases	craters
sunlight	aliens	astronauts
waxing	dark	planet
new	silent	flowers
fire	full	round
sky	red	valleys
mountains	oceans	waning
	footprints	

_____ I am **very interested** in reading and learning about the moon.
____ I am **interested** in reading and learning about the moon.
_____ I am **not interested** in reading and learning about the moon.

APPENDIX C3

VRT-WATER

VRT-WATER

This week we will be reading books about the ways that water can change. Below you see a list of words. Put a circle around the words that you are able to read and are sure have something to do with the ways that water can change. Do not guess, because wrong answers will lower your score.

hat	shape	molecules
ice	gas	freeze
steam	droplets	moss
fog	barn	rain
liquid	hail	map
mist	solid	water vapor
plate	snow	west
weather	cows	frozen
	clouds	

_____ I am **very interested** in reading and learning about changes in water.
____ I am **interested** in reading and learning about changes in water.
_____ I am **not interested** in reading and learning about changes in water.

APPENDIX C4

VRT-INSECTS

VRT-INSECTS

This week we read books about insects. Below you see a list of words. Put a circle around the words that you are able to read and are sure have something to do with insects. Do not guess, because wrong answers will lower your score.

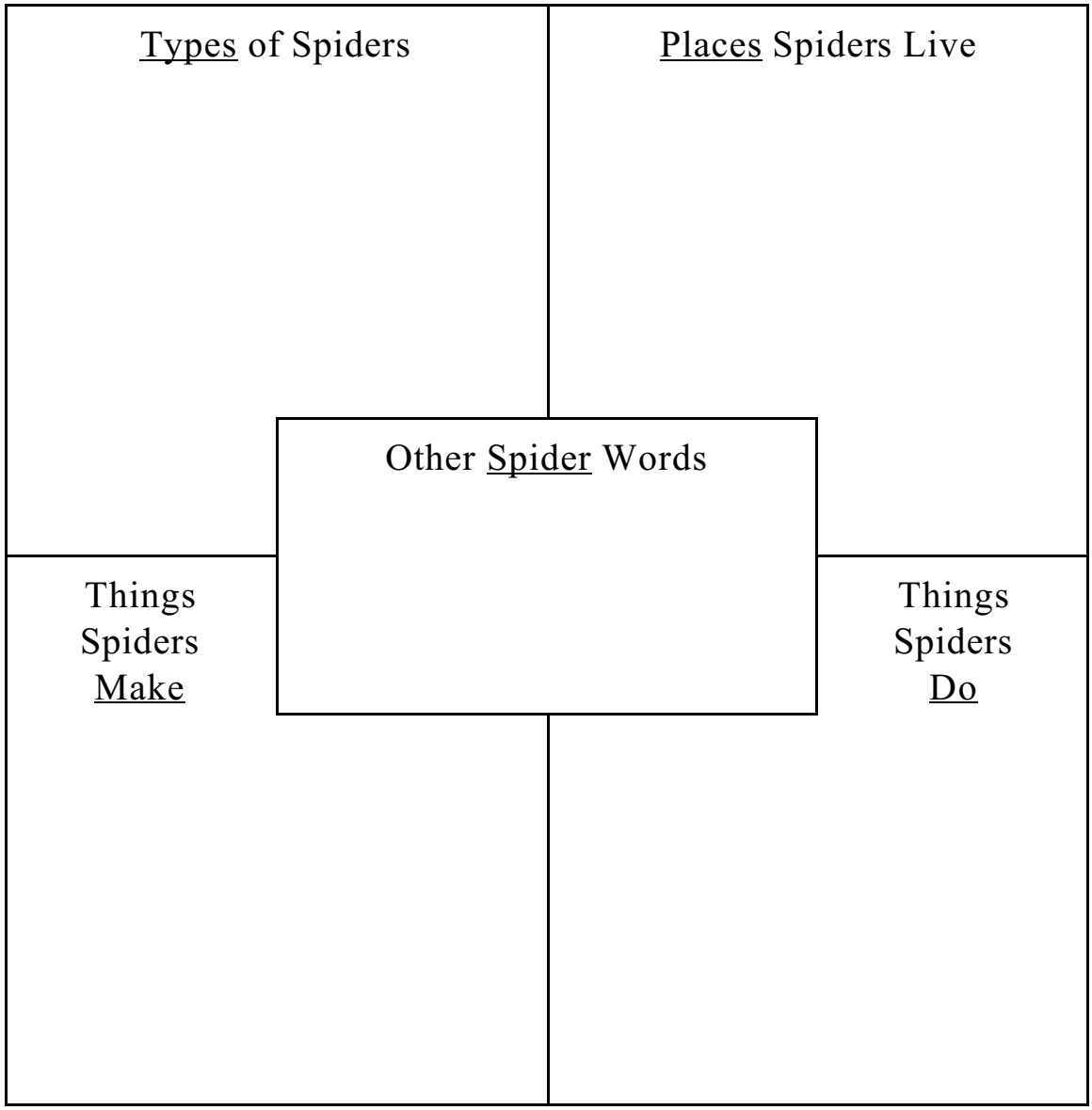
thorax	worm	ant
ponds	feelers	hair
abdomen	leg	hatch
teeth	antenna	cockroach
mosquito	mouthpart	apples
swamps	snail	wing
shell	beetle	skeleton
colony	backyard	fish
	bugs	

_____ I am **very interested** in reading and learning about insects.
____ I am **interested** in reading and learning about insects.
____I am **not interested** in reading and learning about insects.

APPENDIX D1

WEB: SPIDERS

WEB: SPIDERS


Types of Spiders
Places Spiders Live
Other Spider Words
Things Spiders Make
Things Spiders Do

APPENDIX D2

WEB: MOON

WEB: MOON

By _____

The Moon	Words the describe the moon
Words about visitors to the moon	Words about the moon's changes

APPENDIX D3

WEB: WATER

WEB: WATER

Water in Nature or Outside	Words that Describe Water
Forms of Water (Science Words)	Things that can be done to change water

APPENDIX D4

WEB: INSECTS

WEB: INSECTS

Insects By_____	Insects' Body Parts
Places to find insects__	Kinds of insects

APPENDIX E1

MAZE: SPIDERS

MAZE: SPIDERS

Spiders are strange-looking creatures. A spider isn't an insect. It's an arachnid. It has two body parts. Some spiders have eight eyes. All spiders have _____ legs.

a. no b. two c. six d. eight

Some spiders live in holes or burrows. Some spiders live in the water. And some spiders live in tunnels like this trap-door spider. At the top of his tunnel, there is a dirt _____.

a. floor b. ceiling c. trapdoor d. room

Some spiders can jump. Some spiders creep. Some spiders can _____.

a. fly b. hop c. gallop d. swim

Lots of spiders spin webs. They make their webs from _____.

a. silk b. blood c. cotton d. dirt

It comes from inside their bodies. You can find webs in lots of places. Spiders spin many different kinds of _____.

a. legs b. eyes c. insects d. webs

The spider uses its web to catch insects for _____.

a. fun b. food c. thread d. birds

The male spider is a lot _____ than the female.

a. meaner b. larger c. smaller d. brighter

He visits the female's web to mate. The baby spiders will grow in the _____.

a. egg sac b. web c. silk d. thread

After a few days the baby spiders are ready to leave the egg sac. Baby spiders are called _____.

a. insects b. tarantulas c. spinnerets d. spiderlings

Soon the growing spiderlings are ready to make homes of their own. They swing from their own silky _____.

a. leaves b. mother c. threads d. black widow

APPENDIX E2

MAZE: MOON

MAZE: MOON

The moon is your nearest neighbor in the sky. The moon doesn't shine with its own light. It is a big, old _____.

a. sun b. milky way c. rock d. comet

The light you see is the sun shining on the moon.
The sun shines on the earth and it shines on the moon, too. When the sun shines on a whole side of the moon, the moon is called a _____.

a. full moon b. new moon c. waxing moon d. waning moon

Sometimes the moon looks as if it changes shape. The moon doesn't really _____.

a. move b. orbit c. travel d. change

It is really a big, round rock. What changes is how much of the sunny side you can see. The moon is not like the earth. There are no _____ .

a. mountains b. trees c. valleys d. rocks

There are no rivers or lakes. There are no clouds. There is no wind or snow. There is no _____.

a. sunlight b. weather c. sky d. ground

Where the sun hits the moon, it is very _____.

a. rocky b. dark c. hot d. cold

Where it is dark, the moon is very _____.

a. rocky b. cloudy c. hot d. cold

People landed on the moon in 1969. They took moon rocks back with them in their _____.

a. spaceship b. jet c. airplane d. rocket

The first visitors left a _____.

a. spacesuit b. helmet c. flag d. flower

They also left behind their _____.

a. footprints b. air c. shoes d. astronaut

APPENDIX E3

MAZE: WATER

MAZE: WATER

Water is everywhere. It falls from the sky as rain. You can pour water.
Water is a _____.
a. solid b. liquid c. gas d. molecule

Water is made of tiny parts. The tiny parts are called _____.
a. molecules b. water vapor c. ice d. steam

These tiny parts stick together to make droplets.
When water gets cold enough, it freezes. Then it is called ice. Ice is a _____.
a. solid b. liquid c. gas d. molecule

You can't pour a solid.
When water turns to ice it takes up more space than when it was a liquid. It seems to get _____.
a. smaller b. bigger c. cleaner d. shiny

If you leave an ice cube on a plate in a warm room, it will _____.
a. freeze b. spill c. drop d. melt

Then the water seems to disappear. The water molecules drift into the air. The water becomes _____.
a. drops b. ice c. water vapor d. frozen

Now it is a _____.
a. solid b. liquid c. gas d. molecule

Cool air turns water vapor into little _____.
a. snowflakes b. rain c. droplets d. molecules

This might look like the mist from your breath or fog.
Cold air in the sky also forms _____.
a. ice b. clouds c. stars d. rainbows

As more little droplets join together, the clouds get bigger and heavier until they fall from the sky as _____.
a. rain b. stars c. molecules d. gas

APPENDIX E4

MAZE: INSECTS

MAZE: INSECTS

Bugs have been on earth a lot longer than we have. Bugs were on Earth even before _____.
a. plants b. spiders c. trees d. dinosaurs

What makes a bug a bug? All adult insects have a body with three parts. Every insect has a head, abdomen, and _____.
a. wings b. thorax c. feelers d. antennas

Every insect must have six legs. They also must have a hard outer _____.
a. skeleton b. leg c. ring d. wing

Adult insects also have a pair of _____.
a. eyes b. antennas c. legs d. eggs

They may have wings. But to be an insect, it has to have three body parts, six legs, and a hard outer skeleton that is like armor.

Insects begin their lives as _____.
a. worms b. ants c. eggs d. butterflies

When they hatch, some look like tiny copies of their parents. As the little insect grows, it gets too big for its outer skeleton. So it _____ the old skin.
a. sheds b. flies c. hatches d. grows

Then a new skin grows.
Other baby insects don't look at all like their _____.
a. eggs b. caterpillars c. skin d. parents

When a butterfly egg hatches, out comes a _____.
a. butterfly b. worm c. caterpillar d. grasshopper

The caterpillar wraps itself up in a sack. Inside, it becomes a _____.
a. grasshopper b. butterfly c. fly d. leaf

Then it opens the sack and flies away.
Be careful when you hunt for bugs. Some bugs bite or _____.
a. fly b. eat d. hatch d. sting

APPENDIX F1

RETELLING CODE SHEET: SPIDERS

RETELLING CODE SHEET: SPIDERS

Spinning A Web						
	#	MI	HiS	Sub	Sub	
Spiders are strange-looking creatures!			*(L)			
(An example is a) golden orb spider			T	*		PC
A spider isn't an insect.		*				
It's an arachnid.		*				
It has 2 body parts.				*L		
It has 8 legs.				*L		
Some spiders even have 8 eyes. (P)				*L		
Ex=tarantula			T			PC
Ex=wolf spider			T			PC
Some spiders live in holes. (P)		Live	*			
Ex=wolf spider			T	*		PC
Or (some spiders live in) burrows. (P)		Live	*			
Ex=wolf spider			T	*		PC
Some spiders live in the water. (p)		Live	*			
Ex=water spider			T	*		PC
And some spiders live in tunnels		Live	*			
Like this trap-door spider				*		
Can you see the trapdoor at the top? (P)						
Example=trap-door spider	R		T			PC
Some spiders can jump. (P)		(do)	*			
Ex=jumping spider			T	*		PC
And some can swim.		(do)	*			
Ex=fishing spider			T	*		PC
Lots of spiders spin webs.		*				
They make their webs			*			
From silk				*		
That comes from inside their bodies. (P)					*	
Ex=black widow spider			T		*5	PC
You can find webs in lots of places. (P)				*		
Spiders spin many different kinds of webs.				*		
Example=orb web					*	PC
Example=funnel web					*	PC
Example=bowl and doily web					*	PC
Example=sheet web					*	PC
The spider uses its web to catch insects (P)				*		
(The insects are) for food.					*	
Ex=banded argiope spider			T		*	PC
The male spider is a lot smaller than the female.(p)		(re)		*		
He visits the females web		(re)	*			

(He visits) to mate.		(re)		*		
	#	MI	HiS	Sub	Sub	
Ex=orb weaver spider			T		*	PC
The female spider then spins an egg sac (p)		(re)	*			
In which the baby spiders grow.		(re)		*		
Ex=black widow spider	R		T		*	PC
After a few days, the baby spiders are ready to leave the egg sac (P)		(re)	*			
The baby spiders are called spiderlings.		(re)		*		
Soon the growing spiderlings are ready to swing from their own silky threads (P)		(re)	*			
(Soon the spiderlings swing away) to make homes of their very own. (P)		(re)	*			
Importations	*Dis*	*Pic*	*Inf*	*Tex*	*PK*	*Er*

T=type of spider; Check this box if students list several kinds of spiders, rather than using them as an example of the information about spiders.

APPENDIX F2

RETELLING CODE SHEET: MOON

RETELLING CODE SHEET: MOON

The Moon						
	#	MI	HiS	Sub	Sub	
Look up.					*	
Do you see the moon shining		*				
(which is) in the sky?			*			
It looks like a big tortilla.				*		
But a tortilla is flat				*		
And the moon is round		*				
(the mooon is) like a ball.			*			
The moon is your nearest neighbor in the sky.			*			
The moon shines over Mt. Ranier in Washington State.					*	PC
The moon doesn't shine with its own light.		*				
It is a big, old rock.				*		
The light you see			*			
(the light) is the sun shining on the moon.			*			
The sun shines on the earth					*	
And it shines on the moon too.			*		*	
When the sun shines on a whole side of the moon,			*			
It's called a full moon.				*		
(The sun shines rays on the earth.)					*	PC
(The sun shines rays on the moon.)			*			PC
(The moon orbits the earth.)		*				PC
Sometimes the moon looks as if it changes shape.		*				
Don't be fooled!					*	
The moon doesn't really change.			*			
It is always a big, round rock.	R			*		
What changes is how much of the sunny side you see.			*			
Sometimes the moon looks different.	R	*				
The sun is shining on one entire side of the moon.			*			PC
The sun is shining on one half of the moon.			*			PC
The sun is shining on one quarter of the moon.			*			PC
The sun is shining on a sliver of the moon.			*			PC
What is it like up on the moon?		*				
Look (at what it is like on the moon).		*				
It is not like the earth.			*			
There are no trees.				*		

There are no rivers				*		
Or (there are) no lakes.				*		
There are no clouds.					*	
There is no wind					*	

	#	MI	HiS	Sub	Sub	
Or (there is) no snow.					*	
There is no weather at all.				*		
Where the sun hits the moon			*			
It is very hot-			*			
Hotter than boiling water.				*		
Where it is dark			*			
The moon is very, very cold-			*			
Much colder than ice cubes.				*		
This is how big the moon looks placed on top of the United States.						PC
People landed on the moon		*				
(it happened) in 1969.			*			
They took moon rocks back with them			*			
(they traveled) in their spaceship.			*			
The first visitors left a flag (P)			*			
To show they had been on the moon.				*		
They left their footprints too. (P)			*			
The footprints are still on the moon.				*		
They may always be (on the moon).				*		
There is no wind					*	
To blow them away.					*	
There is no rain					*	
To wash them away.					*	
The sky is always black in outer space. (P)			*			
Sound travels in air				*		
And there is no air in outer space.				*		
The moon is a silent place.			*			
The moon travels around the earth.		*				
The path is called an orbit.			*			
The moon orbits all the way around the earth	R	*				
Once a month.			*			
The moon is orbiting the earth.			*			PC
The moon is always there		*				
even when you can't see it.			*			
Watch for it shining down.			*			
It can keep you company in the night. (P)					*	
Importations	Dis	Pic	Inf	Tex	PK	*Er*

APPENDIX F3

RETELLING CODE SHEET: WATER

RETELLING CODE SHEET: WATER

Water: Liquid, Solid, Gas						
	#	MI	HiS	Sub	Sub	
Water Everywhere		*				
Water is everywhere.	R1	*				
It falls from the sky			*			
(water falling from the sky is known) as rain.				*		
It flows down rivers,			*			
(it flows) over waterfalls,			*			
(it flows) into ponds,			*			
And (it flows) into lakes			*			
And (it flows) into oceans.			*			
Almost three-fourths of the earth is covered with water.			*			PC
There is even more water underground.			*			PC
Water is Wet			*			
Water is a liquid.		*				
It feels wet.			*			
You can pour it.			*			
Water is made of tiny, tiny parts			*			
(the tiny parts are) called molecules.				*		
Water molecules like to stick, or cling together.				*		
A drop of water has a round shape.				*		PC
The clinging water molecules pull the water into round droplets.				*		PC
Molecules (are tiny round parts of a droplet).	R					PC
Hard as Ice			*			
When water gets cold enough			*			
It freezes			*			
Then it is called ice.			*			
Ice is a solid.		*				
You can't pour a solid.			*			
If it is cold enough outside,			*			
Water on grass (will turn to ice)				*		
And water on rocks will turn to ice.				*		
Ponds (freeze too)				*		
And lakes freeze too.				*		
About 10% of the earth is covered with glaciers and ice.			*			
It is so cold at the North Pole				*		
And (it is so cold) at the South Pole				*		
That they are always covered in ice.				*		

When water turns to ice			*			
	#	MI	HiS	Sub	Sub	
It takes up more space than when it was a liquid.			*			
It seems to grow.				*		
Try this (experiment).				*		PC
Draw a line on a plastic cup.					*	PC
Fill the cup with water up to the line.					*	PC
Then put it in the freezer overnight.					*	PC
In the morning, look at the cup.					*	PC
What happened?					*	PC
Water in the Air			*			
If you leave an ice cube on a plate, (P)				*		
First it melts. (P)					*	
Ice that is warmed up					*	
(ice) Becomes liquid again (P)					*	
Then the water disappears. (P)					*	
Where does it go?						
The water molecules drift into the air.					*	
The water becomes water vapor.				*		
Water vapor is a gas.		*				
A gas doesn't hold a shape.			*			
You can't see water vapor.			*			
Cool air turns water vapor into little droplets			*			
That you can see.			*			
When the air is cool,			*			
You might see the mist from your breath (P)				*		
Or (you might see) fog covering a lake. (P)				*		
Cold air also forms clouds high in the sky. P)			*			
At first, the little water droplets in the clouds hang in the air.				*		
Then they join together.				*		
The droplets get bigger				*		
And (the droplets get) heavier				*		
Until they fall from the sky				*		
As rain.				*		
Water is everywhere.	R1	*				
Importations	*Dis*	*Pic*	*Inf*	*Tex*	*PK*	*Err*

APPENDIX F4

RETELLING CODE SHEET: INSECTS

RETELLING CODE SHEET: INSECTS

Looking At Bugs						
	#	MI	HiS	Sub	Sub	
What makes a bug a bug?						
Bugs are everywhere.			*			
They have been on earth a lot longer than we have.			*			
Even before the dinosaurs there were bugs. (P)			*			
What exactly makes a bug a bug?	R1	*				
(There is an) Insect Checklist		*				
All adult insects have (3 things):			*			
(All adult insects have) a body with 3 parts.				*		
(One part is the) head (P)					*	
(One part is the) thorax (P)					*	
One part is the abdomen (P)					*	
(All adult insects have) 6 legs				*		
(All adult insects) have a hard outer skeleton.				*		
The skeleton is like armor.					*	
Adult insects also have a pair of antennas. (P)				*		
They may have other things too.				*		
(An example is =like) wings (P)					*	
But to be a bug, it has to have the 3 things on the list.	R		*			
(This is how insects) Growing up		*				
Insects begin their lives as eggs			*			
When they hatch,			*			
some look like tiny copies of their parents.				*		
As the little insect grows,					*	
It gets to big for its outer skeleton.					*	
So it sheds (the skeleton)					*	
And (it) grows a new one.					*	
Grasshoppers grow this way. (P)					*5	
These are newly hatched true bugs and their egg shells.					*5	PC
Other baby insects don't look at all like their parents.				*		
When a butterfly egg hatches,					*	
A caterpillar crawls out.					*	
It looks more like a worm than a bug. (P)					*5	

But then it changes					*	
	#	MI	HiS	Sub	Sub	
A caterpillar wraps itself up in a sack.					*5	
Inside the caterpillar turns into a butterfly with wings					*5	
It breaks open the sack					*5	
And (it) flies away.					*5	
There are more than 1 million kinds of insects.			*			PC
The stick insect is the longest.				*		PC
It is almost 2 feet long.					*	PC
(People can go) Bug Hunting		*				
You may want to pick up some of the insects			*			
(that) you find.		*				
But that's not a good idea.			*			
Unless you are sure that the bug doesn't sting				*		
Or (the bug doesn't) bite.				*		
Also, you might hurt the bug.				*		
So it's better just to look.			*			
A park can be a great place to find bugs.				*		
Or even a puddle can be a great place to find bugs. (P)				*		
Check under leaves (P)				*		
And (check under) rocks				*		
And (check) on tree trunks.				*		
Try to leave things the way you found them.				*		
Be careful				*		
And (be) quiet.				*		
You will see more bugs that way.			*			
Importations	*Dis*	*Pic*	*Inf.*	*Tex*	*PK*	**Err**

APPENDIX G1

CUED RECALL: SPIDERS

CUED RECALL: SPIDERS

"Please tell me everything you can remember about the book. Also, tell me anything the book made you think of."

Cued Recall: Spiders

1. Describe the spider's body. (E)

2. Why do think there is a trap-door at the top of the spider's tunnel? (I)

3. Tell me about 3 different kinds of webs made by spiders. (E)

4. Where might you be likely to find a spider web? (I)

5. Why might the female spider be larger than the male? (I)

6. How long does it take the baby spiders to hatch and leave the egg sac? (E)

APPENDIX G2

CUED RECALL: MOON

CUED RECALL: MOON

"Please tell me everything you can remember about the book. Also, tell me anything the book made you think of."

Cued Recall: Moon

1. What makes the moon look different throughout the month?(E)

2. Describe the moon and what it is like on the moon. (E)

3. If you were to land on the moon today, how would you know that somebody had already been there? (I)

4. Why is the moon silent? (I)

5. Describe the moon's orbit. (E)

6. Tell me about how the sky in outer space looks compared to the sky we see here on Earth. (I)

APPENDIX G3

CUED RECALL: WATER

CUED RECALL: WATER

"Please tell me everything you can remember about the book. Also, tell me anything the book made you think of."

Cued Recall: Water

1. What is water made of? (E)

2. What is water called when it is a solid? (E)

3. If you put a very full bottle of water in the freezer, what would happen and why? (I)

4. Which form of water that we have read about doesn't have any shape? (E)

5. Water vapor is invisible because it is a gas, but we still know it is there. What could you do to change the invisible water vapor back to a droplet that you could see? (I)

6. Describe the changes that would take place in clouds before a snowstorm. (I)

APPENDIX G4

CUED RECALL: INSECTS

CUED RECALL: INSECTS

"Please tell me everything you can remember about the book. Also, tell me anything the book made you think of."

Cued Recall: Insects

1. Why do you think insects were able to survive over millions of years but dinosaurs were not? (I)

2. Describe the body of an insect (E)

3. How might adult insects be different than babies? (E)

4. Why must one be careful when hunting for insects? (E)

5. Why would a person want to hunt for bugs? (I)

6. Is a spider an insect? Why or why not? (I)