A STUDY OF THE EFFECT OF PROBLEM/SOLUTION TEXT ON CHILDREN'S COMPREHENSION

DOREEN BARNES

Memorial University of Newfoundland

A STUDY OF THE EFFECT OF PROBLEM/SOLUTION TEXT ON CHILDREN'S COMPREHENSION

by

Doreen Barnes, B.Ed.

A thesis submitted to the School of Graduate Studies
in partial fulfilment of the requirements
for the degree of Master of Education

June 1995

St. John's Newfoundland

ISBN 0-612-06104-3

Canada

Abstract

The aim of this quasi-experimental study was to learn if consistent direct instruction of the problem/solution text structure strategy would improve: 1) total recall of text, 2) total recall of problem/solution text structure idea units, and 3) comprehension. One grade five class (n=24) in an urban school served as the treatment group while a second class (n=26) functioned as the control group. It was found that after three weeks of direct instruction the treatment group recalled more problem/solution text structure idea units and had better comprehension scores. There was no significant difference in total number of idea units recalled between the two groups at both pretest and posttest. It was concluded that direct teaching of the problem/solution text structure strategy was effective in improving recall and comprehension for text having this structure. This occurred when the treatment group began to focus on the important elements of the text, which in turn helped them to organize their schema of text.

Acknowledgements

Several people helped make the completion of the thesis not only possible but also a very memorable experience.

Thank you to my Co-Supervisors, Dr. Tim Seifert, and Dr. Marc Glassman, for your guidance and critical review of this thesis.

To the students in the two classes for their cooperation and informed questioning.

To Mrs. Janet Lobo and Mr. Harry Rogers for agreeing to help with the study in their classrooms.

To my husband, Peter, and my children, Gordon and Carolyn, for their continual support and patience.

To my mother, Alice Mac Donald, and my mother-and father-in-law, Gordon and Florrie Barnes, for their understanding and encouragement.

TABLE OF CONTENTS

Page

TABLES

CHAPTER I

INTRODUCTION TO THE STUDY

The purpose of this quasi-experimental study was to determine if direct instruction of the problem/solution text structure strategy would improve students comprehension for text having this structure.

INTRODUCTION TO THE PROBLEM

Research by Vacca and Vacca (1994), Irvin (1990), Gee and Forester (1988), Flood (1986), Taylor (1985) and Durkin (1984) has shown that little, if any, instruction is given to middle grade students on how to interpret expository text. Since grade four students already know how to read, it is expected that they can extract and use certain information from text. However, students up to grade four have been exposed mostly to narrative text and have, through the years, developed their ability to construct "story schemas" to deal with narrative texts. Schemas for expository text have not been consistently developed because children have not been exposed to great quantities of text in this genre. Therefore, the schemas necessary for

assimilating and recalling facts and details of expository text may not be in place. Therefore, middle grade students may need direct instruction in strategies to assist them in developing schemas for expository texts. The literary and "bookish" language of textbooks, encyclopedias and other expository text that students are confronted with in grade four can pose serious problems for some students. Each subject area text, such as religion, health, social studies, science, math and language arts, includes various underlying organizational patterns such as problem/solution, compare/contrast, cause/effect, sequence and description, that can be represented in an outline. Recognition of the organizational pattern, or text structure, can assist the reader in two ways: 1) the reader is better able to select important information, and 2) the reader is better able to build internal connections (knowledge and experience) and external connections (text) (Cook & Mayer, 1988).

Irvin points out that "becoming an independent learner is a lifelong process" (1990, p. 27). For this reason continued and systematic reading instruction at the middle level is imperative in order to provide students with the necessary skills to accommodate and store new information from text. New information generated from reading and

instruction needs to be integrated with what is already known. "The structure of a reader's pre-existing knowledge affects how a text is understood and remembered" (Weaver & Kintsch 1991, p. 236). However, Wittrock (1989) stresses that in addition to experience and background knowledge, students must be able to generate relations among the parts of the text in order for comprehension to occur. Schemas provide the necessary structure for sorting and recalling these ideas and facts from text to create organization.

Armbruster, Anderson and Ostertag, (1989) state that the following skills need to be taught to build schema for expository text: 1) teach readers to use format clues such as subheadings, headings and paragraphs as indicators of text structures; 2) teach readers to make concrete visual representations of the ideas in a text such as mapping charts and frames; and 3) teach children common structures in expository text such as compare/contrast, cause/effect, problem/solution, sequence and description.

The aforementioned skills presented by Armbruster, Anderson and Ostertag were compared to the skills in the language arts curriculum found within the Nelson Networks basal program text Reading and How (Hughes & McInnes, 1985). The Nelson Networks program is the prescribed basal reading

program for the province of Newfoundland and Labrador. Reading and How does teach headings and subheadings which is congruent with the first skill suggested by Armbruster, Anderson and Ostertag. The Reading and How text however does not provide adequate exposure to Armbruster, Anderson and Ostertag's second and third skills (i.e., mapping techniques and text types). Skills, when taught consistently over a period of time, become strategies that the student can apply independently to appropriate reading situations. Therefore, adequate exposure to skills instruction is necessary. Yet, this component is absent from the Reading and How text.

Armbruster, Anderson and Ostertag's second skill necessary for building schemas for expository text is making visual representations. Researchers (Irvin 1990; Rossi 1990; Armbruster, Anderson & Ostertag 1989; Singer & Donlan 1989; Wittrock 1989; Cook & Mayer 1988; Taylor & Beach 1987) have shown that maps and frames are effective visual aids for particular types of text. One such frame was developed for the problem/solution text structure and was used in this study (Armbruster, Anderson & Ostertag, 1989, see appendix A). Visual representation of text information assist students' comprehension of text in two ways:

1) assisting students to make connections between events and ideas and 2) assisting students in organizing information in schemas, thus enhancing students recall and retention of information.

The third skill stated by Armbruster, Anderson and Ostertag necessary for building schemas for expository text structure is identifying specific text structures. Throughout Reading and How, students are made aware that they are reading different types of expository text, but nowhere in Reading and How is the text structure identified. Students need to be taught the language or "signalling devices" that aid in identifying the type of expository passage, and in what content area text they will find these signalling devices. Vacca and Vacca (p. 42) list the common signalling devices found in text structures. They are compare/contrast (e.g., however, but, as well as, while, although, similarly), problem/solution and cause/effect (e.g., because, since, therefore, as a result, if..then), sequence (e.g., now, as before, after, when, first, second, finally) and description (e.g., to begin with, most important, also, in fact, for instance, and for example).

Reading and How does introduce some excellent skills to aid in comprehension of text, but it fails to provide

repetition of skill practice that would enable these skills to become strategies that the student can use independently. Students need direct instruction in how they can transfer these strategies to other content area reading (Pressley et al, 1990). Teachers and authors cannot automatically assume that students will make these connections. The authors of Reading and How state that the text will help children to read in content areas. However nowhere is it explicitly stated how the strategies teachers are directed to teach will be helpful and where students should apply the strategies in their reading.

STATEMENT OF THE PROBLEM

The Nelson Networks basal program Reading and How may not provide adequate skill practice for students to help them in reading and interpreting content area material. For example, in the unit on "Horses" (p. 45) in Reading and How, a post reading mapping strategy is introduced. Mapping strategies are generally designed to assist students in organizing information visually and aid in building schemas for later recall. However, this particular mapping strategy of compare/contrast is not used again throughout Reading and How text. Research (Vacca & Vacca, 1994; Routman, 1991) has

shown that in order for this strategy to be used independently by students and become part of the students' schemas continuous repeated use of the strategy is required. There are four stages of effective strategy instruction: 1) direct instruction; 2) guided practice; 3) independent practice; and 4) independent use (Slater & Graves p. 156-157). Effective strategy instruction requires time and practice over a period of two to three weeks before students can begin using the strategy independently and are able to identify where to apply the strategy in other content area reading.

The proposed study was designed to do two things: 1) teach the problem/solution text structure strategy to an treatment group using the prescribed language arts program with supplementary passages and 2) transfer the instruction to the social studies textbook to show how the problem/solution text structure strategy learned in language arts can be applied to social studies and other social science textbooks.

SIGNIFICANCE OF THE STUDY

English Language Arts Primary-Level III Curriculum Framework Draft (Department of Education, 1994) states as one of its language learning goals that elementary students should (1:3) "develop ability to read independently, by choosing appropriate strategies and processes." The document further states that students (aged 7-11) are to:

> "- be able to identify the organizational structures and features of a text that can assist them in understanding information.
>
> - appreciate the importance of acquiring specialized vocabulary in a particular area of study.
>
> - employ a variety of reading strategies when encountering unfamiliar text."

This researcher contends that the present language arts program, the Nelson Networks basal series, does not adequately meet these goals. Therefore, this thesis, and more specifically the quasi-experimental study, was designed to determine if supplementing the Nelson Network program with instruction in recognizing text structures would assist students in meeting these goals.

DESIGN OF THE QUASI-EXPERIMENTAL STUDY

Two grade five classes were used in this study. One class served as the control group, the other class the treatment group. Both classes followed the same course content, that is, the theme of "horses" from the Nelson Networks basal reading program. The strategy instruction was transferred to the prescribed social studies text The Atlantic Edge: Living in Newfoundland and Labrador, Chapter Four," Early European Visitors". The control group was instructed to use a question/answer strategy and the treatment group taught to use a problem/solution text structure identification strategy. The instruction in the treatment group was supplemented by a problem/solution mapping frame and summary chart (Armbruster, Anderson & Ostertag, 1989, see appendix A). Instruction took place over a three week period. Each of the thirteen instructional classes was forty-five minutes in duration.

EVALUATION

The evaluation consisted of two steps. One week before the study began, the students in the two grade five classes were given the Gates-MacGinitie Reading Test, second edition Level D Form 2 (Gates & MacGinitie, 1965). This test, taking approximately 1 hour to complete, provides a measure of the general level of reading achievement. The two classes were compared in their reading and comprehension scores. On the first day of the quasi-experimental study, the students wrote a pretest. The pretest contained a 250 word passage. Following the reading of this passage, the students were required to write a summary of the text, followed by a comprehension test, which included five short answer questions. At the end of the three weeks of instruction, the students wrote a posttest following the same procedure as the pretest. The passage for the posttest was taken directly from the social studies text. The Fry Readability Formula (Fry, 1990) was applied to the text, and this showed that the passage was written at a 7.1 reading level. This was consistent with other passages from Chapter 4," Early European Visitors". In addition to the pretest and posttest,

tests were given at the end of week one and week two of instruction. These tests were similar in format to the pretest and posttest with the exception of the comprehension component.

The SAS statistics program (1990) was applied to the results. The three dependent measures in the pretest and posttest were: 1) total number of idea units recalled, 2) total number of problem/solution text structures recalled, and 3) comprehension test. The means and standard deviations of the pretests and posttests were compared. In addition, the effects of time, group and time by group interactions were studied as well as the percentage of idea units recalled at weeks one and two.

CHAPTER II

OVERVIEW OF THE CHAPTER

In this chapter, the development of reading comprehension instruction over the last one hundred years will be discussed. Prereading strategies are examined, in particular the content area reading/prereading strategy of problem/solution text structure. Studies will be presented which support the direct teaching of this strategy to link students schemas with text.

REVIEW OF THE LITERATURE

Comprehension instruction has changed significantly over the last ninety years due to an increased understanding of the processes that occur while reading. Flood and Lapp (1991) described the development of reading comprehension instruction in four phases, beginning in the early 1900's. Previous to this, comprehension was not taught because it was thought to be a by-product of learning to read. The goal of schooling prior to the 1900's was simply to teach elocution and rote memorization. In the early twentieth century however, the first phase of reading comprehension instruction began with an emphasis on improving

comprehension during silent reading. This shift from oral reading to silent reading was the beginning of more intense study by researchers on the internal processes involved in gaining meaning from text.

The second phase occurred during the years 1940 to 1980. This was named the period of "subskill proliferation" by Farr (1971). The emphasis during this second stage was on teaching separate distinct skills in isolation from any particular context. Skills such as phonics, finding the main idea in paragraphs, following directions, and finding the answers to questions were taught through the use of workbooks and worksheets.

Phase three began in the 1980's with a reversal in philosophy from skills teaching to the "whole language" approach. This philosophy promoted comprehension as a unitary phenomenon rather than a set of subskills. Meaning was thought to best be gained by looking at the whole. Quality literature was promoted in the classrooms and basal reading programs were discouraged.

The final phase in comprehension development discussed by Flood and Lapp is the focus towards direct explicit instruction of strategies. This shift in instructional practice from learning by "osmosis" to direct instruction

changed the teachers' role in the comprehension process. Teachers provided direct instruction followed by independent practice until the strategy was internalized by the student. The goal of direct instruction of strategies was to enable the learner to control his/her own comprehension.

Another trend in comprehension instruction not mentioned by Flood and Lapp but supported in current literature (Vacca & Vacca, 1994; Fielding, 1990) is the recognition that there must be a match between schema (background knowledge) and text before comprehension can occur. Prereading strategies are thought to be vital to the comprehension process of connecting schemas and text. Prereading strategies that help connect the two are discussed further in this chapter and were used by this researcher in the quasi-experimental study.

All the phases discussed above show an increasing awareness of the process approach to reading comprehension building upon what was already known about the way students read and write. The shift from oral reading, elocution and rote memorization, to silent reading, to skills teaching, to whole language, to direct instruction, and finally to specific instruction of schemas and schema/text connections, show an increasing awareness of the importance of the

process approach to reading comprehension instruction. Teachers recognized the need for students to monitor their comprehension during the reading process.

Moore, Readence and Rickelman (1983) used similar phases in their review of historical development of content area reading instruction. However, they described the phases according to the groups who influenced the changes in reading instruction. These are the humanists, the developmentalists, the scientific determinists, reading researchers and educators.

Moore, Readence and Rickelman suggested that humanist thought set the stage for reading to learn. John Dewey, in his text How We Learn (1910), stated that students should construct their own meaning from text, rather than reiterate the author's statements. He recognised reading as an active process. Dewey also stressed that school activities should be connected with children's experiences and interests and that students should be taught to be problem-solvers and to reason independently. Another progressive figure at this time, Colonel Francis Parker, connected reading directly to meaningful learning. Parker thought that students should be active in the reading process. Students should be able to elaborate on ideas from text from their own knowledge and

experience rather than retell information exactly from text. These insights of Dewey and Parker carried clear implications for reading instruction. Both men helped educators see that rote memorization would not assist students in achieving better comprehension in reading. Reading needed to be connected with students' prior knowledge. This change in focus is consistent with stage one of comprehension instruction development outlined by Flood and Lapp (1991).

The second phase of research and instruction was influenced by developmentalists such as psychologists G. Stanley Hall and Arnold Gesell who studied patterns of growth among children. They recognized that children pass through various stages of development and that they pass through these stages at different rates. Their ability to think, reason and generalize changes with each stage. Hall's and Gesell's research helped educators realize that students cannot be compartmentalized. The implication here is that not all texts and tasks are suitable for all grade levels. This insight encouraged educators to look at how to best teach reading beyond the primary grades. Young people need guidance as they meet new challenges in more complex materials and assignments.

The third phase of reading comprehension instruction saw the development of standardized tests. Scientific determinists believed that decisions about school affairs could best be made through testing. Standardized tests were developed to measure students' academic abilities. Reading comprehension was one of the abilities that was measured in order to access outcomes of the schools. The standardized tests required students to read with understanding previously unseen passages and complete unfamiliar tasks. These tests differed drastically from earlier tests where students wrote definitions and recited reading passages. Students were required to read and comprehend passages without having received any instruction. This testing complemented the humanist emphasis on training "reasoning abilities." Students were expected to independently gain meaning from what they read. Educators soon came to realize they needed help in enabling students to develop their thinking skills. This prompted researchers to begin designing and identifying strategies to help educators accomplish this goal.

According to Moore, Readence and Rickelman (1983), reading processes were also being investigated at this time. Thorndyke suggested that readers needed to predetermine a

purpose for reading and to construct schemas for subsequent reading. Further research between 1930 and 1940 found that success in reading in the content areas depended on the student's ability to comprehend text while silent reading. In reading silently, students were expected to set a purpose for reading, to predict what was to come, to ask questions, to answer questions and to summarize text. If students were successful at this, they were in effect monitoring their own reading.

Three prominent reading educators at this time were Authur Gates, Earnest Horn and William Gray (Moore, Readence & Rickelman, 1983). Gray popularized the phrase "every teacher a teacher of reading." He stressed that all subject area teachers play a role in strategy instruction, not just the reading or language arts teacher. Gates promoted the "work-type" reading. He encouraged the teaching of skills such as finding answers to questions, following directions, and relating what is read to students perso. al experience. Horn recognized and promoted the importance of reading beyond school texts to a wide range of literature to promote meaningful learning and to accommodate individual differences. Today researchers encourage the use of nonfiction and fiction books to complement themes covered in

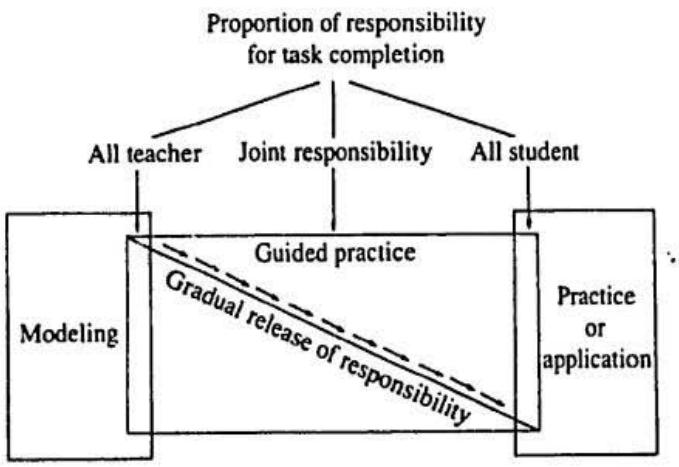
content area texts. William Grays' contribution to comprehension instruction was through his studies on retention. He is noted for his work on measuring and diagnosing reading achievement. He investigated study techniques, comprehension difficulties, the value of wide reading, and the relation between reading and scholastic achievement. He initiated much research in these areas and early textbooks and journal articles frequently cited his research.

The results of research on students' comprehension of content area text indicated the need for systematic direct reading instruction. This shift was strongly influenced by researchers and educators who recognized that many students in elementary, junior high and senior high have difficulty comprehending content area textbooks. Content area teachers' guides do not provide enough direction for teachers in helping students to comprehend these texts (Vacca & Vacca, 1994; Gee & Forester, 1988; Armbruster & Gudbrandsen, 1986). In addition, not all content area textbooks are written coherently (Osborn, Jones & Stein, 1992; Fielding, 1990; Singer & Donlan, 1989; Armbruster & Anderson, 1981). Experience with expository texts, without direct instruction in how to comprehend this text, affects students knowledge

and retention of information. In addition, knowledge and use of strategies is not rapidly acquired (Aulls, 1982).

The shifts in comprehension instruction over the years reflect a growing understanding of the importance of strategies and the students' ability to use and generalize strategies to a variety of reading situations. There is also growing recognition that strategies can be acquired and developed through direct instruction and guided practice. These shifts in instruction also acknowledge the changing role of the teacher from one who controls the comprehension process to one who facilitates the comprehension process. The following is a strategy teaching model developed by Pearson and Gallagher (1983) which illustrates the shift in instruction (Slater & Graves, p. 156).

Figure 1
The Gradual Release of Responsibility Model of Instruction



From P.D. Pearson and M.C. Gallagher. The instruction of reading comprehension. *Contemporary Educational Psychology*, 1983, *8*, 317-344.

In this model, the teacher sets the purpose for reading and provides direct instruction in the strategy to be taught. The teacher models the strategy and demonstrates how comprehension occurs. The students follow the modelled behaviour through guided practice. Discussion and questions and answers are encouraged during this phrase until students can use the strategy independently.

At this time, researchers were actively seeking ways to help students improve comprehension. They recognized that knowing strategies was not enough. Students must make connections between new information written in text and what they already know about the topic in the text in order for comprehension to occur. Background knowledge structures to which new information becomes connected are called "schemas." Readence, Bean and Baldwin (1989) describe schemas as "the central guidance system in the comprehension process" (p. 16). They further state "an individual's comprehension of new information is directly related to the richness of existing knowledge" (p. 18). Students will be able to comprehend new information in a content area only if they are shown how the new information builds upon and extends their prior knowledge (schemas).

SENSE OF STORY AND STORY STRUCTURE

The term schemas was first utilized by Piaget in Gestalt psychology during the 1930's. Piaget used the term to describe the intellectual structures that expanded with cognitive development (Prince & Marcus, 1987). However, it was Bartlett (1930) who recognized that schemas were "an active organization of past reactions or past experiences" (Bartlett, 1932 as cited by Best, p. 208). Schemas were not only used in learning about new material, but also in retrieving facts or past experiences from long term memory. Bartlett recognized that at the time of recalling information, a person was not able to distinguish which information was recently encoded fact and which was retrieved from already existing schemas on the topic (Best, p. 208).

Researchers (Stein & Glenn, 1979; Mandler & Johnson, 1977; Stein & Garfin, 1977; Bartlett, 1930) studied children's recall of stories. Bartlett (1930) was interested in the structures children used in their recall. He looked for a formal opening such as "once upon a time," a closing such as "lived happily ever after" and the consistent use of past tense common in all stories. He found that seventy percent of two year olds used at least one structure, and

that by five years forty-seven percent of children used all three structures. Bartlett concluded that sense of story was developmental (Applebee, 1978).

Stein and Glenn (1979) presented children aged seven to eleven with story fragments and had the children construct a story. The eleven year olds were seventy-seven percent more successful than seven year olds. They concluded that older children were able to fill in the gaps using inferencing due to their experience and knowledge of story structure.

Stein and Glenn (1979) also assessed story recall among adults and compared it to the recall of seven to eleven year olds. Their objective was to see which story events were best remembered. They discovered that this too changes as children get older. Adults were able to recall more information and were better at remembering the internal response and reaction structures in stories. Children best remembered setting, problems and outcomes. This is also an indication that sense of story is developmental.

ACQUIRING A SENSE OF STORY

There are basically two approaches to acquiring a sense of story: first, by hearing or reading a variety of stories, and by the "acquisition of knowledge regarding human and

social interaction" (Stein, 1988). These two approaches indicate that as children become more familiar with grammatical structures such as plot, theme, setting, and resolution, they sort this information into more sophisticated schemas.

Mandler and Johnson (1977), followed by Stein and Glenn (1979), were interested in proving children's reliance on sense of story or schemas. They asked primary children to listen to a folktale and then repeat the folktale in the order in which they heard it. Mandler and Johnson found that children as young as six years make very few errors in recalling the correct order of story, if the story corresponded to their prior experience of story structure. Stein and Garfin's research (1977) showed that even four and five year old children experienced little difficulty ordering the events in a story, provided the story corresponded to their expected sequence. When stories with deviations, such as a missing goal, were presented to children of the same age, they had difficulty organizing the story for recall. The children made additions, deletions and used inferencing skills in their attempts to make sense of the story. One may conclude that when children are exposed to story structures with more complicated plots and

subthemes, they have difficulty organizing this information in their schemas. These children had no previous experience with these new structures, and therefore information contained within the structures was not organized into schemas.

Story grammar research has consistently concluded that knowledge of story structure is critical to understanding stories. This knowledge begins forming during the preschool years and is refined throughout elementary school (Baker & Stein, 1981). It is in elementary school that the focus and structure of reading changes for students. In the primary years learning is attained through the narrative genre. In elementary school learning is attained through the expository genre. Students entering grade four are suddenly exposed to different structures of expository text in their various text books such as those used in religion, social studies, science, health and math. Each of these texts is written using different text structures, and often two or three structures are contained within the one text. Therefore, just as knowledge of story structure is essential for comprehension in primary, so to is knowledge of text structure essential in elementary schooling, especially since the focus of learning has changed from reading for

enjoyment to reading to learn. Reading is now used as a tool for learning, requiring accurate attention to facts and details.

Vacca and Vacca discuss eight differences between narrative and expository text structures. They are:

1. Suspension of disbelief - the information in narrative text may be fictitious. However, in expository text, the reader assumes the information is true.

2. Temporal & spatial referents - statements in narrative text are true for the specific time and location of the narrative. Time and place in expository text are regarded as universally true.

3. Literate prose versus mother tongue -- when people talk in everyday conversation, the discourse is narrative, rather than expository. Expository text is different from everyday language usage.

4. Conceptual structures - sequences of episodes in narrative unfold in a chronological order, whereas information in expository prose may not follow any temporal order.

5. Number of inferences - comprehenders draw more inferences from narrative text than expository text.

6. Communication function - expository text informs, narrative entertains.

7. Rhetorical features - narrative text contains suspense, surprise and irony. Episodes flow in a chronological order. Expository text has a pyramid development. The passage first provides overall elements of a topic and these elements are expanded upon in paragraphs. Rhetorical devices are text structures in expository text and include: compare/contrast, cause/effect, description, problem/solution, and sequence.

8. Connectives, transitional words and signalling devices: 1. compare/contrast: but, however, on the other hand; 2. problem/solution, cause/effect: because, since, therefore, consequently, as a result, if..then, thus; 3. sequence: not along after, now, before, after, first, second, then finally; 4. description: to begin with, most important, also, in fact, for instance and for example. Text structure is one of the most important variables in the comprehension of content area text. Students who are able to identify main and supporting ideas in content area texts generally recall significantly more information than those who do not.

Wittrock (1989) stated that two things happen in the comprehension process: 1) the reader is active in generating relations among the parts of the text, and 2) the reader is active in generating relations between text and knowledge and experience. Recognizing text structures assists students in organizing the information from text into their schemas. It prepares them to anticipate what the text will be about. It is necessary for students to be taught strategies to stimulate the process of connecting schemas and text.

Direct teaching of strategies assist students' in the comprehension process. Strategies should be taught in three phases during the reading process, prereading, reading and post reading (Vacca & Vacca, 1993). The purpose of prereading strategies is to activate students' schemas or background knowledge relevant to the material to be read. During reading strategies help students control the meaning-making process. Post reading strategies expand, consolidate and extend the students' learning from text. The prereading strategies are vital in connecting schemas and text. Schemas help students interpret text, and prereading strategies help activate schemas for interpreting text. Prereading strategies such as guided imagery, text previews (including text structures), PReP and problematic situations (Vacca &

Vacca, p. 138-157) provide opportunities for students to activate their background knowledge, expand upon background knowledge and for teachers to recognize when no background knowledge is available. These strategies also assist teachers in identifying when background knowledge is incorrect. This is identified by Armbruster, Anderson and Ostertag (1989, p. 333) as being necessary to develop schemas for expository text structure.

Schemas function in at least three ways: 1) schemas provide a framework for learning that allows readers to seek and select information that is relevant to their purposes for reading; 2) schemas help readers to organize information; and 3) schemas help readers to elaborate information (Vacca & Vacca, p. 33). Prereading strategies then are vital in the overall comprehension process for students. Students establish within themselves a purpose for reading. Schemas and motivation are intertwined and enable students to approach text in a meaningful way. "When a teacher creates conditions that allow students to establish within themselves motives for reading, readiness to learn is affected" (Vacca & Vacca, p. 137).

SKILLS AND STRATEGIES

The need for prereading strategies has been discussed, now it is necessary to look more thoroughly at their role in the comprehension process.

There is an important distinction between skills instruction and strategy instruction. Phinney (1988) defines skills as: "referring to the specific tools used in narrowly defined reading situations. Using a rule like the 'two vowels' rule or the 'magic e' rule is a skill" (p. 130). Skills instruction is teacher-centred and is a necessary part of instruction. However, skills must be brought to the strategic level so that learners are conscious of the skill they are using and are able to apply the skill to other learning situations. When this occurs, the skill has become a strategy for the learner. Irvin (1990) defines strategies as: "a conscious effort on the part of the reader to attend to comprehension while reading" (p. 30).

The teacher plays a vital role in determining whether the skill reaches the strategy level. A teachers' philosophy, approach, method, context (isolated or integrated learning) and timing are all important factors in determining whether the skills become useful strategies for the learner (Routman, 1991, p. 134). The learner must

discover how to utilize skills in varied reading and writing situations in order for the skills to become strategies. "The major difference, then, between skills teaching and strategy teaching concerns the presence or absence of self-direction on the part of the learner" (Holdaway, 1979, p. 136). It is the teacher's responsibility to provide sufficient instruction, guided practice and discussion so that students know when to apply specific strategies and know why they are to apply them. This is an important step in helping students develop their metacognitive knowledge.

The process of reading is both a cognitive and metacognitive event. Cognition is one's own knowledge. We teach about strategies to enhance learning, but students need to develop their metacognitive skills as well. Metacognition refers to awareness of what one's purposes are for reading and of how to regulate the reading process. Students need to know the significance of the strategies they are using and how they work (Palincsar, 1982, 1986). Strategies are metacognitive devices; that is, they help children think about their own thinking. "The more children think strategically, the better they become at making decisions about what they already know, and about what they still need to know to accomplish a task" (McInnes, Geopfert,

Moore, & Wheatly, 1985, p. 35). Therefore, it is necessary to teach students a wide range of strategies. Because there have been over thirty two strategies identified in research (Wittrock, 1989), Palincsar (1986) suggests teachers need to critically evaluate which strategies are appropriate for particular learning situations, keeping in mind the flexibility across reading situations and which strategies promote comprehension monitoring. Schemas, cognition and metacognition must interact in the reading process in various ways in order for meaningful learning to take place.

Metacognitive strategies involve moving from teacher-directed learning to student-directed reading activities and a shift from teacher-developed questions to questions that students ask themselves during the act of reading.

Research at present indicates that students in elementary grades need direct strategy instruction to help them read and comprehend expository text structure (Vacca & Vacca, 1994; Frager, 1993; Olson & Gee, 1991; Irvin, 1990; Rossi, 1990; Taylor & Samuels, 1983). A number of factors account for students difficulty with expository text. These include: 1) limited background knowledge to link new information, 2) content area texts are written to inform rather than entertain and students have lower motivation for

this type of text, 3) unfamiliar text organization, 4) text lacks logical connectives and transition words requires increased cognitive effort and 5) students' inability to recognize subject specific words (Olson & Gee, p. 299). However, research also indicates students are not receiving sufficient instruction in strategies to help them cope with more difficult texts (Vacca & Vacca, 1994; Mayo, 1993; Armbruster, 1992; Pressley & Harris, 1990; Baron, 1981; Durkin, 1978). In 1978-79, Durkin spent over three hundred hours observing content area lessons in classrooms. A mere one percent of time was spent in actual instruction in helping students organize information and strategy development (Fielding & Pearson, 1991). Teachers were more concerned with covering the content rather then helping students develop the skills for reading the content. The students were given many workbook pages, tests, and asked questions. However, these exercises mostly tested understanding instead of teaching them how to comprehend. Durkin's research more than any other single book or article motivated researchers to design and carry out research on comprehension instruction (Flood & Lapp, 1991).

Pressley and Harris (1990) confirmed that instruction does not take place in content area classrooms for two

reasons: 1) teachers do not teach strategies because they are not knowledgeable about the need for and techniques of strategy instruction and 2) information about strategies is rarely included in textbooks. Mayo (1993) and Armbruster (1992) concurred with Pressley and Harris that strategies are not being taught and provide further insight why strategy instruction is not being taught. They note the lack of teacher training in strategy use as being the main problem. Armbruster states "...although elementary teachers support teaching students how to read science, they offer little instruction in their undergraduate reading courses about informational text and how to teach reading to learn" (p. 346). Pressley and Harris further clarify that where strategy instruction did exist, students failed to transfer and apply strategies to new learning situations and to other content areas. Results of a national study (National Association for Elementary Principals, 1985) on reading and writing showed that forty percent of thirteen year olds and sixteen percent of seventeen year olds attending high school still had not acquired intermediate reading skills (cited in Pressley & Harris, p. 348). This means a large portion of students were unable to search for information, determine relationships between ideas, or derive generalizations from

literature, science and social studies materials. These are tasks widely recognized as essential to success in school (Irvin p. 25). It became obvious to researchers that more emphasis needed to be put on the teaching of strategies in content areas and less emphasis on covering quantities of text.

As noted earlier, prereading, reading and post reading strategies have specific purposes in the comprehension process. Prereading strategies aim to do one or more of three things: preview the topic, preview vocabulary and preview the text. Previewing the topic occurs through brainstorming i.e., "Tell anything that comes to mind when you hear the word _____". Responses are written on the board. "What made you think of _____?" This helps students become aware of how associations are made. Following discussion, the students write other ideas about _____. Here, students talk about associations that have been changed or elaborated on as a result of the discussion. It is previewing the text about which the researcher is concerned.

Previewing vocabulary is approached in many ways including looking at the word in context, looking at and

guessing at meanings of words out of context, and looking up words in the dictionary.

In previewing the text, a wide variety of text features may be viewed: illustrations, graphs, charts, titles and subtitles, chapter questions, introductory and summary paragraphs, whole text scanning and organizational patterns. The goal of prereading strategies is to increase the students knowledge about text. Therefore, because students' in grade four are introduced to five different organizational patterns in text, there is a need for direct instruction to help them identify the patterns. "Recent research based on schema theory has shown that the structure of a text and how adeptly a reader recognizes that structure affect the amount of information the student remembers" (Taylor & Samuels, 1983). Taylor and Samuels (1983) found that a significant number of students are unaware of text structure. They do not use structure to understand and remember information even though understanding and remembering information becomes increasingly important as they progress through school.

Many researchers have stated that students at all grade levels can be taught the structures that underlie content area texts (Spires, Galline, & Riggsbee, 1992; Rossi, 1990;

Gordon, 1990; Armbruster, Anderson & Ostertag, 1989; Cook & Mayer, 1988; Berkowitz, 1986; Flood, 1986; Flood, Lapp & Farnan, 1986; Taylor & Beach, 1984). Students who consistently use their knowledge of text structure while they are reading texts recall and comprehend more than students who do not know or use text structure knowledge (Armbruster, Anderson & Ostertag, 1989; Cook & Mayer, 1988; Baumann, 1984). Gordon (1990), using both qualitative and quantitative data, found that students who were taught about text structures remembered more of the relevant facts than students who were not taught to identify text structures. In addition, the students used the text structure not only during reading, but during writing and in everyday tasks such as making grocery lists and oral communication. Taylor and Beach (1984) taught elementary students about text structure by having them write a summary using the text organization of headings and subheadings. Trained students scored better at remembering new social studies chapters than untrained students. Armbruster, Anderson and Ostertag (1989) taught a group of grade five students to identify problem/solution text structures using a summary chart. Students who were trained in this text structure recalled more information, provided better summaries and recalled

more main idea units than an untrained group. Taylor and Samuels (1983) investigated whether superior recall for expository text could be attributed to the use of text structure as a retrieval cue or some other factor for grade six students. Their studies concluded the students' recall was a result of knowledge of text structure. Cook and Mayer (1988) found that skilled grade five readers lacked complete awareness of expository text structure and could benefit from even modest instruction. These studies provide support for the importance of teaching text structures beginning at elementary grades.

Text structure seems to be one of the most important variables in the comprehension of content area text. Students who are able to identify main and supporting ideas in content area texts generally recall significantly more information than those who do not. In other words, the above students have shown that if we focus our efforts on helping students identify and use structural cues when reading their texts, they will comprehend more of the information they encounter in these texts.

CONTENT AREA TEXT STRUCTURES

There are five main content area text structures (Vacca & Vacca p. 40-41). These are description, sequence, compare/contrast, cause/effect, and problem/solution.

The first is description. This is the most common textbook organization. Ideas are connected through listing the most important characteristics or attributes of a topic. This text structure is common in language arts texts.

Another text structure is sequence. Facts, events or concepts are put into sequence. These sequences may be ordered upon temporal or physical characteristics. This text type is usually found in history books.

The third text structure is compare/contrast. It points out differences and likenesses between people, events, concepts, and facts. This text structure is found in science, math, social studies, and history texts.

The fourth is cause/effect. It shows how events, facts and concepts happen because of other facts events and concepts. This text structure is found in science and history texts.

The last structure is problem/solution. It shows the development of a problem and the action and solutions to the

problem. This text structure is found in social science textbooks.

Each of these text structures has specific signalling devices (discussed earlier). Signalling devices provide surface clues to aid readers in recognizing organizational structures (McNeil, 1987). For example, some words signal a compare/contrast structure: on the other hand, but, in contrast; other words signal a cause/effect structure: consequently, as a result, therefore. By noting surface clues to the underlying structure, the reader may be able to anticipate the author's purpose and to adopt a reading strategy appropriate for the structure (McNeil, 1987).

Knowledge of the text structures can provide students with information so that they will know what to expect from the text and how to organize the incoming information in their schemas. Each text structure can be organized using a different graphic organizer to sort ideas and assist in making associations between ideas. Graphic organizers also assist in the recall of information and help differentiate between main and subordinate ideas in text. The sequence text pattern, for example, can be organized using a time line. The problem/solution structure can be organized using a frame that sorts the problem/action/solution, and shows

the connections between the three concepts. This mapping strategy was used by this researcher in the quasi-experimental study (Armbruster, Anderson & Ostertag, 1989).

In addition to graphic organizers, summarizing can be used to teach text structures. McGee and Richgels (1985) state: "The best way to help students recognize the structures is to have them become authors themselves." In addition, Flood (1986) states: "We need to teach summarization because composing and comprehending are process-oriented thinking skills which are basically interrelated." In a study by Doctorow, Wittrock and Marks (1978), it was found that grade six students who generated paragraph summaries after reading text, sizeably and statistically significantly increased their retention and comprehension of text and recalled nearly twice as much in the posttest. It was concluded that the active generation of relations among sentences in a paragraph sizeably facilitated comprehension and retention of text (cited in Wittrock, 1989).

Rinehart, Stahl and Erickson (1986) found that summarization training transfers directly to both reading and studying behaviours. In their study of grade six students, summarization had significant main effects on

recall of major information in a studying task but did not significantly affect recall of minor information. This finding suggests that summarization training may have taught students to concentrate on major information and disregard less important information.

Students initially need guidelines for writing summaries. Summary patterns scaffold children's responses from text and provide the necessary bridge between narrative and expository writing (Hadaway & Young, 1994; Lewis, Wray & Rospigliosi, 1994).

In summary, research has provided evidence that text structure strategies are not being taught in many schools. In addition, research has also shown that elementary teachers who do teach text structure and use a graphic organizer and summarizing strategy to teach about structure in general and about the five text structures specifically, are giving their students a head start in dealing successfully with content area material. Flood (1988), suggests that writing experience is a "bridge to understanding more difficult text structure."

CHAPTER III

METHODOLOGY

OVERVIEW OF THE CHAPTER

The purpose of the study was to investigate the effect of direct instruction of problem/solution expository text structure on students' ability to comprehend text having this structure. The overall methodology of the study is discussed in this chapter. Attention is given to providing a description of the instructional materials, procedure, testing and scoring.

SAMPLE

The sample consisted of fifty students from two grade five classrooms in an urban community school. Most families were middle class. The students ranged in ages from 9.5 years to 10.4 years. The mean age in each class was 10.2 years.

MATERIALS

Teaching Materials

The instructional materials consisted of six researcher-prepared passages as well as seven passages found in the social studies text currently being used by the subjects. The treatment class received: 1) a definition/description of the problem/solution text structure, along with a schematic representation (frame) of the problem/solution text structure (see appendix A), and 2) explicit rules for how to write a summary of problem-solution passages, including a pattern for writing the summaries and guidelines for checking it. The control group received the same passages and comprehension questions (five). The questions were similar to questions asked at the end of textbook lessons or chapters. Three of the questions asked and discussed in the control group were about information critical to the problem/solution text structure, for example, "Why was Eric the Red ordered to leave Iceland?" Two of the questions probed the recall of information not directly related to the problem/solution structure, for example, "Who was Thorvald?" The latter question would not provide any important information regarding the problem facing the Norsemen, the action taken

to solve the problem, and the solution to the problem, but required the recall of other significant idea units.

Assessment Materials

The pretest and posttest included a written summary and a short answer test following the reading of a two hundred and fifty word passage from the prescribed social studies text. These summaries were evaluated for two measures. These included: 1) the number of idea units recalled from the passage and 2) the number of idea units directly related to the problem/solution text structure. Five short answer comprehension questions followed. Tests similar in format to the pretest and posttest were given after week one and week two of instruction to measure progress.

Timeline of Activities

Both the treatment group and the control group were instructed by the researcher with the regular classroom teacher present. The instruction took place over thirteen consecutive school days for forty five minutes per day per class.

The instruction for the structure training subjects followed the principles of the Gradual Release of

Responsibility Model (Slater & Graves, 1989) which involves a direct instruction component. That is, the instruction featured teacher modelling of explicitly defined procedures, teacher monitoring with corrective feedback, small group work, and independent practice. The structure training group proceeded as follows:

Day 1: The researcher introduced herself and provided a rationale for the project. The students were taught how strategies that are learned in language arts can be carried over to the other content area subjects. Using the first example of a problem/solution text passage, the students discussed answers to the questions: Who has the problem? What is the problem? What actions were taken to solve the problem? What were the results of those actions? The researcher explained that these four questions are always associated with problem/solution texts. The problem/solution frame was then introduced and students were shown how the diagram would help organize answers to the three problem/solution questions. The researcher demonstrated how answers to discussion questions could be recorded in the frame. Students filled out the frames, beginning with the problem, then the action that was taken to solve the problem, and finally the solution. All the passages, frames,

and summaries were placed in individual file folders, kept in the students desk. The "Gradual Release of Responsibility Model of Instruction" (Slater & Graves, 1989) was used for instruction. In this model, the teacher initially assumes full responsibility for the lesson. As modelling and instruction continues, and students' feedback begins to show mastery of the strategy, the teacher gradually withdraws instruction in favour of enabling the students to take a more active role in completing the task. The ultimate goal is to have them become proficient in their use of strategies in order to become independent learners.

Day 2: The researcher briefly reviewed and then led a discussion on the second passage. The answers to the problem/solution questions were recorded in a frame on the chartboard. The researcher explained to students that one way to learn from reading textbooks is to summarize the information. The researcher explained the guidelines for summarizing problem/solution passages and modelled writing and checking summaries based on the two passages already "framed" in the file folder.

Days 3-6: Students continued to work on the problem/solution passages on the topic of "horses". The passages were presented by the researcher and then read and

discussed in pairs. The pairs then completed the problem/solution frames and summaries, with guidance given by the researcher as necessary. Guidance was gradually removed as the week progressed.

Day 7: Students returned to their classroom textbook where they were required to apply the framing and summarizing strategies to designated passages. Guidance was given.

Days 8-13: Following discussion, the students worked individually on completing the passages. The researcher circulated in the classroom and provided assistance as necessary. Meanwhile, the control group worked at the same passages. The students worked in pairs to answer the comprehension questions after they were discussed by the class. Students were encouraged to answer all questions in complete sentences. From days 3 to day 7, the control group also worked in pairs. They also returned to their classroom textbook on day 7. Students then worked individually to answer the comprehension questions. As with the treatment group, the control group became more independent throughout the project. They also received corrective feedback and assistance from the researcher.

Testing Procedure

Students were given a pretest the day before the commencement of instruction. Subjects were given five minutes to read a passage. They were encouraged to reread until the time was up. The passage was then removed and the students were asked to recall all the information they could from the passage. Students were given seven minutes to complete this task. The summaries were then removed. A short answer test was then distributed to the subjects. They were given five minutes to complete the answers. Fifty students completed this criterion test.

After the first week of instruction, the students were tested again. A passage on the continuing theme of horses was used. The format of the test was the same as the pretest. Forty-five students completed this criterion test. Another test was given after week two. Again the format was the same as the pretest except the next passage from the social studies textbook was used since the students had returned to the text. This would allow for continuity of the theme. Forty five students completed the test.

The day after the completion of instruction, a posttest was given. The format was the same as the pretest, using a different passage. The 250 word passage used was from the

social studies text. Students were given five minutes to read the passage and were encouraged to reread until the time was up. The textbook was removed. Students wrote summaries and answered comprehension questions as in the pretest. Forty six students completed the test.

Scoring

The passages were divided into idea units. Three evaluators reached a consensus on the total number of idea units for each passage used in the testing. The number of idea units varied in the four passages. The pretest passage contained 26 idea units. Week one passage contained 36 idea units. Week two passage contained 27 idea units and the posttest passage contained 44 idea units. One point was given for each idea unit recalled in the summaries. The second measurement consisted of the total number of problem/solution idea units contained in the summaries. One point was given for each idea unit that related to a problem/solution structure i.e., the problem, action taken to solve the problem, and the solution of the problem. The third unit of measurement was the comprehension. The answers to the comprehension questions were scored out of fifteen points. Interrater agreement was reached by having two

elementary teachers score the same fifteen summaries. Their scores were compared to the researchers scoring. Any differences in the scoring was discussed and reviewed. The level of interrater agreement after discussion was 98 percent.

CHAPTER IV

RESULTS AND DISCUSSION

OVERVIEW OF THE CHAPTER

This chapter presents the research findings obtained from the quasi-experimental study. Seven tables are presented showing the means and standard deviations of the dependent measures. The tables represent results from the pretest, posttest, testing after week one and testing after week two. Additionally four ANOVA tables are presented showing the results of between-groups repeated measures contrasts.

DATA ANALYSIS

Because each student had not been randomly assigned to a treatment condition, the mean reading comprehension ability of each classroom was computed and compared. Scores of vocabulary and comprehension subtests of the Gates-MacGinitie Test (Survey D, Form 2) were used for this purpose. The composite standard score for each pupil was found by averaging the vocabulary and comprehension standard scores. The composite percentile score was found by using

the table of Percentile Equivalents of Standard Scores found in the teachers manual (Gates-Macginitie Reading Tests). The mean standard scores for the control group and treatment group were 50.6 and 46.4 respectively. There were no statistical differences in reading ability between the two classes $t(46) = 1.07$.

The primary analysis consisted of a two-way ANOVA with group membership as a between groups factor and time (pretest - posttest) as a repeated measure. If a statistically detectable interaction effect was found at the .05 level, this was followed up with a posteriori contrasts at the .025 level of significance.

RESULTS

The results were analyzed using a 2 (control, treatment) * 2 (pretest, posttest) repeated measures design with group membership as a between groups factor and time as a repeated measure. The means and standard deviations after the pretest, week one, week two, and posttest were calculated for each test given. Proportion of idea units, proportion of problem/solution idea units and comprehension scores, were the dependent measures. In addition, the percentage of problem/solution text structure idea units

recalled was calculated using a variable which was the ratio of idea units recalled to the total number of problem/solution idea units recalled.[1]

Proportion of Idea Units Recalled

The results of the ANOVA indicated that there was no statistically detectable interaction effect. Also there was no difference between groups and no time effect. Thus we can conclude that the training had no impact on the proportion of idea units recalled (Tables 1 and 2).

---

[1]Although a 2*4 split plot factorial design may seem the appropriate analysis to analyze the 4 repeated measures, the decision was made to utilize a 2*2 pretest-posttest repeated measures design. This specific analysis was chosen because the conditions of measurement during weeks two and three were different than at pretest and posttest. The passages used during weeks two and three were shorter and given at the end of a lesson as opposed to the pretest and posttest which were longer and did not follow as part of instruction per se. Thus, the measure of recall obtained during weeks two and three were considered qualitatively different than the pretest and posttest and were not directly compared to pretest and posttest scores.

Table 1

Summary of ANOVA Statistics for Proportion of Ideas Recalled

Source	df	SS	MS	F	P
Group	1	785.90	785.90	3.78	>.05
Error(between)	43	8951.11	208.17		
Time	1	169.75	169.75	3.65	>.05
Time*Group	1	19.99	19.99	.43	>.05
Error(within)	43	2001.39	46.54		

Table 2

Proportion of Idea Units Recalled

		Pretest		Posttest	
Group	N	Mean	SD	Mean	SD
Control	24	14.7	13.9	12.9	8.7
Treatment	20	22.3	12.1	17.8	9.6

The ANOVA shows the time*group interaction effect ($F = 0.4$, $p > .05$) was not significant after three weeks of instruction. Time ($F = 3.65$, $p > .05$) was not significant and group ($F = 3.78$, $p > .05$) measure was not significant.

Table 3

Summary of ANOVA Statistics of Idea Units Recalled which were Problem/Solution Ideas

Source	df	SS	MS	F	P
Group	1	592.20	529.20	3.70	>.05
Error(between)	43	4743.53	4743.53		
Time	1	172.16	172.16	3.70	>.05
Time*Group	1	191.13	191.13	4.11	< .05
Error(within)	43	2001.39	46.54		

Table 3 presents the results of the ANOVA for the proportion of problem/solution idea units recalled. A statistically detectable interaction effect was found ($p < .05$) indicating that the training had a differential effect on the performance of the treatment group. A posteriori contrasts revealed that while there were no statistical differences

between the two groups at pretest ($t(40) = .99$, $p > .025$), the treatment group outperformed the control group at posttest ($t(40) = 8.06$, $p < .025$). The control group decreased the proportion of idea units recalled from pretest to posttest ($t(40) = 3.81$, $p < .025$) but the treatment group did not ($t(40) = .24$, $p > .025$). The fact that the treatment group recalled more problem/solution idea units indicates that they were looking for and remembering ideas relevant to the text structure.

Table 4

Proportion of problem/solution idea units recalled

		Pretest		Posttest	
Group	N	Mean	SD	Mean	SD
Control	24	9.62	11.11	4.92	5.13
Treatment	20	13.14	9.88	12.99	9.57

Table 4 indicates a decrease in the proportion of problem/solution idea units recalled by the control group. Each day, the control group were given five questions to discuss and answer. Three of the five questions were centred

around problem/solution text structure. However, in the reading of the passage to find the answers to the questions, the text structure was not identified and there were no connections made between the problem, the actions taken to resolve the problem, and the solution to the problem. Research has shown that the more able readers can make these connections automatically. The average readers, and the less able readers however, need assistance in helping to make these connections, thus the need for direct instruction. The treatment group showed gains in the total number of text structures idea units recalled. The mean score for the treatment group was 12.99 while the control scored 4.92. These results indicate the students in the treatment group were more aware of the text structures and their summaries centred around these structures. These students showed they were independently applying what they had learned about problem/solution text passages.

Table 5

Summary of ANOVA Statistics and Tests of Simple Main Effects Comprehension

Source	df	SS	MS	F	p
Group	1	77.92	77.92	5.96	<.05
Error(between)	43	574.90	574.90		
Time	1	285.26	285.26	43.58	<.05
Time*Group	1	29.71	29.71	4.54	<.05
Error(within)	43	224.55	5.22		

Table 6

Comprehension

		Pretest		Posttest	
Group	N	Mean	SD	Mean	SD
Control	25	3.0	2.6	5.4	3.7
Treatment	20	3.7	2.9	8.4	3.1

Table 5 indicates a statistically detectable interaction effect ($F = 4.54$, $p < .05$) on the comprehension measure. This shows that the treatment group made greater gains in comprehension than the control group. There was also a main effect for time ($F = 43.58$, $p < .05$) and a main effect for group ($F = 5.96$, $p < .05$). There were no differences in the mean comprehension scores between groups at pretest [(control group 3.0, treatment group 3.7) ($t(40) = .93$, $p > .025$)]. In the posttest however, the treatment group outperformed the control group [(control group 5.4, treatment group 8.4) ($t(40) = 3.92$, $p < .05$)].

The control group were exposed to the question/answer strategy each day. The questions were similar in format to those asked in the posttest. The practice in the question/answer strategy could account for the gain in the comprehension posttest scores. Students in the treatment group were focused on the problem/solution text structure, the problem, the action and the solution because of the direct instruction they received on this structure. As a result, their retention of the reading material was enhanced because they were able to distinguish between the main ideas and supporting details. In addition, the treatment group were able to see the relationships among the ideas which

further enhanced their comprehension and recall of text. The discussions in the control group did not necessarily revolve around the text structure of the passage. Three of the five questions on the pretest/posttest were specifically focused on the text structures, but the questions themselves did not assist students in making associations among the ideas in the passage. For example, the following comprehension questions were asked after the reading of the posttest passage "Fishermen Visit Our Shore" (page 74-75 in the social studies text):

1. Why did the fishermen salt their fish?
2. What are flakes?
3. In what country was salt very expensive?
4. How long did fishermen stay to fish in Newfoundland each season?
5. Where did French, Portuguese and Spanish fish offshore from Newfoundland?

Questions 1, 2, and 3 ask about important main ideas and are centred around the problem/solution text structure. Questions 4 and 5 assess recall of extraneous details.

Table 7

Summary of ANOVA Statistics for Ratio of Problem/Solution Ideas Recalled to Total Number of Ideas Recalled

Source	df	SS	MS	F	p
Group	1	2914.08	2914.08	4.47	<.05
Error(between)	43	24132.29	652.22		
Time	1	795.81	795.81	3.65	>.05
Time*Group	1	8405.78	8405.78	9.09	<.05
Error(within)	43	34205.44	924.47		

Table 8

Ratio of the Total Number of Problem/Solution Idea Units Recalled

		Pretest		Posttest	
Group	N	Mean	SD	Mean	SD
Control	19	61.96	32.34	33.19	26.31
Treatment	19	55.92	26.83	70.54	31.59

Table 7 presents the results of the ANOVA of the ratio problem/solution ideas recalled to total number of ideas recalled. There is a statistically detectable interaction effect for time ($F=(1,43) = 3.65$, $p < .05$), group ($F(1,43) = 4.47$, $p < .05$) and time*group interaction ($F(1,43) = 9.09$, $p < .05$), which can be intrepreted to mean that the three weeks of instruction provided valuable guidance in the change of focus for the treatment group in their reading of problem/solution text.

The ratio measurement illustrates the percentage of problem/solution idea units recalled by each person and was calculated by: $100 * \frac{\text{problem/solution idea units}}{\text{total idea units}}$

The mean ratio score of the treatment group improved from 55.92 in the pretest, to a posttest ratio score of 70.52 ($t(40) = 2.15$, $p < .025$). The control group showed a significant decrease in the mean ratio score from the pretest (65.23) to posttest (37.54 ($t(40) = 4.31$, $p < .025$). These results further indicate the positive implications that direct instruction of problem/solution text structure can have on students recall and comprehension of text.

The results were again supported by the tests completed after week one and week two.

Table 9

Mean Scores for Idea Units Recalled

	Week One			Week Two	
Group	N	Mean	SD	N	Mean	SD
Control	24	5.3	2.9	24	9.2	4.6
Treatment	22	4.1	2.7	19	14.9	4.1

A pair of t-tests revealed there was no statistically detectable difference between the treatment and control groups in ideas recalled at the end of week one ($t(45) = 1.75$, $p > .05$). However, by the end of week two, a statistically detectable difference was observed ($t(43) = 4.18$, $p < .05$). This is intrepreted as indicating that the direct instruction of the problem/solution text structure strategy was assisting students in organizing and recalling information from text.

Table 10

Mean Scores for Text Structure Idea Units Recalled

		Week One			Week Two	
Group	N	Mean	SD	N	Mean	SD
Control	24	1.0	1.0	24	5.4	3.5
Treatment	22	.9	.8	19	11.8	2.9

The testing after week one showed overall weak scores of text structure idea units recalled from both the treatment and control groups with no statistical difference between the two groups ($t(42) = .63$, $p > .05$). However, by the end of week two, there was a significant statistical difference ($t(43) = 5.95$ $p < .05$), indicating that the students' had applied the problem/solution text structure independently in their reading. One week of direct instruction was not sufficient to transfer independent use of the text structure strategy to the treatment subjects. After two weeks of instruction, subjects showed they had integrated this learning and were subsequently applying it. In addition, as noted earlier, the passage for the test after week two of instruction was taken from the students

social studies text. The problem/solution structure is not clearly stated in these passages, as was the case in the researcher prepared passage for week one testing. The results of this analysis can be interpreted as indicating that subjects were actively engaged in looking for the pattern in the text, as they had been taught, and had then learned to do. This is clearly illustrated by the results from analysing the ratio variable at week 2.

Table 11

Ratio Scores

	Week One			Week Two	
Group	N	Mean	SD	N	Mean	SD
Control	22	18.2	13.3	23	55.9	25.1
Treatment	20	19.5	17.9	19	80.6	13.2

The t-tests showed a significant statistical difference between the two groups after week two of instruction ($t(36.2) = 3.73$, $p < .05$), whereas the t-test after week one was not statistically significant ($t(42) = .82$, $p > .05$). The difference between mean ratio score in the control and

treatment groups is significant: 55.9 for the control and 80.6 for the experimental at the posttest. In addition, the standard deviations for the control group are higher indicating a greater range of scores. This could be because the higher achieving students in the control group are able to retain and identify important idea units regardless of the intervention or strategy used. In turn, the average and low achieving students may have had difficulty identifying important idea units and organizing them in schemas for later recall. The standard deviations also support the theory that "the rich get richer and the poor get poorer". The control group had a wide spread in these scores at 25.1 after the second week as indicated by the test of homogeneity of variance ($F(22,20) = 2.86$ $p < .05$). The treatment group had a smaller standard deviation (13.2) indicating less of a difference between scores and a more consistent improvement in overall recall of text structures presumably because of the direct instruction they received.

CHAPTER V

LIMITATIONS OF THE STUDY, EDUCATIONAL AND RESEARCH RECOMMENDATIONS

OVERVIEW OF THE CHAPTER

The intent of this chapter is to summarize the findings of Chapter IV and discuss the limitations of this study. In addition, this chapter discusses recommendations for education and further research.

SUMMARY OF THE STUDY

The purpose of this study was to determine if consistent direct instruction of the problem/solution text structure strategy over a period of three weeks would improve the students' comprehension of text having that structure. Results showed that students in the treatment group outperformed control students in recall of problem/solution text structure idea units and in comprehension but did not improve significantly in the total number of idea units recalled. This indicated that the students in the treatment group were focused in their reading of text, looking for the main ideas and supporting

details defined by the text structure. In addition, they were making connections between the ideas in the text. At the end of three weeks of instruction, the students in the treatment group were independently applying the strategy they had been taught in their reading and achieving some benefits. The overall conclusion to draw then is that direct instruction of problem/solution text structure in a whole class setting supplements the Nelson Networks basal reading program to enhance students reading performance.

There are five factors that are significant to the study. These include: 1) use of the summary chart and mapping frame; 2) question/answer strategy in isolation of text structure; 3) time factor; 4) change in focus of the treatment group summaries; and 5) transference of strategies to content area subjects.

Of the five text structures, problem/solution text structure is one of the more difficult to learn. Therefore, two aids were used to help students identify and organize the information from text, a mapping frame and a summary chart. This researcher observed that using the framing instruction for the first half of the quasi-experimental study was beneficial for the students in the treatment group. It helped them to visualize the text and to

illustrate the relationship between the ideas in the text, to organize the information and provide a structured overview. In addition a summary pattern was used.

Summary chart instruction included a pattern for writing a summary, guidelines for summarizing the problem/solution passages and guidelines for checking summaries. The pattern was provided to scaffold children's responses from text and provide the necessary bridge between narrative and expository writing (Hadaway & Young 1994, Lewis, Wray & Rospigliosi 1994). The value of having students write summaries is that it requires them to construct meaning by building relationships among ideas in text and between their knowledge and experience (Wittrock, 1989). Writing summaries requires the student to build relations among the words in sentences, the sentences in paragraphs and paragraphs within the text (Wittrock, 1989). Therefore, the cognitive process of writing summaries improves comprehension of text. The summary frame was used for the first seven days of the study. This researcher observed that students by this point (one and a half weeks) had received enough instruction and guided practice to write well structured summaries but we have no data to confirm this. The guide was also enlarged and posted in the

classroom for reference as needed. The control group used only the question/answer strategy.

It is known that students do learn from discussion and the question/answer strategy. However, educators must be careful about asking questions without reference to the text structure. Students need to have good questioning strategies modelled for them. They need to be encouraged to direct their reading with self-questions to construct appropriate main ideas and summaries and connect text with background knowledge and experience. They also need ways of connecting ideas together. This quasi-experiment compared the effectiveness of two distinct strategies: one demonstrating the relationships among the ideas, the other asking questions about the ideas. This justifies the importance of connecting the relationship between the problem/action/solution format present, and not so clearly present, in social studies and history textbooks.

Time was also a significant factor in strategy instruction. Students must be provided direct instruction over a period of time in order for them to be able to use the strategy independently. The study showed that after one week of instruction, there were no major differences in the scores of the control group and the treatment group in the

recall of text structure idea units. It was during the second week of instruction that the researcher noted some independence and competence in the framing and summarization of the problem/solution text. The observations were confirmed by the test at the end of week two, with the treatment group showing definite improvement over the control group. The students in the treatment group had a clear focus of what information they needed to learn from the text. Time was an important factor in enabling them to reach the point where they could achieve the goal of using the strategy independently.

The treatment group recalled significantly different information in their posttest summaries than in the pretest summaries. Seven of the nineteen students recalled only problem/solution text structure idea units. In the control group no students recalled only problem/solution text structures. These results indicate that the treatment group were active in organizing text structure, making connections between the problem, the action taken to solve the problem and the solution. The information had been organized externally and therefore recall was organized and specific. This was a result of the instruction they received.

This researcher's study differed from previous research in that students were shown how a strategy introduced in one subject area can be transferred to another content area subject. Strategy instruction is a part of the language arts program. However, content area subjects do not provide adequate strategy instruction directions in the teachers' guidebooks. Therefore, students may be familiar with the skills taught in language arts, but these skills have not become strategies for them because they cannot apply the skills to other content area subjects. Instruction in the present study began with the teaching of a unit on "horses" adapted from the prescribed Nelson Networks basal reading program. After seven days of instruction using this theme, instruction transferred to the social studies text because the problem/solution text structure is commonly used in this text and other social science texts. The strategy was modelled repeatedly for the students in the treatment group. This was followed by guided practice in how the strategy could be applied to aid in the organization and recall of information. Results of the testing after three weeks of instruction confirmed that the students had transferred the strategy introduced in language arts to the social studies text. The treatment group outperformed the control group on

the total number of problem/solution idea units recalled and on comprehension scores.

Wittrock (1989) states that "instructional intervention enhances learning or comprehension only when it induces learners to perform activities they would not otherwise perform or not perform as well" (p. 358). Instructional intervention in this study did enhance learning that would not otherwise have occurred. The study had a significant impact on the students in the treatment group because their focus and comprehension of the problem/solution text improved significantly.

LIMITATIONS OF THE STUDY

Internal Validity

The results of the quasi-experimental study are internally valid. That is, the improvement in the text structure idea units and comprehension of the treatment group can be directly attributed to the manipulation of the independent variable, the direct instruction of the problem/solution text structure. However, there are some factors that are not part of the experiment, but may effect the performance of the dependent variable.

History

One week before the study began, students in both the control and treatment group wrote down all they knew about horses. They also wrote two questions they wanted to have answered during the classes on the theme of "horses". This provided a focus for instruction and revealed any background information they may have had on the theme. It was noted by this researcher that students' background information varied from students who knew only that there were many breeds of horses, to students who could name various body parts of horses and describe the many uses of horses. These latter students already had schemas in place for the topic of horses. They may therefore have relied more on background knowledge than text structure for recall of information.

Testing

The pretest and posttest were three weeks apart. The students were familiar with the structure of the test (recall of a passage and five short answer questions). Tests after week one and week two were also of the same format with the exception of the comprehension component. Students were familiar with and prepared for the structure of the posttest because of the practice they received in the study.

In addition, the control group practised the question answer strategy daily. The questions on the posttest were similar to the questions used daily in the control group. This could be seen as preparation for the posttest and may have impacted on the results of the testing.

Course Content

The reading level of the social studies text used in the last seven days of the study was at the 7.1 reading level. A more accurate picture of the results may have been achieved if the text were written at 5.1 reading level.

Transference of Strategy

The quasi-experimental study showed statistically that the treatment group improved in their recall of text structure idea units. However, the study did not test for long term independent strategy use. It would have been beneficial to test the treatment group one week after the study was completed to check for transference of skills.

Time of Testing

Time may have affected the results. The pretest and regular classroom instruction for the control group took place last class in the afternoon. The posttest however, was administered in the morning of the last day of instruction. The researcher in consultation with the classroom teacher decided this was best because of the restlessness and on the part of some students late in the afternoon. This was especially true on days of inclement weather, when the students could not go outdoors at lunch time.

THREATS TO INTERNAL VALIDITY

Bias on the Part of the Researcher

The researcher wanted the study to work and was intense in the preparation and teaching of the content. However, bias may have unintentionally occurred. The vice principal of the school was asked by the researcher to check on both control and treatment classes on an ad hoc basis to note if any differences, other than the prescribed formulas, were evident in the teaching. In addition, the classroom teachers were present for part of all classes and no bias was noted by them. The researcher was focused and defined in the

teaching. The study may have been more valid if a classroom teacher taught the treatment and control classes and the researcher observed.

Use of Intact Groups

During the second week of instruction, students worked in pairs. A partner was assigned by the researcher in consultation with the classroom teacher. Students had not been assigned to pair or group work until this study began and therefore their cooperative skills were not as developed as the researcher had hoped. This may have impacted on the gradual release of instruction model of teaching.

Location of the Study

The school used in the study is fifteen minutes outside St. John's. Teachers in this school have easy access to the university resources and public libraries. Schools at a greater distance from the city may not have access to resources and upgrading courses that are regularly offered at the university. Students in the study may have been affected by teaching methods used by their regular classroom teachers.

RECOMMENDATIONS

The present study has resulted in the identification of several recommendations for both practice and further research.

Recommendations for Practice

1. It is recommended that teachers assess their questioning strategies. Is there a balance between the three levels of questioning, literal, interpretive, and applied? Are good questioning strategies modelled for the students? Are students actively generating their own questions during the reading process?
2. It is recommended that all teachers have access to information about research based on teaching skills and strategies. This should include current theories on the relationship between knowledge of text structure and reading comprehension.
3. It is recommended professional development programs access Stem-Net. This would provide a source of interactive communication and support as teachers apply new strategies in the classroom.
4. It is recommended that each school develop its own skills continuum. What strategies do we expect students to be using

independently at the end of grade four, grade five, and grade six?

5. It is recommended that teachers early in the year use a content area reading survey with students to find out how children feel about their reading progress in the content area subjects. This will provide opportunity for teachers to assess and direct their approach to reading strategies.

6. It is recommended that schools communicate regularly with the professional development centre of the Newfoundland and Labrador Teachers Association. Any training being provided by the centre should be reported to teachers regularly at staff meetings.

7. It is recommended the all education students be required to take a content area reading course. This course would be inclusive to all primary, elementary, junior high and senior high students.

8. It is recommended that parents be made aware of the content area reading strategies teachers are implementing. Parents will have the opportunity of reinforcing these strategies through homework and study skills, involving them more in the education process.

9. It is recommended that teachers be provided time through inservice training and grade level meetings, to view models of teaching and demonstrations of skills teaching.

10. It is recommended that teachers use summaries more frequently in content area subjects. Teachers must initially provide a scaffold for students making the transition from narrative to expository writing.

Recommendations for Further Research

The present study has resulted in the identification of several directions for further research:

1. Extensive research is needed to determine if gaps exist in content area teacher guidebooks across the curriculum in the teaching of strategies. Elementary teachers depend on guidebooks for direction. Guidebooks must provide the necessary strategy instruction techniques that consistent with current research.
2. More research needs to be done to evaluate teacher training. Currently, education students are required to complete one reading course, one language arts course and one children's literature course. To what degree are these courses meeting the needs of new teachers in elementary classrooms?
3. Further research is needed to determine the types of professional development programs that are most effective in meeting the needs of teachers currently employed in elementary schools throughout Newfoundland and Labrador. Teachers in outport community schools as well as inner city schools need to have equal access to professional development. How can this be done successfully? Are the needs of each group different?

4. This was a limited study which explored one specific strategy in one classroom of one school. A more extensive study is warranted using larger representatives of the population of elementary students in both rural and urban settings. Instruction would include teaching more than one strategy over a longer period of time.

5. Further research is needed to determine the influence of the publication of the "The Royal Commission Learning Outcomes" on elementary teachers focus in the classroom. Will teachers teach from the target goals and ignore the strategies that are so necessary in elementary? Will new sets of objectives be devised by teachers to meet these target goals? What guidance will be given to teachers in implementing these target goals?

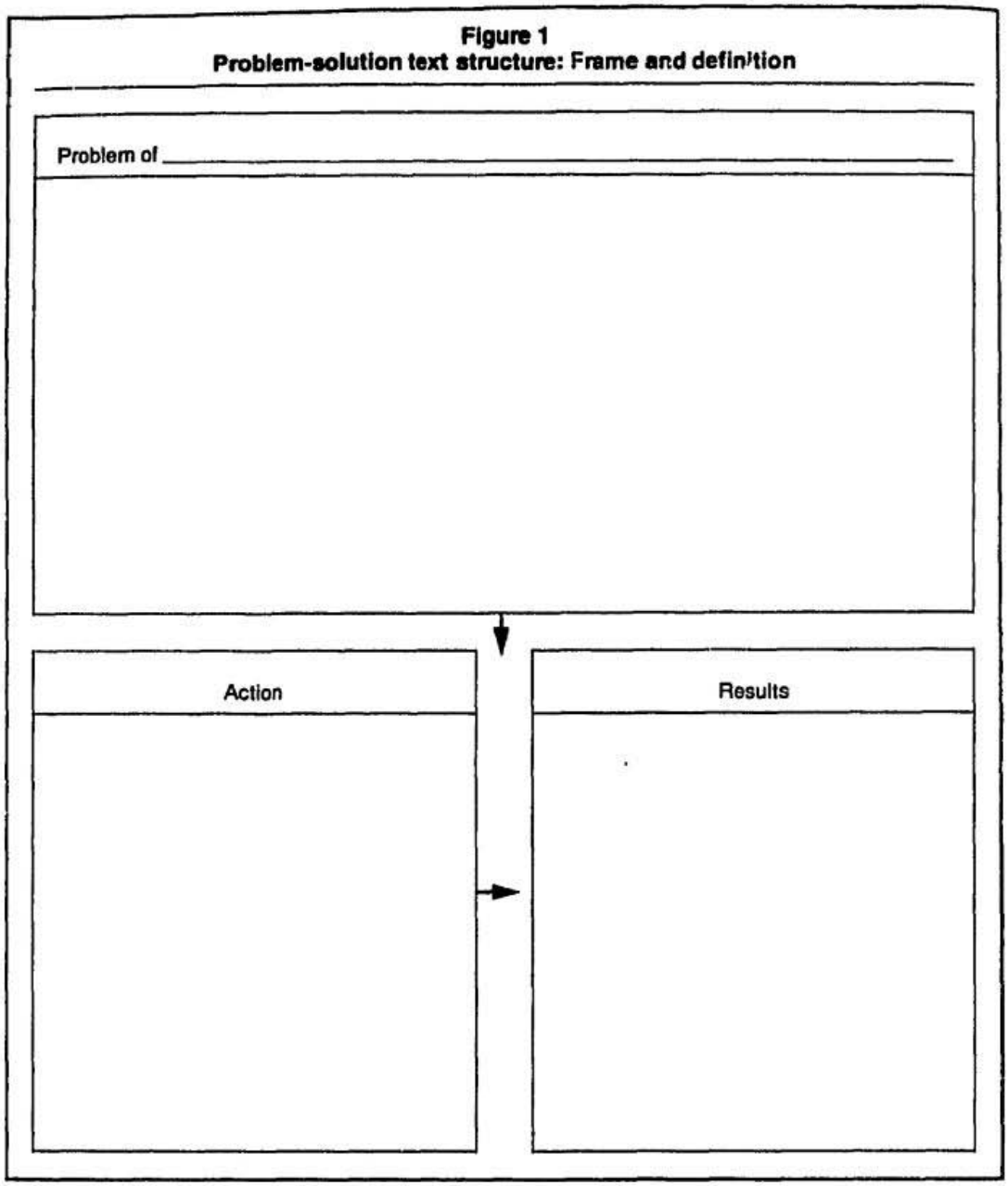
7. Further research needs to be conducted to ascertain what specific text structure strategies can be successfully taught at elementary grade levels.

8. More research needs to be conducted on the teaching of study skills in elementary grades. Are study skills being taught? How can study skills be effectively taught in the classroom in context of the particular content area text book? How can we add on to these study skills each year to help students cope with more demanding text?

9. Further research needs to be conducted on the interactive qualities of pictures in content area texts. Do they adequately show the relations among the parts of the text they attempt to interrelate?

APPENDIX A

Figure 1
Problem-solution text structure: Frame and definition



Problem = something bad; a situation that people would like to change
Action = what people *do* to try to solve the problem
Results = what happens as a result of the action; the effect or outcome of trying to solve the problem

GUIDELINES FOR SUMMARIZING PROBLEM/SOLUTION PASSAGES

How to summarize problem/solution passages:

Sentence 1: tells who had a problem and what the problem is.

Sentence 2: tells what action was taken to try to solve the problem.

Sentence 3: tells what happened as a result of the action taken.

Pattern for Writing a Summary of a Problem/Solution Passage

_____ had a problem because _____

_____.

Therefore, _____.

As a result, _____.

Guidelines for Checking Summaries of Problem/Solution Passages

Check to see that:

1. Your summary has all of the information that should be in summary of a problem/solution passage. Compare your summary with the original problem/solution passage to make sure that the summary is accurate and complete.
2. You have used complete sentences.
3. The sentences are tied together with good connecting words.
4. The grammar and spelling are correct.

Pretest Passage

FINDING THE WAY

Hundreds of years ago, before they had **navigational** tools, sailors did not like to leave the sight of land for fear of getting lost. By AD 1200, European sailors were using the magnetic compass. The needle of the compass always points north so sailors could tell in which direction they were going.

While the magnetic compass could show sailors in which direction they were moving, it could not tell them where they were. To pinpoint their position, sailors need to know how far east or west, north or south they are in relation to something which does not move. We now use lines of latitude and longitude to pinpoint positions. One special line of latitude, the equator, helps us to know how far north or south we have travelled. Another special line, the prime meridian, helps us figure out how far east or west we have travelled.

By the 1490's, sailors had learned to find their latitude by measuring the angle of the sun's rays. Now they knew exactly how far north or south of the equator they were. Knowing their latitude and their direction, they could find their way across the ocean. It was many years before sailors could use longitude.

After boats sailed all around our coastline, sailors knew how to get from place to place safely. In order to remember their way, they made up songs. The most famous of these songs is the "Wadham's Song," written in 1756.

(p. 66, in <u>The Atlantic Edge: Living in Newfoundland and Labrador</u>)

Posttest Passage

FISHERMEN VISIT OUR SHORE

News of the excellent fishing around our province spread quickly. Many fishermen from England, France, Portugal and Spain set out each spring to catch the fish that Europeans needed in winter.

In those days, there were no refrigerators and people didn't know how to can food. The only way to keep fish from spoiling was by salting and drying it. The French, Portuguese and Spanish could get salt very cheaply. Therefore they could salt their fish heavily and dry it after they returned home. They could fish offshore on the Grand Banks.

In England, salt was expensive, so the English fishermen used as little as possible to preserve their fish. This meant they had to dry it before returning home. To do this, they had to set up summer fishing stations along the shores of Newfoundland.

Each spring, most of the English ships sailed directly to the harbours that lie between Cape Race and Cape Bonavista. They fished from their sailing ships or from small boats. On shore, they cleaned the fish and lightly salted it. If there were no rocky beaches to dry the fish on, they built **flakes**. They also built bunkhouses and cookhouses for the workers.

Each fall, before the bad weather came, the fishermen returned to England. The flakes, sheds and bunkhouses were left. In spring the ships returned to the same harbour. After the crew repaired any buildings that may have been damaged in winter storms, they were ready to start another season.

(p. 74 in <u>The Altantic Edge: Living in Newfoundland and Labrador</u>)

REFERENCES

Applebee, A. (1978). The child's concept ofstory. University of Chicago Press, Chicago.

Armbruster, B., & Anderson, T. (1981). Teaching text structure to improve reading and writing. The Reading Teacher, 42, 130-137.

Armbruster, B., Anderson, T., & Ostertag, J. (1989). Does text structure/summarization instruction facilitate learning for expository text? Reading Research Quarterly, 22(3), 331-346.

Armbruster, B., & Gudbrandsen, B. (1986). Reading comprehension instruction in social studies programs. Reading Research Quarterly, 21(1), 36-48.

Aulls, M. (1982). Developing readers in today's elementary school. Boston: Allyn and Bacon.

Baker, L., & Stein, N. (1981). The development of prose comprehension skills. In C. M. Santa & B. L. Hayes (Eds.), Children's prose comprehension, (pp. 7-43). Newark International Reading Association.

Barron, R. (1981). Development of visual word recognition: A review. In T. G. Walker & G. E. MacKinnon (Eds.), Reading research: Advances in theory and practice. Vol. 3, (pp. 119-158). New York: Academic Press.

Bartlett, F. (1932). Remembering. Cambridge, England: Cambridge University Press.

Baumann, J. (1984). The effectiveness of a direct instruction paradigm for teaching main idea comprehension. Reading Research Quarterly, 20(1), 93-115.

Bean, T., Singer,H., Sorter, H., & Frazee, C. (1987). Acquisition of hierarchically organized knowledge and prediction of events in world history. Reading Research and Instruction, 26, 99-114.

Berkowitz, S. (1986). Effects of instruction in text organization on sixth-grade students memory for expository reading. Reading Research Quarterly, 21, 161-176.

Best, J. (1992). Cognitive psychology (3rd ed.). New York: West Publishing Company.

Britton, B., & Black, J. (Eds) (1985). Understanding expository text: A theoretical and practical handbook for analysing explanatory text. Hillsdale, N.J.: Lawrence Eribaum Associates.

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

Cook, L., & Mayer, R. (1988). Teaching readers about the structure of scientific text. Journal of Educational Psychology, 80(4), 448-456.

Cramm, F., Fizzard, G. (1991). The altantic edge: Living in Newfoundland and Labrador. St. John's, Nfld.: Breakwater.

Department of Education (1994). English language arts primary-level III curriculum framework draft. Division of Program Development, Government of Newfoundland and Labrador, St. John's, N.F.

Dreher, M., & Singer, H. (1980). Story grammar instruction unnecessary for intermediate grade students. The Reading Teacher, 34, 261-266.

Durkin, D. (1978). What classroom observations reveal about reading comprehension instruction. Reading Research Quarterly, 14(4), 481-533.

Durkin, D., (1984). Is there a match between what elementary teachers do and what basal reader manuals recommend? The Reading Teacher, 37, 734-744.

Farr, R. (1971). Measuring reading comprehension: An historical perspective. In F. Greene (Ed.), Reading: The right to participate. Twentieth Yearbook of the National Reading Conference.

Fielding, E. (1990). Reading in the content areas: The importance of choosing appropriate level texts. Reading, 24, 179-184.

Fielding, L., & Pearson, D. (1994). Reading comprehension: What works. Educational Leadership, 44, 62-68.

Fielding, L., & Pearson, D. (1991). Comprehension instruction. In R. Barr, M. Kamil, P. Mosenthal, & D. Pearson (Eds.), Handbook of reading research: Volume II, (pp. 815-860). New York: Longman.

Flood, J. (1986). The text, the student, and the teacher: Learning from exposition in middle schools. The Reading Teacher, 39(8), 784-791.

Flood, J., & Lapp, D. (1991). Reading comprehension instruction. In J. Flood, J. M. Jensen, D. Lapp, & J. R. Squire (Eds.), Handbook of research and teaching the English language arts, (pp. 559-586). New York: MacMillan.

Frager, A. (1993). Affective dimensions of content area reading. Journal of Reading, 36(8), 616-622.

Fry, E. (1990). A readability formula for short passages. Journal of Reading, 32, 292-297.

Gates, A., & MacGinitie, W. (1965). Gates-MacGinitie reading tests: Survey D, form 2. New York: Teachers College Press.

Gates, A., MacGinitie, W. (1965). Gates-MacGinitie reading tests: Teachers manual. New York: Teachers College Press.

Gee, T., & Forester, N. (1988). Content reading programs: Meeting the promises. NASSP Bulletin, 72, 95-101.

Gee, T., & Rakow, S. (November, 1991). Content reading education: What methods do teachers prefer? NASSP Bulletin, 76, 104-110.

Gordon, C. (1990). Contexts for expository text structure use. Reading Research and Instruction, 29(2), 55-72.

Hadaway, N., & Young, T. (1994). Content literacy and language learning: Instructional decisions. The Reading Teacher, 47(7), 522-527.

Holdaway, D. (1979). The foundation of literacy. New York: Ashton Scholastic.

Hughes, M., McInnes, J. (1985). Reading and how. Scarborough, Ont.: Nelson Canada.

Irvin, J. (1990). Reading and the middle school student: Strategies to enhance literacy. Toronto: Allyn and Bacon.

Lewis, M., Wray, D , & Rospigliosi, P. (1994). "...And I want it in your own words". The Reading Teacher, 47(7), 528-536.

Mandler, J., & Johnson, N. (1977). Remembrance of things parsed: Story structure and recall. Cognitive Psychology, 9, 111-151.

Marzano, R. (1991). Language, the language arts, and thinking. In J. Flood, J. M. Jensen. D. Lapp, & J. R. Squire (Eds.), Handbook of research and teaching the English language arts, (pp. 559-586). New York: MacMillan.

Mayo, K. (1993). Learning strategy instruction: Exploring the potential of metacognition. Reading Improvement, 30(3), 130-133.

McGee, L., & Richgels, D. (1985). Teaching expository text structure to elementary students. The Reading Teacher, 38(8), 739-748.

McInnes, J. (1988). Reading and how. Special features of a unique text, (pp. 1-3).

McInnes, J., Goepfert, P., Moore, W., & Wheatley, J. (1985). Networks: Teacher's resource book, book B. Scarborough: Nelson Canada.

McNeil, J. (1987). Reading comprehension: New directions for classroom practice. Los Angeles: Scott, Foresman and Company.

Moore, D., Readence, J., & Rickleman, R. (1983). An historical exploration of content area reading instruction. Reading Research Quarterly, 18(4), 419-438.

Olson, M., & Gee, T. (1991). Content reading instruction in the primary grades: Perceptions and strategies. The Reading Teacher. 45(4), 298-307.

Osborn, J. Jones, B., & Stein, M. (1992). The case for improving textbooks. Educational Leadership, 42, 9-16.

Palincsar, A. (1986). Metacognitive strategy instruction. Exceptional Children, 53(2), 118-124.

Palincsar, A. (1982). Inducing strategic learning from texts by means of informed, self-control training. Topics in Learning and Learning Disabilities, 2, 1-17.

Palincsar, A., & Brown, A. (1987). Enhancing instructional time through attention to metacognition. Journal of Learning Disabilities, 20(2), 66-75.

Palincsar, A., & Brown, A. (1984). Reciprocal teaching of comprehension fostering and comprehension monitoring activities. Cognition and Instruction, 1, 117-175.

Pearson, D. (1985). Changing the face of reading comprehension instruction. The Reading Teacher, 38(8), 724-738.

Phinney, M. (1988). Reading with the troubled reader. Toronto: Scholastic.

Piaget, J. (1973). Memory and Intelligence. New York: Basic Books.

Pressley, M., Burkell, J., Cariglia, T., Lysynchuk, L., Mc Goldrick, J., Schneider, B., Snyder, B., Symons, S., Woloshyn, V. (1990). Cognitive strategy instruction that really improves children's academic performance. Cambridge, Ma.: Brookline Books.

Pressley, M., & Harris, K. (1990). What we really know about strategy instruction. Educational Leadership, 48, 31-34.

Prince, A., & Macus, D. (1987). Enriching comprehension: A schema altered basal reading lesson. Reading Research and Instruction, 27, 45-54.

Readence, J., Bean, T., & Baldwin, R. (1989). Content area reading: An integrated approach. Dubuque, Iowa: Kendall/Hunt.

Reutzel, D., (1985). Story maps improve comprehension. The Reading Teacher, 38,(4), 400-404.

Rinehart, S., Stahl, S., & Erickson, L. (1986). Some effects of summarization training on reading and studying. Reading Research Quarterly, 21, 422-438.

Rodriguez, J. (1985). When reading less can mean understanding more. Journal of Reading, 29, 701-705.

Rossi, J. (1990). The function of frame in the comprehension of scientific text. Journal of Educational Psychology, 82(4), 727-732.

Routman, R. (1991). Invitations. Toronto: Irwin Publishing.

SAS (1990). SAS/STAT User's Guide, Cary, N.C.: SAS Institute

Singer, H., & Donlan, D. (1989). Reading and learning from text. New Jersey: Lawrence Eribaum Associates.

Slater, W., & Graves, M. (1989). Research on expository text: Implications for teachers. In K. Denise Muth (Ed.), Children's comprehension of text: Research into practice, (pp. 140-166). Newark, Delaware: International Reading Association.

Spiegel, D., & Fitzgerald, J. (1983). Enhancing children's reading comprehension through instruction in narrative structure. Journal of Reading Behaviour, 15(2), 1-17.

Spires H., Gallini, J., & Riggsbee, J. (1992). Effects of schema-based and text structure-based cues of expository prose comprehension in fourth graders. Journal of Experimental Education, 60(4), 307-320.

Stein, N. (1988). How children understand stories: A developmental analysis. Early Childhood Education, (pp. 261-290).

Stein, N., & Garfin, D. (1977). Preschool children's understanding of stories. Unpublished manuscript, University of Illinois: Urbana-Champaign.

Stein, N., & Glenn, C. (1979). An analysis of story comprehension in elementary school children. In R. O. Freedle (Ed.), New directions in discourse processing: Multidisciplinary perspectives, Vol. 2 (pp. 53-120). Norwood, N.J.: Ablex.

Taylor, B. (1985). Improving middle-grade students' reading and writing of expository text. Journal of Educational Research, 79, 119-125.

Taylor, B., & Beach, R. (1984). The effects of text structure instruction on middle grade students' comprehension and production of expository text. Reading Research Quarterly, 19(2), 134-146.

Taylor, B., & Samuels, S. (1983). Children's use of text structure in the recall of expository material. American Educational Research Journal, 20(4), 517-528.

Vacca, R., & Vacca, J. (1993). Content area reading. (4th ed). Harper Collins College Publishers, New York.

Weaver, C., & Kintsch, W. (1991). Expository text. R. Barr, M. L. Kamil, P. Mosenthal, & P. D. Pearson (Eds.), Handbook of reading research, (pp. 230-245). New York: Longman.

Wittrock, M. (1989). Generative processes of comprehension. Educational Psychologist, 24(4), 345-376.