

THE EFFECTS OF INSTRUCTION IN TWO LEVELS OF METACOGNITION
ON THE SUMMARY WRITING ABILITY OF SIXTH GRADE STUDENTS

A Thesis

submitted to the Faculty of the Graduate School

of the University of Manitoba

by



Rosalind J. Burnette

In Partial Fulfillment of the Requirements
for the Degree of Master of Education

December 1988

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ROSALIND J. BURNETTE

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ABSTRACT

The general objective of this study was to determine the degree of instructional explicitness required to help competent and less competent sixth grade readers understand that a summarization intervention procedure was appropriate to use in future independent learning. More specifically, the study examined whether 51 sixth grade students (a) applied a summary writing intervention procedure in a new situation using sociology passages when instruction involved the summarizing of history text and (b) maintained the use of the summarizing strategy over time.

Three levels of explicitness were compared: informed, self-control and blind training. In informed training, subjects were taught to use a summarization strategy and given information about the significance of that strategy. In self-control training, subjects were instructed in (a) the use of the summarization strategy, (b) its relevance in terms of when and why to employ it, and (c) the self-monitoring, checking and evaluation of their summaries. In blind training, which served as a control, students were taught to use the summary writing strategy without being given an understanding of its significance.

Instruction was delivered over six, 60 minute sessions excluding the pretest, immediate and delayed posttests. History passages were used for instruction while test passages were chosen from both history and sociology texts.

Students' summaries were evaluated in terms of product (main idea and efficiency) and process (rule application). The summaries of competent and less competent readers were examined separately to establish how the interventions affected sixth graders of different abilities.

As indicated by main idea scores on immediate post instruction summaries of both history and sociology texts, self-control training appeared to be generally more effective than either of the other two treatments, although there were no significant treatment effects for efficiency and rule application. Delayed posttest results were similar for history text summaries. That is, self-control training seemed to be more effective than the other treatments as measured by main idea scores but not as measured by efficiency and rule application. For sociology text summaries, students given self-control training performed better on all summary writing measures. The effects of self-control, informed and blind training were overall not significantly different for competent and less competent readers, although as measured by main ideas found in summaries, the performance of the competent readers in the blind training group failed to match the performance of the competent readers in the self-control training group. It was concluded, that in the long run, the most useful summarization intervention for sixth grade readers was the most explicit self-control training because self-control training not only facilitated maintenance in the training situation but was most effective for transfer. This conclusion was supported by student interviews.

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DEDICATION

To my mother, Beatric C. Burnette

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CHAPTER 1

NATURE OF THE STUDY

This study sought to determine the degree of explicitness of instruction required for the understanding of the use of an intervention procedure in writing summaries at the sixth grade level. Two different levels of explicitness were compared: informed and self-control training. In informed training, subjects were taught to use a summarization strategy and given information about the significance of that strategy. In self-control training, subjects were instructed not only in the use of the summarization strategy and its significance, but also given explicit direction in how, and when to employ summarization and to monitor, check and evaluate their application of the strategy. Both types of training are considered elements of metacognition (Brown, Campione and Day, 1981).

The performance of students receiving the two levels of metacognitive instruction was contrasted with the performance of sixth graders given conventional instruction (blind training) in how to write summaries. In blind training, the students were taught to use the strategy for writing summaries without an understanding of the significance of the strategy hence it excluded training in metacognition.

Supplementary goals of the study were to discover whether students applied the intervention in new situations and whether use of the intervention was maintained over time.

The materials used for instruction in writing summaries were selected from the field of history, while materials used to measure the ability to write summaries and determine the extent of transfer were chosen both from history and sociology texts.

Rationale for the Study

Justification for the Use of Metacognitive Training

One of the goals of teaching is the improvement of students' learning abilities. In recent years, several well developed positions on cognition and metacognition have influenced instructional programs designed to help students learn how to learn. Among these are Flavell's (1976, 1979) theory on metacognitive training, Sternberg's (1983) guidance for intelligence training, and Gagné's (1985) theory of learning. The metacognitive perspective focuses on enhancing students' metacognitive knowledge as a basis for developing executive control skills in the maintenance and transfer of learning strategies. Sternberg's (1983) guidelines for intelligence training suggest that learning ability is a form of intelligence that has training components, and emphasize the importance of providing adequate linkages between the processing skills being taught and their transfer to real world situations. Gagné's (1985) theory implies that learning ability is partly trainable intellectual skills and partly strategic thinking which evolve as a function of experience and intelligence. Derry and Murphy (1986) assert that such perspectives all lead to the conclusion that the improvement of learning ability "necessitates development not only of specific skills, which we know how to teach, but also an executive

control mechanism that automatically accesses and combines learning skills when they are needed". (p. 1)

Metacognition has been receiving substantial attention from educators. By the early 1980s, a significant body of literature pertaining to the role of metacognition in the acquisition and use of learning skills had developed. On the other hand, much is yet to be uncovered thus there is need for more research in the area.

For the purpose of this study metacognition refers to learners' awareness of their own learning processes as well as their ability and tendency to control metacognitive processes during learning (Jones et al., 1987). According to Jones and his colleagues, awareness pertains not only to knowledge of specific cognitive strategies but also to knowledge of how and when to use them. Control is the capacity to monitor and direct successful implementation of a task at hand (Baker & Brown, 1984; Garner, 1987; Jones, Palincsar, Ogle & Carr, 1987).

There are two levels of metacognition. At a superficial level learners may be able to verbalize but not transfer metacognitive knowledge adequately. This level is characteristic of informed training. At a more sophisticated level, learners demonstrate both the ability and tendency to control their learning through the application of metacognitive processes. Thus depending on the degree of metacognition, mainly awareness and very little control may be involved. With deeper levels of metacognition, however, learners demonstrate both awareness and control over their own thinking and study procedures. A question this study addressed was whether informed training was sufficient to help competent and less competent readers gain both awareness and control over thinking and learning strategies.

The concept of metacognition and the elaboration of its application is often attributed to Flavell (1976, 1979). Flavell's theory is comprised of four components: action, goals, metacognitive experience and metacognitive knowledge. Accordingly, the model reader is assumed to select or formulate certain cognitive plans, strategies or actions in pursuit of certain learning goals. Successful implementation of the strategies reinforces and refines the student's store of metacognitive knowledge about learning. Derry and Murphy (1986) explain that Flavell's theory represents an attempt to operationalize the developmental process whereby learning ability improves. Derry and Murphy (1986) argue that if Flavell's assessment is accurate, it follows that there are four general categories of training to be attempted in metacognition: (a) helping students develop a store of skills, (b) training students to recognize what they must learn, (c) intensifying the frequency and quality of experiences that lead to insights about learning, and (d) helping students build a library of information about the utility of learning strategies including when and how to use them.

According to Derry and Murphy (1986) skill training, is least problematic. These authors contend that students of nearly any age can be induced to outline and rehearse, for example. They nevertheless emphasize that the acquisition of these behaviours alone does not necessarily transfer. Students may not realize the value of the activities for enhancing learning in other situations. Metacognitive theory would attribute this to the fact that learning ability includes additional metacognitive knowledge governing how and when to deploy strategies.

Metacognition and Reading

The whole issue of metacognition is important to the field of reading. By the early 1980s a number of studies had been conducted to determine the effectiveness of metacognitive skills training to enhance reading achievement. For example, André and Anderson (1978-1979) found that students who were taught to generate main idea questions constructed better questions than those who were not. Adams, Carnine and Gersten (1982) were able to substantiate the efficacy of training students in the use of metacognitive skills such as rereading for clarification, using subheadings and carrying out reviews. Students trained in those skills performed better in later reading activities than those who were not. A study by Brown, Campione and Barclay (1979) supported the hypothesis that students who learned to recite and review information remembered material better than those who were not taught to use those strategies.

It appears however, that the specific approach used in metacognitive strategies has significant effects on the application of those strategies.

Approaches to Metacognitive Training

Before discussing approaches to metacognitive training, it is necessary to examine the conventional method of teaching learning skills. This approach is often employed when students are taught to outline or to summarize to help master text content. Brown, Campione, and Day (1981), Brown, Bransford, Ferrara and Campione (1982) call this "blind training."

Blind training. Blind training helps students to employ a learning strategy without being instructed in how the strategy helps performance or how the strategy is appropriate for facilitating learning in other situations (Brown et al., 1981; Brown et al., 1982).

Such blind training often results in improved performance because students are participating in an appropriate learning activity. However, not realizing the significance of the strategy, students do not continue to apply the strategy nor realize that the strategy is generalizable to other situations. This limited outcome has been attributed to the absence of metacognitive training as part of instruction.

To overcome the weaknesses of blind training, metacognitive instruction has been incorporated into instruction in a number of studies. Brown et al. (1982) identify two levels of metacognitive training: informed training and self-control training.

Informed training. Brown, Campione and Day (1981), Brown, Bransford, Ferrara, and Campione (1982) and Derry and Murphy (1986) point out that informed training enhances direct intervention strategy training because information regarding the significance of the strategy is included. Paris and Jacobs (1984) stipulate that through informed training, students' learning may be enhanced by three kinds of knowledge. The first kind, commonly referred to as declarative knowledge, includes propositions about a domain or skill ('knowing that'). The second kind is procedural knowledge because it conveys information about actions ('knowing how'). Conditional knowledge, refers to the particular circumstances under which a student applies declarative and procedural knowledge. Paris and Jacobs (1984) believe that it is knowing when and why to apply strategies that makes a reader strategic and

flexible rather than mechanical. Brown et al. (1981) maintain that informed training leads both to improved performance on the training task and future maintenance of the activity in the face of similar tasks. Brown et al. (1981) caution nevertheless, that although there is some evidence that generalization takes place, the evidence may be challenged because performance has been evaluated on posttest tasks that are very similar to the training tasks.

Self-control training. According to Archer (1979), Brown et al. (1981), Brown et al. (1982), and Garner (1987) self-control training is superior to informed training. Students are not only instructed in the use of a strategy but receive explicit instruction in how, when and why to employ the strategy and to monitor, check and evaluate the effectiveness of that strategy. Brown et al. (1982) suggest that direct instruction in self-control skills is particularly important in the context of transfer. In self-control training the instructor attempts to emulate the spontaneous producer. The trained students are consequently taught to produce and regulate their study activities. It would appear that teaching students to monitor and regulate their study activities as an addition to informed training enhances the transfer effects. Accordingly, if students are taught how to monitor their performance, they can see their improvement for themselves. At this level of instruction, students are provided with feedback about strategy effectiveness. The extent to which this self-regulatory control training occurs then, is the crucial element in metacognitive instruction leading to more widespread effects than the provision of informed training only. Consistent monitoring of performance has the potential of enabling students to determine the effects of any number of routines for improving their learning.

The results of studies employing self-control training are encouraging, but are limited in number (Baker & Brown, 1984). There is need for more research in this area. Furthermore, there is controversy regarding the need for explicit instruction in self-control training for all children (Day, 1980; Jones et al. 1987). The question then, is whether students differing in reading ability, for example, profit equally from self-control training.

Justification for the Selection of Summarization

Summarization was the intervention strategy chosen for this study. Summarization refers to the skill of producing a shortened version of a particular passage, (Day, 1980).

According to Rubin (1983) summarization is a viable means of having students gain essential information. She contends that summarization is a mode of learning that helps students retain the most important concepts and facts in a long passage. It forces students to think about what they have read and to identify and organize the essential information. As support, Garner (1987) claims that summarization is a tool not only for making cognitive progress but also for monitoring it. It allows learners to synthesise information from multiple sources and diverse perspectives, making it a prerequisite for adept completion of such common tasks as writing reports and writing responses to essay examinations. Garner (1987) explains that as a metacognitive strategy summarization allows learners to attempt a synopsis of what has been read. If students cannot produce abbreviated versions of texts, some remedy, perhaps rereading the material, must be applied. Thus, text summarization is extremely important to the learning of content material.

Creating a summary reduces information to manageable units. To do this effectively, students must reprocess the text and identify what is important. While text reinspection facilitates mastery of the content, the summary itself contains the essential information that needs to be mastered. Students can use the summary for studying.

Creation of a summary is well articulated by Kintsch and van Dijk (1978) who have developed a model of text comprehension and production. Their model suggests that in addition to having a schema for the ideas in a text, readers possess a schema for the way the text is organized, forcing the use of macrorules which act on the micropropositions in the material. As they read the text, learners formulate a macrostructure, gist or summary for the material. The macrorules have specific functions such as deletion, generalization, and construction. Since no reader is capable of recalling everything from a passage, a macrostructure is formed representing the information that a reader regards as important. Thus, it is the macrostructure and not the original text that the reader remembers, and when attempting to recall the material, readers use this macrostructure.

Despite the apparent importance of summarization, there is much need for improvement in students' summarization skills. Evidence of students' lack of proficiency at summarization has been revealed in studies using summarization rules derived from Kintsch and van Dijk's (1978) macrorules (Brown & Day, 1983). The rules are (a) delete trivia, (b) delete redundancies, (c) substitute a superordinate for a list of actions, (d) select a topic sentence if one is available and (f) invent a topic sentence if none is available. Indications are that summarization proficiency is not necessarily acquired by all college

students (Baker & Brown, 1984), nor by high school students (Brown, Day & Jones, 1983). Young and/or poorer readers make decisions about what to include in a summary on a piecemeal or sentence by sentence basis, while older and/or good readers base their decisions on the meaning of the whole text (Brown, Day & Jones, 1983; Winograd, 1984). Other research (Brown, Campione, & Day, 1981) suggests that students in grades 5 and 7, for example, are deficient in substituting superordinates for lists of items or actions in text and in selecting in-text topic sentences to include in a summary; they also revealed inadequate planning, condensing and revising abilities.

A search of the literature suggests that little work on summarization has been conducted with upper level elementary school students. Hahn and Goldman (1983), for example, found developmental differences in summaries of expository texts compiled by Grades 4 and 6 students. The texts used in the Hahn and Goldman (1983) investigation were only manipulated for the presence or absence of topic sentences. Since Grades 5 and 7 students proved to be deficient in summarization skills (Brown, Campione, & Day, 1981) it could be concluded that sixth-graders would be deficient in those skills as well.

On the other hand, Day (1980) and Hare and Borchardt (1984) have demonstrated that summarization can be taught. Day (1980) developed and implemented a summarization training program in which she taught five summarization rules to junior college students of average and poor writing ability. Subjects were assigned to one of four training conditions varying in the explicitness of instruction. Training took place over two 60 minute class sessions designed to encourage students in the direction of self-management. Results favoured the most explicit self-control training condition. Borrowing from the work of Brown and Day

(1983) and Day (1980), Hare and Borchardt (1984) designed two versions of Day's (1980) most explicit summarization intervention program, one taught inductively and one taught deductively to two experimental groups. Hare and Borchardt's (1984) investigation was conducted with high school students over three 2-hour sessions excluding pre and post-test sessions. No significant differences were observed between the experimental groups on summary process and product scores. However, the two experimental groups were different from a control group in terms of summarization efficiency and summarization rule usage.

It needs to be pointed out, however, that the studies of Day (1980) and Hare and Borchardt (1984) had shortcomings. The passages used in Day's (1980) investigation were not ecologically valid since subjects were at the college level, while the passages were at the grade 5 readability level. Furthermore, Day's instructional sessions (two 1 hour classes) were inadequate and the time lapse of only two-three weeks between training and delayed posttesting was too short. Similarly, Hare and Borchardt's (1984) instructional periods (three 2 hour sessions) were too few even if they were an improvement over Day's (1980). The two week interval between training and maintenance testing proved to be too short. These criticisms are well founded.

Given the results of Day's (1980) and Hare and Borchardt's (1984) investigations, a study was designed to evaluate the most appropriate procedure for grade six students. The most explicit self-control program was adapted and contrasted with an informed and a blind training program. The instructional periods were increased, allowing skills to be taught more progressively and using more ecologically valid teaching material. Finally, maintenance testing was administered two months after training.

Justification for the Selection of Grade Six Students

Grade six students are representative of students at the upper elementary levels. Content area texts are an important learning source at higher levels in the school system, therefore, children in the upper elementary grades must learn how to read and study content area material. Report writing, test preparation and synopsis of text are all important learning activities for upper elementary grade students and the ability to summarize is essential to the successful completion of these activities.

Summary of Rationale for the Study

Various degrees of intervention have been used in helping students learn from text. Among them are blind, informed and self-control training. There is consensus that incorporating metacognitive strategies in instruction is more beneficial than teaching through blind training. Informed training, as one level of instruction in metacognition, is beneficial but self-control training appears to be more advantageous in terms of efficacy, durability and generalizability. However, there is need for further investigation into self-control training. Moreover, there is still the issue over whether all students need the intensive explanation given in self-control training. Finally, more information is required regarding whether self-control training is necessary for students of differing reading abilities.

Research indicates that summarization is an appropriate intervention strategy for investigation as it has a defined, teachable and important role in learning. Grade six students are at the stage where learning from text is becoming more important thus summarizing text

is an important study skill for upper elementary school students for writing reports and essays. To date, little research have been conducted involving grade six students as subjects.

It appeared that Day's (1980) and Hare and Borchardt's (1984) summarization interventions involving self-control training could be adapted for use with grade six students with more instructional periods and more ecologically valid texts. The time lapse between training and strategy maintenance testing also had to be increased. Finally, the self-control training had to be contrasted with another level of metacognitive training, informed training, and with conventional blind training. Results would then indicate the level of training appropriate for competent and less competent sixth graders.

Scope of the Study

This study was designed to implement and evaluate three summarization intervention strategies involving competent and less competent grade six readers. The general objective was to determine the degree of explicit instruction required to ensure that students understood that an intervention procedure for creating text summaries was useful to facilitate independent learning. Other purposes were to discover whether subjects used the intervention in new situations and whether the intervention was maintained over time. Two experimental treatments involving different levels of metacognitive training were employed in teaching summarization. One group of sixth graders focussed on informed training and another on self-control training. In addition, a control treatment, blind training, was instituted.

In the informed training experimental group, students were taught how to use a summarization strategy and given information about the significance of the strategy, when, why and how it might be used in other learning situations. In the self-control training, sixth graders were not only instructed in the use of the summarization strategy but also received explicit instruction in how, when and why to employ the strategy and to monitor and check strategy use. The summary writing performance of the two experimental groups was contrasted with the summary writing performance of a blind training group which served as a control which was taught to use the summarization strategy without understanding the significance of that strategy for studying and independent learning.

Material for the investigation was selected from grade six social studies texts. History texts were used for instruction while both history and sociology texts were used for testing. The quality of student summaries was evaluated in terms of both product and process using a procedure employed by Hare and Borchardt (1984).

Summary of Scope of the Study

The major research question was what degree of explicit instruction was required to ensure that competent and less competent grade six students understood that an intervention procedure for creating text summaries was useful for independent learning. The study also examined whether subjects applied a summarization intervention procedure in new situations and whether the intervention was maintained over time. To this end pre, post and delayed-post summaries were evaluated both for product and process variables. The specific questions can be summarized as follows.

Questions for the Study

Immediate summaries. The first issue was to examine what degree of explicitness in terms of instruction was necessary for both competent and less competent readers to write effective summaries. The second issue was to establish whether instruction was transferred and helped students cope with new material such as sociology text. The first questions of the study therefore were: For competent and less competent readers at the grade six level, are there significant differences in the summaries of history and sociology texts written immediately after an instructional program in terms of product (main idea and efficiency) and process (rule application) between -

1. students given informed training and students given self-control training?
2. students given informed training and students given blind training?
3. students given self-control training and students given blind training?

Delayed summaries. A second area of study involved the question of strategy maintenance over time. Questions addressing this issue were: For competent and less competent readers at the grade six level, are there significant differences in summaries of history and sociology texts written two months after an instructional program in terms of product (main idea and efficiency) and process (rule application) between -

1. students given informed training and students given self-control training?
2. students given informed training and students given blind training?
3. students given self-control training and students given blind training?

Design of Study

A 3 x 2 x 3 design using repeated measures was employed. Between subject factors included the 3 treatments (blind, informed and self-control training) and the two levels of readers (competent and less competent). The within subject factors included the repeated measures (pre, post, and delayed post-instruction summaries) scored for both product and process variables. The product variables included scoring both the number of main ideas contained in the summaries and the efficiency of the summaries. The process variables involved the application of the summarization rules.

Assumptions

Research indicates that there is need for students to become more proficient at summarization as they have much difficulty with the task (Brown, Campione & Day, 1981; Brown, Day & Jones, 1983; Kintsch & Kozminsky, 1977; Winograd, 1984). Empirical research suggests that summarization can be taught (Day, 1980; Hare & Borchardt, 1984). Day (1980) claims that explicit instruction in training strategies for accomplishing a given task, coupled with routines to oversee the successful application of the task, constitute the most beneficial instructional approach.

Day's (1980) postulation is tied to the beliefs of Jones et al. (1987). These investigators maintain that learning is goal oriented. Accordingly, skilled learners strive to reach two goals: to understand what they must learn and to regulate their own learning. These study purposes are powerful incentives for learning in a given situation and help students focus on what is important.

According to Jones et al. (1987) learning is linking new knowledge to previous knowledge. Adams and Collins (1979), Anderson (1977), Mason et al. (1984), McNeil (1984) and Rumelhart and Ortony (1977) claim that information can be stored in the memory in knowledge structures called schemata. A schema represents the sum of what an individual knows about a given thing. Jones et al. (1987) argue that schemata are not simple collections of information. They are highly interrelated and have active properties that allow a learner to be successful in many situations. Jones et al. (1987) explain that students must therefore, be able to access their prior knowledge in order to perform well. Among the knowledge systems are declarative knowledge (the what of learning), procedural knowledge (the how of learning) and conditional knowledge (the when and why of learning).

Jones et al. (1987) assert that learning is strategic because model learners are aware of and control their efforts to use particular skills and strategies. Brown (1980) contends that students can be taught to be aware of and to control their own performance and that mastery of these metacognitive skills can lead to more successful independent learning.

According to Jones et al. (1987) and Baker and Brown (1984) learning is developmental and comparisons can be made between skilled and

expert learners and novices and less proficient students as well as between younger and older students. However, Brown, Campione and Day (1981) insist that students can be taught to use various learning and thinking skills. Brown, Campione and Day (1981) emphasise the importance of explicit instruction, disclosing that opportunities must be given for practice and application of skills in varied contexts with corrective feedback as well as sustained explicit strategy instruction with strong emphasis on metacognitive components. Derry and Murphy (1986) argue that we know how to teach the learner to use strategies but that instruction is inadequate if metacognitive strategies are not operating properly.

It can, therefore, be concluded that instructional procedures can be developed to increase students' awareness and control over their learning strategies. The application of such metacognitive awareness and control is associated with efficient learning and retention and can help novice learners become sophisticated problem solvers (Meyer & Paris, 1978).

This study set out to examine the level of explicitness necessary in instructing sixth grade students in how to summarize text and to establish whether instruction transferred successfully to new situations and was maintained over time.

The assumptions specific to this study were:

1. that grade six students could internalize the benefits of metacognition such as knowing how, when and why to employ a strategy and being able to monitor and evaluate the effectiveness of their strategy application, thus becoming independent learners transferring strategy use to new situations and maintaining strategy use over time.

2. the testing procedures elicited application of these metacognitive strategies.
3. the passages used in the investigation were within students' level of comprehension.
4. the passages used to test for transfer of strategy use were sociology texts and were different from the history text used in instruction. While history texts focussed on the uniqueness of individual chronological events, sociology texts focussed on the interrelationships of human groups such as the family, tribes and labour groups. The history passages described single past events. In contrast the sociology passages permitted generalizations to be found. For example, the advent of labour unions led to the demise of child labour.

Definition of Key Terms

The key terms in the statement of the problem for this study are defined as follows:

1. Metacognition: learners' awareness of their own learning processes and their ability and tendency to control those processes during learning (Jones et al., 1987). Awareness and control are defined further as follows:
2. Awareness: learners' knowledge of specific cognitive strategies and knowledge of how to use them and when they should be used (Jones et al., 1987).
3. Control: learners' capacity to monitor and direct the success of a task at hand (Jones et al., 1987).

4. Summarization: the skill of presenting a shortened version of a particular passage (Day, 1980).
5. Blind training: an instructional intervention in which students are taught to use a strategy but are not helped to understand the significance of the strategy for studying and learning on their own (Brown et al., 1982).
6. Informed training: an instructional intervention in which students are taught to use a strategy and are given information concerning the significance of that strategy and how it might be used in other learning situations (Brown et al., 1982).
7. Self-control training: an instructional intervention in which students are not only instructed in the use and significance of a strategy but also receive explicit instruction in how and when to employ the strategy and to monitor, check, and evaluate the strategy (Brown et al., 1982).
8. Competent readers: students obtaining the median score or higher on the comprehension section of the Gates-MacGinitie Reading Tests Level D-Form 1 administered in the sixth month of grade six (February, 1988).
9. Less competent readers: students obtaining below the median score on the comprehension section of the GatesMacGinitie Reading Tests Level D-Form 1 administered in the sixth month of grade 6 (February, 1988).
10. Process scores: the scores for summary rule application - deletion, superordination, selection, invention, polishing (Hare & Borchardt, 1984) subsequently totalled to derive one process score for each student's summary.

11. Product scores: are two scores, one of which is calculated for the number of main ideas found in students' summaries and reported as a percentage of the total number of main ideas found in the passage. The second is related to the efficiency of summary writing and calculated by finding the ratio between the number of main ideas, and the total number of words in students' summaries (Garner, 1982).

CHAPTER 2

REVIEW OF THE LITERATURE

An important dimension of learning reading-study skills such as summarizing and outlining is understanding how to apply those skills to master text content. Skill application involves strategic use. Since a skill is a mental activity applicable to specific learning tasks, while a strategy is a specific procedure or way of executing a given skill (Jones, Palincsar, Ogle & Carr, 1987), summarization is a skill. On the other hand, using a particular set of summarization rules in a particular instance is a strategy. Therefore, a sequence of activities is a strategy and not a unitary event (Kail & Bisanz, 1982). This suggests that learners need to develop both the underlying component processes or skills related to strategy use and a routine for organizing and applying the processes (Garner, 1988). According to Garner (1988) this differentiation helps explain frequent displays of nonstrategic reading and studying behaviours and the difficulties associated with training students to apply strategic learning activities that will both stand the test of time and transfer to solve new study problems.

A critical feature of a strategy is the intentional, effortful selection of a means to achieve a particular end (Paris, 1978), and that it is largely under the control of learners (Garner, 1988). This signifies that strategies require restricted attentional resources (Garner, 1988) and that the strategies must be available for introspection and conscious report (Garner, 1988; Paris, Lipson, & Wixson,

1983). Another crucial characteristic of any strategy is the need for flexible use (Brown, Armbruster & Baker, 1986; Garner, 1987, Garner, 1988) implying that knowing when and why to use a strategy is as consequential as knowing the processes or skills involved in it. As Paris, Lipson and Wixson (1983, p. 296) point out, "strategies are not necessarily different actions; they are skills that have been taken from their automatic context for inspection." Strategies are "skills under consideration" (Paris, Lipson & Wixson, 1983, p. 295) or "defossilized" actions (Vygotsky, 1978). Thus, thinking about one's thinking must be at the core of the use of any strategy (Paris, Lipson & Wixson, 1983).

Flavell (1981) claims that metacognitive strategy often precedes or follows strategy use. Flavell (1979) outlines what metacognitively competent learners do in carrying out cognitive activities to assess both their progress in conducting a particular task and completing the task efficiently. They retrieve metacognitive strategies not only for monitoring but also for making cognitive progress. This ideal is desirable for all learners.

Palincsar and Ransom (1988) and Peterson (1988) explain that strategy instruction is more effective when instructors are attentive to the processes in which students are engaged while learning. Teachers need to be more reflective regarding their own cognitive processing in order to guide the thinking of their own students. Thus instructors should attend seriously to learners' metacognitive knowledge and strategy implementation. Swafford (1985) emphasizes that instruction in metacognition helps students gain awareness and control over their own thought processes and assists them in becoming strategic, independent learners.

As was indicated in Chapter 1, this study was designed to determine the degree of instructional explicitness, in terms of metacognitive training, needed to ensure that sixth graders understand that a set of rules for creating summaries (developing a summarization skill) is useful for future independent learning. Given such a purpose, the study set out to discern whether students applied the summarization skill they were taught in a new learning situation and whether they continued to use the skill over time; that is, whether they became strategic skill users. Against this background, this chapter examines theoretical aspects of metacognition and the role of direct explicit instruction in skill development. In addition, selective research regarding blind, informed and self-control studies is reviewed as is theory and research into summary writing, thus providing a rationale for the thesis.

Theoretical Aspects of Metacognition

Metacognitive Aspects of Learning

Awareness and Control

In the context of this study, metacognition has been defined as learners' awareness of their own learning processes and their ability and tendency to control these processes (Jones, Palincsar, Ogle & Carr, 1987). According to Brown (1985), the two forms of metacognition revealed in the definition are closely related and feed on each other.

Awareness. Brown (1985, p. 500) states that awareness or knowledge of learning processes is "relatively stable, storable, fallible and late developing". According to Brown (1985) and Brown, Bransford,

Ferrara and Campione (1982), this form of knowledge is categorized as declarative knowledge - knowing that. Metacognitive knowledge is stable because a learner who knows pertinent facts about a domain or topic (that a summary must include essential facts and no trivia, for example) is expected to continue to know those facts. Brown et al. (1982) contend that stable kinds of knowledge are the kinds of declarative knowledge learners possess about themselves in a learning situation. They realize the demands of specific criterial tasks and know how to organize both themselves and learning activities to meet those demands. Flavell (1981) and Flavell and Wellman (1977) consider this type of knowledge as knowledge about person, task and strategy variable. Brown (1985) and Brown et al. (1982) indicate that awareness of learning processes is stable because learners can reflect on the processes involved in performing a task and can discuss their processing with others. This form of knowledge is considered fallible too, because learners may possess certain ideas about cognition and task demands that may not necessarily be true.

Brown et al. (1982) assert that many learners have only naive theories of what is involved in meeting the demands of particular criterial tasks as well as having only a limited store of available strategies for accomplishing desired ends. While strategy implementation for performing academic tasks may be late developing, there are inherent implications for teaching children to be effective strategic learners. These authors point out that if children were made aware of what was needed to perform a task efficiently, they would be able to take appropriate steps to accomplish the task effectively. However, they warn that if students are unaware of the complexity of a task, they can hardly be expected to be able to anticipate or recover from problems encountered.

Barr, Blachowicz, Johnson, Morris and Ogle (1987) caution that in characterizing awareness, no distinction should be made between the use of strategies that have reached the point of automaticity and the use of strategies learners are conscious of using. What is critical is that there is knowledge about competence and the possibility of a higher level of competence in performing a task. In Baker and Brown's (1984) view, to have knowledge about competence in executing a task is to be able to reflect on relevant strategic processes and to be capable of discussing them with others.

Control. Brown et al. (1982) explain that the other area of metacognitive knowledge, controlling cognitive processes during learning, includes (a) planning activities before attempting a task (predicting outcomes, planning strategies); (b) monitoring activities during learning (testing, revising, and/or rescheduling strategies) and (c) checking outcomes (evaluating outcomes of any strategic effort against some criteria of efficiency and effectiveness). Brown and her colleagues indicate that in contrast to awareness, metacognitive control activities are relatively unstable, rarely stable without considerable effort, and relatively age independent. Brown herself (1985) explains that metacognitive control strategies are not necessarily stable because although they are often used by mature learners they may not be used consistently. Moreover, even very young children may be capable of monitoring their own learning activities when involved in relatively simple tasks. These metacognitive control activities are not often stable in the sense that individuals may be able to perform a task but may not be able to verbalize and explain the procedures they used because they lack procedural knowledge. In other words, there is a

substantial differentiation between awareness and control. Considerable sophistication is required to exercise consistent metacognitive control over one's own thinking and learning activities. By implication, control is more difficult to teach than simple awareness.

To distinguish between the types of knowledge implied in metacognition, Broudy (1977) uses the terms declarative knowledge (knowing that) and procedural knowledge (knowing how). Paris and his colleagues (1983) add the term conditional knowledge to refer to knowing when and why. These differences are elaborated on in the ensuing discussion.

Declarative, Procedural and Conditional Knowledge

Implications are that in order to be strategic, independent learners, students must access different types of knowledge. Two types are declarative knowledge and procedural knowledge or knowing that and knowing how (Baker & Brown, 1984; Jones, Palincsar, Ogle, & Carr, 1987; Paris, 1986; Paris, Lipson & Wixson, 1983; Pearson, 1986). Another type is conditional knowledge or knowing when and why (Paris, 1986; Paris, Lipson & Wixson, 1983).

Declarative knowledge is content specific consisting mainly of concepts and facts or knowledge about rules. It includes ideas of goals and the structure and characteristics of tasks and beliefs of personal capabilities.

Procedural knowledge includes information about procedures for performing various tasks. Some procedures may be more complex than others. According to Paris, Lipson and Wixson (1983) procedures explain routines involved in any task and are essential to strategic behaviour. However, metacognitive theory emphasizes a distinction

between procedure and procedural knowledge in that procedural knowledge is second order. The argument is that there is a distinct difference between being able to perform a task and understanding the procedure required for performing the task. Paris (1986) and Paris, Lipson and Wixson (1983) indicate that procedural knowledge is usually acquired through direct instruction or through repeated experience. These theorists emphasize that students who are taught a strategy may have more appreciation for how to carry out a task and may eventually be able to articulate how to employ the strategy. This kind of knowledge is obviously facilitative in the development of learning strategies.

There is an assertion, nonetheless, that declarative and procedural knowledge are inadequate for facilitating successful task completion. Supposedly, they emphasise knowledge and skills for performing a task but give no consideration to the circumstances under which the task may be performed. If indeed the axiom is that strategies are deliberate, planful activities undertaken by learners, then the conditions and context associated with such strategies must be important. Conditional knowledge caters to this aspect of strategic learnings. Bransford, Sherwood, Vye and Rieser (1986), Paris (1986), Paris, Lipson and Wixson (1983) and Resnick (1986) argue convincingly that conditional knowledge, knowing when and why to invoke strategies, must be added to declarative and procedural knowledge. They insist that experts with full declarative and procedural knowledge would be unable to adjust to varying task demands without conditional knowledge. Flavell (1978) adds that conditional knowledge guides learners' execution and regulation of declarative and procedural knowledge by gearing such knowledge to specific tasks.

Conditional knowledge also provides learners with a rationale for using particular study activities from those in their repertoire. For students to realize the need for using a particular summarization strategy, not only to select it but to exert effort in using it, for example, summarization must be accepted as valuable. According to Paris (1986) and Paris, Lipson and Wixson (1983) any strategy must have utility and functional value in order to be self-controlled. Without conditional knowledge concerning the underlying logic and value associated with a particular strategy, learners may only use the strategy in compliance with instructors' request or for rewards.

Thus, efficient learning processes cannot be characterized without the inclusion of all three types of knowledge. Unfortunately though, experts seem to have more of all three forms of knowledge than do novices (Jones, Palincsar, Ogle & Carr, 1987).

Executive Control

Implicit in the process of metacognition, is the notion of executive control (Brown, 1978; Brown, Bransford, Ferrara & Campione, 1982; Garner, 1987; Rohwer, Rohwer & B-Howe, 1980). According to Brown, Bransford, Ferrara and Campione (1982) and Garner (1987) learning process models suggest that powerful operations may be attributed to an executive system capable of performing intelligent evaluations of its own. Brown (1978, p. 152) postulates that such a system must include the ability to:

- (a) predict a system's capacity limitations, (b) be aware of heuristic routines and their appropriate domains of utility,

(c) identify and characterize the problem at hand; (d) plan and schedule appropriate problem solving strategies; (e) monitor and supervise the effectiveness of those routines it calls into service; and, (f) dramatically evaluate those operations in the face of success or failure so that the termination of activities can be strategically timed.

This notion of an executive system is useful to explain metacognitive processing. Executive control and automated control processing are intertwined. According to Brown et al. (1982) automated processes are fast processes unrestricted by short term memory and require minimal learner effort and control. On the other hand, controlled effort is slow, serial processing regulated by the constraints of short term memory. Deliberate effort and learner control are needed. This controlled, planful, effortful and laborious processing is the precursor to automated processing (Hasher & Zacks, 1979; Shiffrin & Dumais, 1981). Needless to say, executive control processing is late developing.

Sternberg (1984) enumerates executive processes which may be applied in teaching students to monitor and evaluate their learning strategies. They are: (a) deciding on the nature of the problem, pertinent procedural components and how to combine them strategically; (b) selecting a mental representation for information; (c) allocating resources for problem solution; (d) monitoring solution processes; and (e) being sensitive to external feedback.

Such executive processes not only activate expectations in the working memory and establish learning procedures to be used in attempting to learn, but monitor all other learning processes, coordinating them into a single coherent sequence and monitoring their effectiveness (Rohwer, Rohwer & B-Howe, 1980). These other learning processes include attentional, encoding, retention, retrieval, response and reinforcement processes.

Attentional processes direct the learners attention to aspects of the information that are relevant to the activities in which they are to engage. During encoding, learners evoke their previous knowledge of the topic and then assimilate or accommodate the new knowledge into their existing schema. Information that was transformed in the encoding phase of the learning episode is retained in long term memory where knowledge lies dormant. In order to make use of stored information, learners reactivate and retrieve the dormant information into a working memory.

Fergus Craik (1983) suggests that retrieval reinstates the same process that was going on during the encoding phase of learning. He suggests further that retrieval is effortful. Response processes are responsible for transforming information from its encoded state to some form of overt but controlled behaviour. During the response phase of a learning episode, learners are usually required to perform in some way. Response processes not only transform the information but arrange it so that it fits the criteria or requirements of the task. Finally, the reinforcement processes provide feedback. Depending upon the feedback from the learner's response, the effectiveness or ineffectiveness of the initial learning activity is reinforced and a message, positive or

negative is sent back, in cyclical fashion, to the executive processes. Learners become aware of whether or not the particular learning strategy they instituted was or was not appropriate. This information is weighed by the executive scheme and the executive makes the decision to discard or reinstate any particular learning activity on subsequent occasions.

Thus it is the executive processes that activate metacognitive skills, making learners consciously aware of and helping them exercise deliberate control over their own learning processes. Brown (1978) insists that in the domain of deliberate learning and problem solving situations, conscious executive control of routines is the essence of intelligent activity. Teachers must, therefore, understand the learning processes so they can know how metacognition results. Sternberg (1984) claims further that executive processes, along with performance capabilities and world knowledge, contribute to individual differences in intelligence. Brown et al. (1982) adds that although intelligent systems including humans are dependent on executive processes, many human beings are deficient in executive skills. While this is particularly characteristic of poor learners, Garner (1987) assures that an important feature of executive control processes is that they can be taught. Brown, Campione and Day (1981, p. 14) similarly advise that instructional routines can be devised to "help students learn to learn". Their assertions are of particular importance for slow learners who seem to benefit little from simple, repeated exposure to academic tasks.

Variables of Learning

Indications are that in order to perform various skills, learners must be equipped with definite strategies. They need to be aware of and be in control of those strategies if they are to implement them efficiently and effectively. Since many learners, particularly weak learners, are deficient in metacognitive skills and are not strategic, they need not only to be exposed to primary intervention strategies for accomplishing skills but also to awareness and control training to stress the significance of the intervention. In this way learners will be able to learn how to learn and will eventually be able to move from "other regulation" to "self regulation" of their learning. This goal is the exercise of metacognitive awareness and control over one's own thinking and learning processes.

According to Brown et al. (1982), Jones et al. (1987) and Vacca and Vacca (1986) the tetrahedral nature of learning is a useful way of teaching students to think about interventions and to become strategic. Experts consider this in designing their own plans for learning (Flavell & Wellman, 1977). The following model illustrates the four factors to be considered in learning. The accent is on what learners do and why in the reading situation in particular. The model comprises "the learner in context and interacts in nontrivial ways" (Brown et al., 1982, p. 22). There are two and three way interactions between each variable.

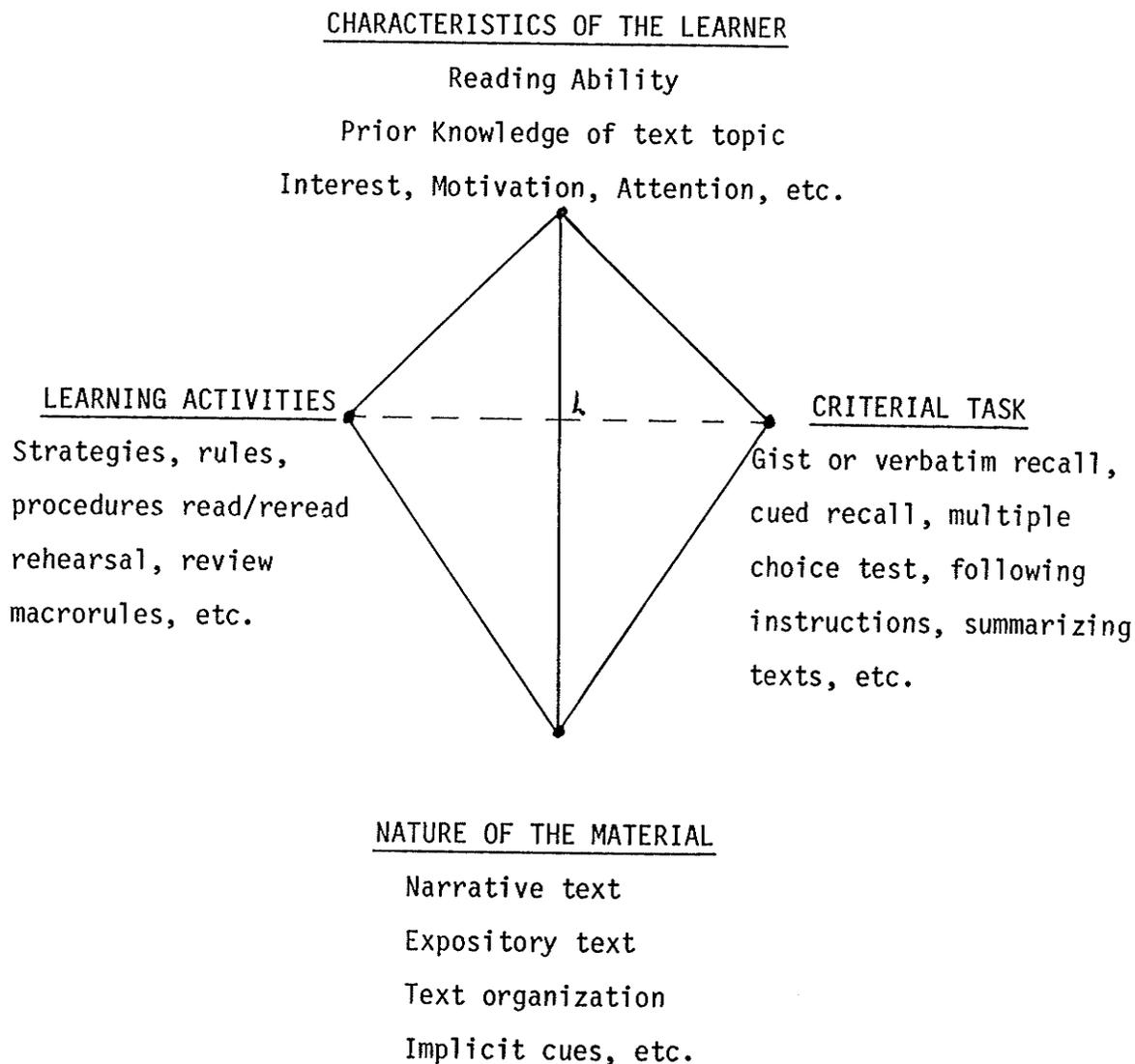


Figure 1. Tetrahedral model for considering study problems (source: Brown et al. 1982, adapted from Jenkins, 1979 and Bransford, 1979).

The Criterial Task

The first variable to be considered is the criterial task or goals and outcomes designated by the instructor and/or the learners. Tasks, for example, may include verbatim recall or summarization of texts. Learners must recognize the purpose of the learning task, the aim of their efforts, and realize that different learning outcomes require different learning activities and gear their efforts accordingly.

Learning Activities

Learning activities are specific goal-directed activities in which learners engage in order to achieve the criterial task. These may include both specific and general strategies. General strategies could be variants of study monitoring activities such as rereading to check whether a text has been understood. Specific strategies include the use of macrorules to summarize a text and rehearsal and review to enhance the ability to respond to verbatim recall.

Characteristics of the Learner

Characteristics of the learner include the learner's repertoire of study skills and knowledge about the content to be taught. Included here is the learner's flexibility in applying study strategies. Interest and motivation are also among learner characteristics, as well as the extent to which learners are able to attribute success or failure to strategic behaviour and not to luck, a factor over which they have little or no control.

Nature of the Materials

The final variable, the nature of the material, is represented in the text used for instruction. The logical structure of the material as well as its form and content, must be considered. Learners need to recognize the importance of text organizational cues and use the author's framework to facilitate learning. Thus, careful organization, clarity of presentation and familiarity of concepts are necessary. On the other hand, without a logical structure, the learners will have to impose their own organization, clarifying concepts and activating their background knowledge to help link the familiar with the unfamiliar.

Jones et al. (1987) acknowledge that these four variables are the "givens" of instruction and are fundamental elements within which teachers might present the notion of metacognition. According to Brown et al. (1982) the interactive nature of the four variables must be understood. If learners understand and are aware of how these variables interact they will become effective and strategic. Such awareness becomes "a prerequisite for self-regulation, the ability to orchestrate, monitor and check one's own cognitive activities" (Brown et al. 1982, p. 20).

Competent and Less Competent Readers

Some learners are strategic while others experience difficulty meeting implicit academic demands. It is evident too, that appropriate strategies for learning are not always employed even if they are available (Brown, 1982). Those who read effectively self-regulate learning from text and monitor their understanding. Beginning and poor readers, on the other hand, are less likely to monitor what they read because

because they lack specific strategies (Meyers & Paris, 1978; Vacca & Vacca, 1986).

Other explanations for the performance of poor readers is their relative insensitivity to task demands (Alvermann, 1987). Learners may be quite capable of recalling information, for example, if "they thought to try" or were forewarned about instructional expectations. When spontaneous and efficient strategies are absent, it may be simply because learners have not anticipated the need or utility of implementing them (Flavell & Welman, 1977). In other words, because of the learners' lack of understanding that they are active agents in the learning process and due also to task and strategy variables that have a bearing on performance, young and incompetent readers may fail to be aware of and to regulate their own learning from text. As specified by Brown, Campione and Day (1981), however, if successful performance is dependent on the application of a set of rules that can be specified exactly, it should be feasible to design instructional routines to introduce such possibilities to learners.

Such instructional programs, in addition to focusing upon explicit procedures to increase the processing of text, also need to emphasize the significance of the strategies so that learners may apply instructed skills in other situations. Both intervention and support strategies are consequently necessary. In effect, instruction has to concentrate on increasing learner awareness of the role of executive schemes that tie together and manage all other learning processes.

Principles for Developing Instructional Strategies

Any instructional strategy in reading needs to meet three criteria (Palincsar & Ransom, 1988): (a) have the potential to be used feasibly across a range of reading situations, (b) serve the dual function of promoting learner interaction with text as well as learner comprehension monitoring (proactive learning), and (c) provide cost benefits in terms of time and success rates. These principles can be illustrated using Palincsar and Ransom's (1988) example in students' summarizing abilities. Summarizing is a strategy in which readers both identify and integrate the gist of what they read. Summarizing is not restricted to any single text or type of material and, therefore, has flexibility. Regarding the second criterion, if a student is unable to paraphrase statements to form a summary, the indication is that the material was not understood; thus summarization is a valuable means of monitoring text understanding. Finally, summarizing is difficult to teach and therefore requires time. With respect to teaching summarizing as assessed by criteria (a) and (b) above, any time spent on teaching summarization skills is justified.

Belmont and Butterfield (1977) claim that in attempting to teach a strategy, instructors must know what a learner should be thinking while performing a task. This kind of information is determined as a result of careful analysis accomplished either intuitively or empirically. Case (1978) explains that task analysis provides a description or outline of the sequence of activities necessary for successful task completions. Belmont and Butterfield (1977) contend that lack of knowledge regarding the cognitive processes engaged during the performance of a task results in an inability to explain immediate or long term

training failures. Without knowledge of the cognitive processing involved, success in training may be inappropriately explained.

As an integral part of training, instructors must be able to evaluate the success of the strategy training. There must be verification about how well a learner must perform in order to acclaim the success of training or intervention. Garner (1987) indicates that immediate improvement in performance, maintenance of instruction effects, and transfer of training to new situations are accepted indices. She explains that immediate improvement in performance may be realized in qualitative change, such as learning to construct optimal summaries or quantitative improvement such as movement towards a criterion approximating adult performance. Further, she states that maintenance is a measure of acceptable behaviour as performance over a time interval with no additional instruction, while transfer involves the acceptable application of a strategy in situations that are related to but still different from the training condition.

According to Axelrod (1977) and Stokes and Baer (1977), transfer of training is not automatic and results in a transfer situation may not be as high as results in the trained situation. Transfer of training must be programmed (Alberto & Troutman, 1986). Students must be given practice in transfer. They must be taught to see a relationship between present learning and future situations and given reasons for using any strategy taught.

Kendall, Borkowski and Cavanaugh (1980) add that if a strategy is not durable it is highly impossible to generalize it to new situations. Garner (1987) claims further that if performance has not improved substantially through strategy training, marked improvement over time is unlikely.

Self-control training appears to result best in enhanced initial performance, and in generalization and maintenance of strategy training (Bellmont & Butterfield, 1977; Brown et al., 1982; Brown, Campione & Day, 1981; Brown & Palincsar, 1982; Garner, 1987; Pressley, Borkowski & O'Sullivan, 1984; Ryan, 1981; Short & Ryan, 1987; Simon, 1980). In their discussion of blind training studies, informed training studies, and self-control training studies, Brown et al. (1982) and Brown et al. (1981) reveal that it is only in self-control training that subjects are active "conspirators" in the whole learning process.

Self-control training adheres to the learning principles inherent in the concept of direct explicit instruction as outlined by Pearson and his colleagues (Pearson, 1984; Pearson, 1985; Pearson & Gallagher, 1983), Roehler and Duffy (1984), and Duffy et al. (1987). In self-control training, students are not only instructed in the use of a strategy but receive direct explicit instruction in how to monitor and evaluate their strategy use.

Direct Explicit Instruction

Self-control training apparently gains superiority over other strategy interventions because it features direct explicit instruction. According to Roehler and Duffy (1984), direct explicit instruction involves making explicit, the implicit principles and algorithms which govern successful strategy use in learning. This instructional concept emphasises intervention skills, learner development regarding conscious awareness of how to use the skills, and proactive teacher behaviour including teacher talk and the use of such teaching devices as advance organizers and think-alouds to provide instructional assistance.

According to Roehler and Duffy (1984), the concept of direct explicit instruction as applied to reading spans various definite aspects of learning and teaching. The concept focuses on the activities that parallel the learning processes. Attention is directed to the mental processing involved and how competent learners carry out tasks. Such explanations are designed to be metacognitive and not mechanistic. Thus, encoding is facilitated by making students aware of the purpose of a skill and how competent readers use it to activate, monitor and regulate their learning. Through practice and feedback regarding their performance, students develop a conscious realization of the function and utility of the reading skills and linkages between those processes and study activities, thus engaging the executive process and increasing the likelihood that the skill will be retained and retrieved for use in similar learning situations.

Direct explanations are also based on the belief that what teachers say to students about the process involved in doing a task is important. The notion is that students' performances depend not only on what they do but on what is said about what they do. Another underlying assumption of direct explicit instruction is that teachers' active instructional role include the use of assistance devices. As referred to earlier, these could include the use of advance organizers and think alouds as well as careful sequencing and the highlighting of important features and attentional cues. These instructional procedures strengthen the link between skill development and reading performance. Thus, the teacher becomes the students' ally, making the learning of skills as clear as possible.

Pearson (1984, p. 231) offers guidelines for direct explicit instruction.

1. The skill must be instructionally relevant.
2. Training should proceed from simple to complex.
3. An analysis of training and transfer tasks should provide evidence of where breakdowns occur.
4. There should be explicit instruction concerning when and how to use the strategies.
5. Feedback should be given during class instruction and after independent work.
6. A variety of passages (or other materials) should be used in order to facilitate transfer to new situations.
7. Self-checking procedures should be used as an inherent part of operationalizing the training strategies.

In essence, direct explicit instruction is a process in which the instructor initially takes full responsibility for performing a task but gradually relinquishes responsibility to the learners (Lohman, 1985; Pearson, 1985; Pearson & Gallagher, 1983; Rosenshine, 1986; Swafford, 1985). The progression may be visualized as taking place within a continuum that moves from teacher modeling, through guided practice using prompts and cues, to independent fluent performance by the learner with teacher feedback. The procedure can be depicted graphically as shown in the accompanying figure (Pearson and Gallagher, 1983).

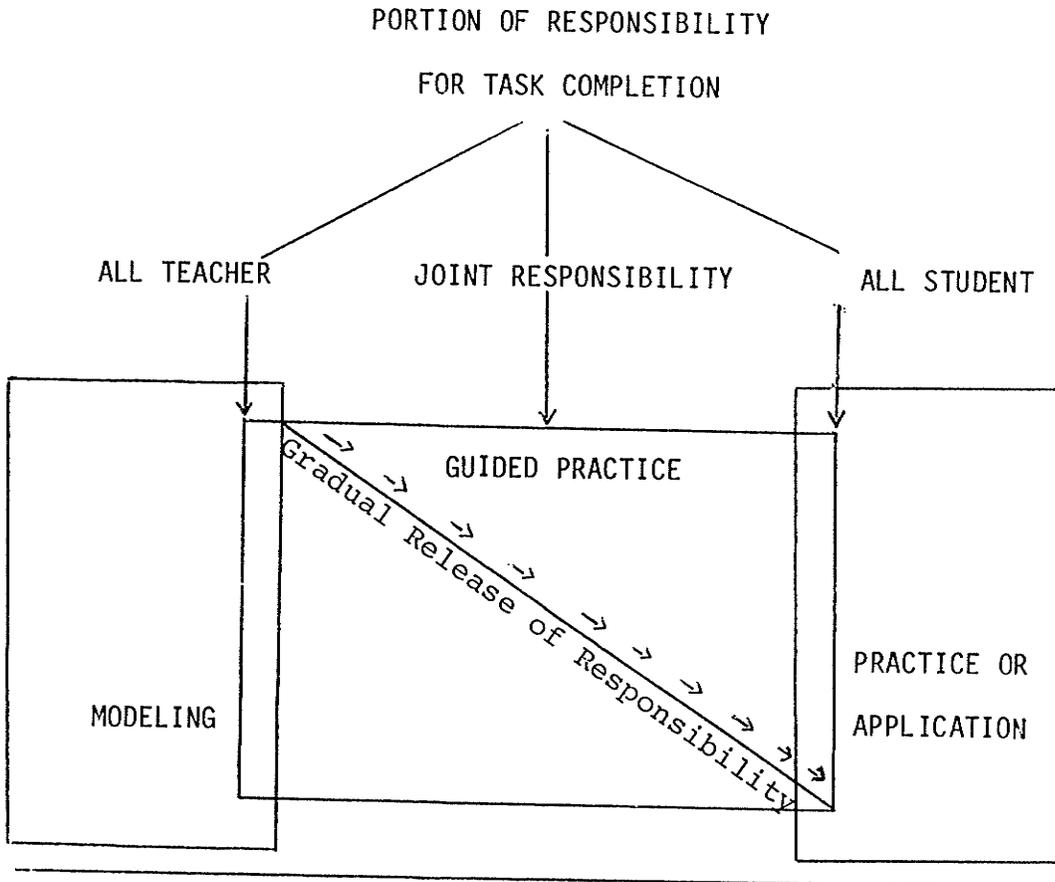


Figure 2. A model of explicit instruction (from Pearson & Gallagher, 1983).

Duffy, Roehler and Herrmann (1988) claim that during modeling: (a) strategies should be presented in the context of the connected text, not in an artificial context; (b) descriptions of mental processing should be illustrative of what experts do when reasoning so that learners have enough information to assume metacognitive control of mental processing; (c) examples and non-examples should be provided in order to demonstrate flexibility of thinking, and (d) opportunities should be made available for student expression so that their reasoning can be observed and elaborative instructional information can be provided when necessary.

Strategy Intervention Studies

Given the concern for improvement in students' learning ability various strategy interventions have been devised to help students become strategic. In the process, there has been much empirical investigation into the efficacy of the interventions. Blind, informed and self-control training studies are examined in the ensuing discussion to show the influences of such interventions on learners' strategic behaviour.

Blind Training Studies

Instructional activities in blind training studies were based mainly on memory or problem-solving situations. The intent of such studies in general was to evaluate hypotheses regarding processes involved in efficient strategy learning as well as to document developmental differences in strategy employment.

One such study was conducted by Turnure, Buim and Thurlow (1976). In their investigation, 36 non-retarded and 60 educable mentally retarded children were tested to determine whether specific interrogative formats would be instrumental in inducing the production of effective verbal mediators. The subjects, who were approximately 7 years old, were assigned to 6 experimental conditions: Labeling, Sentence Generation, Sentence Repetition, Response to What, Response to Why A, and Response to Why B. Subjects were given a 21 item paired associates list to learn. There was a study trial followed by a test trial. In the labeling condition, subjects were required to repeat the names of the paired items. In the Sentence Generation Condition, subjects made up sentences about the items while for Sentence Repetition, subjects

repeated standard, one-relation sentences (e.g.; The soap is hiding in the jacket). In the three other conditions, subjects were asked to answer "what" or "why" questions about the paired associates. For example: "What is the soap doing under the jacket?", "Why is the soap hiding in the jacket?", or "Why is the soap in the jacket?" The questions were introduced to force subjects to think about the meaning of the items and to force them to create elaborations about the relationship between the associates.

Later analyses indicated that subjects in the 3 question conditions outperformed subjects in the non-question conditions. The performance levels of the normal and Educable Mentally Retarded subjects in each of the six conditions were similar. In addition, analyses of semantic and nonsemantic errors suggested that the interrogative conditions induced greater semantic analysis than the non-question conditions.

In another study, Green (1974) investigated the recall and categorizing abilities of mildly and severely retarded subjects when the presentation of ideas was either random or included category cues. The transfer of the cueing strategy learned in the first instance was studied by presenting a second randomly ordered categorizable list, while cueing provided category labels at presentation as well as at recall. This made the clustering strategy as obvious as possible, clarified any ambiguities that might otherwise have existed concerning category membership, and reduced the number of categorical intrusions.

The subjects in this study were 40 high vocabulary age and 40 low vocabulary age retarded adults. They were given a randomly ordered list of 16 categorically related items in a 5-trial free recall task.

Half of the subjects in each group were given category cues while the remainder were given none. The investigation lasted two sessions, 24 hours apart. Cues were given in the first session. In the second (transfer) session, all subjects performed under the no cue procedure. During the first session, cues increased clustering for both vocabulary age groups, but only the high vocabulary age group showed increased recall. At the end of the second session, it was established that previous exposure to cues did not affect performance on a second randomly ordered categorizable list.

Based on the results of his investigation, Green (1974) concluded that a failure to code items with respect to category labels at presentation prevented low vocabulary age subjects from using a clustering strategy efficiently. Whereas high vocabulary age subjects could initially use such a strategy efficiently, they had difficulty initiating it on their own. Green argued that failure to use a clustering strategy in the second session suggested that cues were not enough to induce sustained strategy use. He recommended a form of intervention which made the clustering strategy less ambiguous and which did not require subjects to infer the generalization from the use of specific category labels to the general rule of organizing by categories.

Summary. The investigations of Turnure, Buim and Thurlow (1976) and Green (1974) exemplify blind training studies. Typically these studies strongly suggest that it is possible to design instructional interventions to help students learn. However, such intervention strategies may not result in facilitated learning for students of limited abilities. Blind training may enhance recall initially because students are taking part in a relevant activity to facilitate recall but

blind training fails to result in maintenance and generalization to new, similar situations. Brown, Campione and Day (1981) and Brown, Bransford, Ferrara and Campione (1982) attribute such results to the fact that learners were never made aware of the significance of the interventions. Besides, subjects were not given any support strategies to aid retrieval. Support strategies could have included self-monitoring which could guide students to stop periodically to check and, if necessary, adjust their understanding of tasks at hand.

The inadequacies of blind training led investigators to search for interventions that would enable learners to develop flexible access to strategies rather than specific task improvements. Subsequent research was therefore aimed at supplementing skill instruction with metacognitive training. Two types of training studies then emerged: informed and self-control training. In informed training, subjects were given additional information regarding the significance of the strategy they were using. In self-control training, subjects were provided with information regarding strategy significance or value and were also given direct explicit instruction regarding overseeing, monitoring and regulating strategy use.

Informed Training Studies

Informed training studies are typified by two that will be described. The first study reported was conducted by Burger, Blackman, Holmes and Zetlin (1979) and the second by Kennedy and Miller (1976).

In their investigation, Burger, Blackman, Holmes and Zetlin (1978) examined the ability of 60 educable mentally retarded and 60 non-retarded children to acquire and retain a sorting and retrieval

strategy designed to facilitate recall and clustering. All subjects were administered a baseline task and as a result of their performance were assigned to one of three groups: experimental, practice, and control. The experimental group received a multisession training procedure consisting of instruction in how to arrange stimuli in conceptual arrays, to name individual stimuli and their superordinate categories and to count the number of stimuli in each superordinate. The practice group was presented with the same stimuli but received no training. The control group received only baseline and criterion measures. Unlike the other groups, the experimental group was always provided with a statement to impress them with the value of the strategy components. This experimental group also received prompting and cueing - to encourage strategy use, to facilitate the retrieval of missed items, and to identify their subsuming categories.

Analysis of data on criterion tasks showed superior performance by the experimental subjects. Results were relatively stable over time in that the effects were apparent not only 2 and 3 days (criterion 1) after the conclusion of training but also after a 3-week interval (criterion 2).

Kennedy and Miller (1976) hypothesized that of those subjects given rehearsal training, only those receiving feedback would continue the use of the strategy. In their experiment, 62 6-7-year-olds participated in a serial recall task in which subgroups of 'rehearsers' and 'nonrehearsers' were identified by means of semiovert verbalization. The rehearsers and non-rehearsers were further subdivided into equal groups each of which received training to rehearse verbally. However, only one group received feedback that relayed the usefulness of the

strategy. When subsequently given the option of rehearsing, only those given feedback following rehearsal training persisted in using the strategy. The investigators concluded that persistent use and knowledge of the utility of a newly acquired rehearsal strategy might depend, at least in part, on having a rationale for engaging in such activities.

Summary. The major finding of these informed training studies is that they resulted in improved performance on training tasks and strategy maintenance when subjects were faced with similar situations or tasks. But as Brown, Campione and Day (1981) point out, the evidence for strategy generalization is questionable because in most cases the generalization task was too similar to the training task.

Self-Control Training Studies

The last group of strategy intervention studies involved self-control training, the main feature of which was direct explicit instruction in executive processing skills such as planning, checking and monitoring learning progress. Such studies share many of the learning principles stipulated by Palincsar and Ransom (1988), Pearson (1984), Pearson and Gallagher (1983), Duffy, Roehler and Herrmann (1988) and Rosenshine (1986). In these studies, training (a) proceeded from the simple to the complex, (b) provided modeling, guided and independent practice with feedback, (c) involved direct explicit instruction and (d) was conducted over several days. Two studies, representative of this group are analysed.

Adams, Carnine and Gersten (1982) designed six tactics perceived essential for enhancing comprehension and retrieval of important facts from text books. These were:

1. Previewing the passage by reading headings and subheadings;
2. Reading the first subheading;
3. Asking oneself questions about what might be important to learn;
4. Reading to find the important details;
5. Rereading subheadings and reciting important details; and
6. Rehearsing (as a final review and check for readiness).

Three groups of fifth-grade students were taught to use the studying strategy over four training days. One group received direct explicit instruction, another group studied independently and feedback was provided by a teacher and a third group received no study skills instruction.

The studying instruction given in the direct instruction group was similar to that which might be offered in regular classrooms. Commercial social studies text were used and training sessions were about 40 minutes and conducted over a period of four days. The six tactics were presented after a daily vocabulary review. The SQ3R steps were first modeled by the instructor, after which the instructor generally faded the support so that by the last day of training, subjects were studying silently and independently.

The independent training group spent 40 minutes daily revising vocabulary and then studying 500-800 word social studies text. They were instructed to study until they learned the information. At the end of each session the independent study group, like the direct instruction group, was administered quizzes on the content studied. The group with no study skills instruction received regular classroom instruction during the four training days.

Subjects were administered an immediate posttest one day after training and a delayed posttest two weeks later. Subjects were required to retell passage content and to answer short answer questions on social studies content. Students in the direct instruction group performed better on the short answer test than students in the other two comparison groups. There was no difference between groups on the retelling activity. The results were the same for both posttests. There was no difference in performance between subjects given independent study with feedback and subjects given no instruction at all. Thus, if children are given activity sheets without direct explicit instruction, performance will be weak.

The second study cited involved two phases. In the initial phase Brown and Barclay (1976) gave educable retarded children a series of trials in which the task was to memorize a set of items in order. The subjects were instructed to continue studying the items until they could recall all perfectly. At this time they were to signal the experimenter. The subjects performed poorly in this pretesting phase of the study. The experimenters felt that the subjects' poor performance was a result of their failure to use self-testing strategies that would alert them to their readiness for a test.

For that reason, Brown and Barclay (1976) proceeded to train the subjects in the use of one of two memory strategies, either an anticipation strategy or a rehearsal strategy involving a self-checking component. Following training, both subject's free recall performance and ability to estimate readiness for a recall test improved significantly.

Brown, Campione and Barclay (1979) reported that they followed up Brown and Barclay's (1976) work one year later. In their investigation the same educable retarded subjects were tested for maintenance and generalization. The young subjects (MA = 6 years) showed no training effects whereas the older subjects (MA = 8 years) both maintained the trained strategies on the original rote recall task and generalized strategies effectively in carrying out a new task involving the gist recall of prose passages. In addition, in comparison to two control groups, the students trained to use self-checking routines spent more time studying and recalled more passage idea units. Their recall, moreover, was closely related to the theoretic importance of passage constituent idea units, a pattern presumably characteristic of developmentally more competent subjects.

Summary. Generally, self-control training studies illustrate that strategy plus control training are highly successful in terms of inducing not only enhanced performance, but also strategy maintenance and transfer.

Some theorists question however, whether all students need the detailed instructional experiences characteristic of self-control training. Day (1980) indicates that ability level may be one of the factors determining how explicit training must be in order to obtain maximal performance. She admits that for slower students each step may need to be made explicit. Brighter children on the other hand, generally show spontaneous appreciation for what is taught and may not need extended explanations. Jones, Palincsar, Ogle and Carr (1987) raise similar arguments claiming that proficient learners process information much faster than do less efficient learners. They caution that explicit

instruction may even inhibit a variety of learning and reading tasks for some learners.

Summary

In summary, metacognitive theory suggests that to be strategic learners must exercise awareness and control over their own thinking and learning processes. Implicit in this theory is that learners must be able to access declarative, procedural and conditional knowledge and be able to exercise conscious executive control over their learning processes. Less competent learners may however, be deficient in all three forms of knowledge and in the executive skills which tie together and monitor all other learning processes. This is particularly true in the area of reading. On the other hand, learners can be instructed in the various forms of knowledge and in executive processing skills. Instructional activities that focus on the interactive nature of learning as illustrated in the tetrahedral model are favoured because they appear to be fundamental to learning plans. Awareness of this aspect of learning is a prerequisite for self-regulation: the ability to orchestrate, monitor and check one's cognitive activities.

In addition, strategy training in reading must be based on important considerations: workable strategies must have flexibility, should promote interaction with texts and provide for comprehension monitoring, and they should also be cost effective. In devising a strategy it is important to know what experts think about in implementing it. The appraisal of strategy training should be based on immediate improvement in performance and on maintenance and generalization of training effects.

Various strategy intervention include blind, informed, and self-control training. The last two involve different levels of metacognitive training. Empirical evidence suggests self-control training is superior to the other forms of training mainly because it includes aspects of direct explicit instruction. As a result, self-control training tends to lead to outstanding strategy performance and to durability and transfer of training. However, there is controversy over whether all students, particularly competent learners, need the extensive explanation that accompanies self-control training.

Cognitive Processes Involved in Summarization

Much reading for learning depends heavily on the ability to process expository text generally important in the upper elementary school grades. Study skills are therefore, important to students at upper elementary levels. One essential component of such study skills is the ability to summarize because it aids the retention of textual information (Brown, Day & Jones, 1983; Garner, 1987; Rubin, 1983). Day (1980) adds that comprehension is a prerequisite to the ability to create a summary and that a good summary implies understanding of the author's intended message. Thus helping upper elementary students to summarize is of pedagogical concern.

Based on theories of text structure, Armbruster, Anderson and Ostertag (1987), Brown, Day and Jones (1983) and Day (1980) imply that the ability to summarize represents sophisticated text processing skills. Current text structure theories suggest that a higher order representation of the super structure of a text is automatically abstracted by skilled readers. This macrostructure (Kintsch & van Dijk,

1983) represents the gist of a text which the reader organizes into a coherent whole. It is this element which is associated with the production of recall and summarization (Meyer, 1975; Kintsch & van Dijk, 1983; Rumelhart, 1977; Rumelhart & Ortony, 1977; Thorndyke, 1977).

Summatively, such theories attempt to articulate why learners abstract and retain the gist or essential points of discourse, omitting unnecessary details as they do so. The premise is that all texts are structured and this structure facilitates their comprehension. Assumably, expert learners recognize the text's structure and selectively encode information that is related to the text's organizational pattern. What expert learners eventually produce as a result of this encoding represents an organized representation of the text read. This is known as the gist, and it is this macroprocessing that guides recall and summarization processes.

Generally, theorists suggest comprehension results in a representation of a story usually indicating the gist of the discourse. In theorizing, Rumelhart (1977) for example, discloses that the representation learners develop during the reading of a story has a tree-like structure, the most important points being at the top. In recalling, learners access as much of the structure as possible. But in summarizing learners only retrieve the top portion of the tree, ignoring the lower less important levels. Thus, Rumelhart (1977) contends that the top level of the tree represents the gist of the story.

A more detailed theory of text processing has been developed by Kintsch and van Dijk (1978) which is connected to the comprehension of expository text. They identify macrorules for reducing texts which are pertinent to summarization.

Kintsch and van Dijk's Theory

The theory rendered by Kintsch and van Dijk (1978, p. 366) indicates that "schematic structures play an important role in discourse comprehension and production". Without these schematic structures, it would not be possible to explain language users' understanding of a story or the reasoning behind the accuracy of an argument, for example. In this theory, the surface structure of a discourse is a set of propositions ordered by various semantic relations. The relations may be explicit or may be inferred with the aid of context specific or general knowledge. Two sets of semantic structures are also identified: the microstructure and the macrostructure. The microstructure is a propositional representation of the semantic content of the sentences of a text. The macrostructure is a more global representation of the text characterising the discourse as a whole. In order to arrive at a macrostructure, readers must reduce and organize the more detailed information of the text's microstructure. Thus, "the macrostructure describes the same facts but from a more global point of view" (Kintsch & van Dijk, 1978, p. 366).

In order to reduce a microstructure to a macrostructure, macro-rules must be applied. These are "semantic mapping" rules that relate the microstructure and the macrostructure. The rules have been outlined briefly as follows:

1. Deletion - each proposition that is neither directly nor indirectly necessary for the interpretation of a subsequent proposition may be deleted.
2. Generalization - each sequence of propositions may be replaced by a more general proposition which is a superset.

3. Construction - each sequence of propositions may be replaced by a proposition which represents a more global fact of which the facts in the microstructure propositions are either normal conditions, components or consequences.

The use of these macrorules is under the control of a schema which is a theoretical formulation of the reader's goal. The schema restricts the function of the rules so that the macrostructure does not become meaningless. By applying the rules, the number of propositions in the text base is reduced to the gist of the text. Moreover, the rules may be applied recursively with increasingly more stringent criteria regarding relevance. Several different macrostructures may be formed, the uppermost being the macrostructure. However, this is only possible if the constraints on the rules are met. One of these constraints is that the macrostructure must preserve the truth and meaning explicit in the microstructure. The other is that no proposition that aids the interpretation of a subsequent proposition may be deleted. These constraints ensure the coherence of the macrostructure. In general, application of the macrorules depends on whether a proposition is congruent with the schema determining the relevance of information for a specific goal.

Based on Kintsch and van Dijk's theory, a learner attempting to understand a text begins by determining the microstructure of the text. Simultaneously, the learner clusters micropropositions into categories. By applying macrorules to identified categories, the learner creates macropropositions. The final product comprises the gist or summary of the text. Day (1980) points out that the macrostructure is built during encoding and not at the time of recall or summarizing. Day (1980,

p. 6) contends that "comprehension is the process of building the macrostructure."

Kintsch and van Dijk (1978) are convinced, too, that it is the macrostructure which is stored in the memory together with some of the more relevant micropropositions. They indicate that when asked to recall or to summarize, it is the macrostructure that readers access and they use it for retrieving more detailed propositional information. Thus, the macrostructure created during encoding is the gist or summary of a discourse and is created as a result of text comprehension.

As Brown, Day and Jones (1983) and Day (1980) argue, if Kintsch and van Dijk's explanation that a summary-like representation of a text is formed during comprehension is acceptable, then producing a summary of an understood text should not be difficult. This should hold true for children as well as adult readers since children appear to process text in much the same way as adults do (Brown & Smiley, 1978; Mandler & Johnson, 1977).

On the other hand, Brown, Day and Jones (1983) contend that if children, like adults, extract the gist when comprehending text, there is the possibility that children produce protocols which are pseudo summaries because they may be producing only what is in memory. Accordingly, summarizing texts should involve judgement and effort if more than a bare synopsis is desired. Hence, it is essential to estimate degrees of relative importance of information and to apply condensation rules. Brown, Day and Jones (1983) suggest that summarization is a late developing skill based on deeper levels of processing which are required for recall.

Research on Summarization

Empirical Findings on Summarization Ability

Brown, Day and Jones (1983) examined the development of summaries when the material to be summarized was well known. They also analyzed overt planning activities that were evident before and during the summary writing activities. Subjects in grades 5, 7, and 11 and college students read and studied stories which had been divided into pausal units rated for structural importance. After learning the stories perfectly, subjects were asked to produce recall protocols. Then subjects were asked to pretend they were newspaper reporters and to write a summary of one story for the paper. The text was available to them for reference and summaries were to be written in the fewest number of words possible. On completion, subjects were informed that the editor had to cut their space and the story should be rewritten in forty words. Later, another limit of twenty words was imposed.

Only summaries produced by subjects who had previously recalled 30 percent of the units at each level of importance rated by the investigator were analyzed. Seventh graders failed to meet the criterion and so their summaries were dropped from the analysis.

Results showed that college and eleventh grade students outperformed their younger counterparts in terms of their (a) propensity to plan ahead as shown by their rough drafts, (b) sensitivity to fine gradations regarding the importance of information, and, (c) ability to reduce more idea units into a given number of words. Only a few younger subjects who planned adequately met the performance standard of college students.

The younger subjects treated the summarization exercise as one in which they were expected to include or delete ideas from the surface structure of the original texts. Their protocols were made up of verbatim inclusions. In contrast, the older high school and college subjects departed from the wording and temporal sequence of the texts. They combined information within and across paragraphs and produced summaries using their own words. They also applied transformational rules.

Brown, Day and Jones (1983) concluded that planning seemed to be the best predictor of efficient summary writing, although both the ability to plan and age were highly correlated. These researchers contended that summary production is not simply the result of automatic retention but the ability to work recursively on text information and to restructure information as succinctly as possible. Judgement, effort, knowledge, and strategy-use are all required and these are late developing skills. The Brown, Day and Jones (1983) investigation revealed that the ability to reproduce an adequate summary is not simply a by-product of comprehension.

Following this study, Brown and Day (1983) turned their attention to the Kintsch and van Dijk condensation rules for summarizing texts. They modified Kintsch and van Dijk's three macrorules into six basic rules for summary writing: (a) deletion of trivia, (b) deletion of redundant information, (c) substitution of a superordinate term for a list of items, (d) use of a superordinate term for a list of actions, (e) selection of a topic sentence provided in the text, and (f) invention of a topic sentence for paragraphs in which there is no explicitly stated topic sentence.

The rationale for the rules is based on the fact that a summary should be short and should include only essential information; unimportant information should be deleted as should information that is important but redundant. If a text contains a list of examples the list may be substituted with a superordinate term. In the same way a superordinate action could be used to replace subcomponents of that action. These summarization rules are modeled after the Kintsch and van Dijk's deletion and generalization rules. Any in-text topic sentence must also be selected because it is the author's summary of a paragraph. A topic sentence must be invented for any paragraph in which none is explicitly stated. These last two rules pertain to the provision of main constituent units of paragraphs and are comparable to Kintsch and van Dijk's rules of construction.

After creating the rules, Brown and Day examined age differences in their use. Subjects in grades 5, 7, and 10 and college students were given two expository texts constructed so that all summary writing rules could be applied. After reading a text three times, subjects were required to write an unconstrained summary of it. When this was completed, they were asked to write a 60-word summary of the same text. This procedure was repeated in another session.

Analysis of the summaries revealed that deletion rules were used effectively by subjects in all age groups. Age differences were evident for the superordination and selection rules in that older subjects outperformed novices. Use of invention rules was least effective. Very few fifth and seventh grade subjects were able to infer topic sentences when none was given. Tenth grade subjects used the invention rule one-third of the time, and college students used it about half the time. On the whole, college students produced the best summaries.

This research provides insight into the cognitive processing involved in summary writing. The pattern of ease of application was as clear as the development pattern of the subjects. Competence in applying the deletion rules emerged first, followed by superordination and then selection rules. The invention rules proved most difficult because varying degrees of learner text manipulation are demanded and because the rules depart from the existing strategy of "copy delete" employed by younger learners. The deletion rules and even the selection rules are similar to the "copy delete" strategy in that they require eliminating or copying words from a text almost verbatim. Selection and invention rules are different. Selection requires the imposition of status to topic sentences while invention requires the synthesis of information using different words. Thus, summary writing is a demanding cognitive task.

Another study showing age related differences in text summarization proficiency was conducted by Hahn and Goldman (1983). Grade 4 and grade 6 subjects participated in two experiments. Experiment 1 used texts with a descriptive content, each statement in each paragraph of each text giving an example of the claim made in the paragraph topic sentence. In experiment 2, texts with a thesis/evidence structure were used; each detail in the paragraph supported the topic sentence in a "because" format. The manipulation of the presence or absence of topic sentences in the texts permitted the examination of developmental relationships between selection and invention rules. Text processing demands were controlled through the application of readability formula. Texts were at, and 2 years below the grade level of each group. Subjects were required to construct summaries of three different lengths.

In both experiments, differences were apparent between fourth and sixth graders. When asked to reduce paragraphs to 3 or 4 sentences, the dominant behaviour was to copy detail sentences from paragraphs. However, fourth graders did so more often than sixth graders. Sixth grade subjects generated topic sentences but did so more frequently for text below their grade level. When summary length was restricted and subjects were asked to provide one sentence for each paragraph, fourth graders increased their selection and invention strategies particularly when texts were below their grade level. When subjects were required to summarize the passage in a single sentence, the developmental pattern was the same. Sixth graders produced a topic sentence to summarize the passage. Fourth-grade subjects managed to do so 33 percent of the time and equally often recopied one detail sentence.

In spite of the relatively superior performance of sixth graders, Hahn and Goldman (1983) point out that the pattern of summarization behaviour displayed by subjects indicated that more sophisticated summarization strategies place greater information processing demands on children.

Age related differences in text-summarization efficiency were also found in a study by Garner (1985). Grades 9 and 11 and college subjects were asked to create optimal and nonoptimal summaries of a long expository text based on their understanding of what determined the acceptability or unacceptability of short summaries. Two hypotheses were tested. First it was expected that if different age subjects were unaware of what made a summary acceptable, they would not be able to distinguish between optimal and nonoptimal summaries on measures of interest. On the other hand, if subjects could not generate effective

summaries, they would be unlikely to obtain high scores on the interest measures for the optimal summaries. Measures of interest included (a) number of ideas judged important included in the summaries, (b) number of words used, and, (c) integration level for information judged important.

All subjects demonstrated awareness regarding the inclusion of important ideas. Few subjects at any age level demonstrated knowledge of or production ability for integrating the important ideas. For the youngest and oldest subjects, there were differences both in the ability to reproduce important ideas and to generate succinct summaries.

In addition to age-related differences in summarization efficiency, there is also some evidence that summarization efficiency is related to reading achievement level. Garner, Belcher, Winfield and Smith (1985) attempted to determine what fifth grade subjects could do regarding summarizing. Thirty subjects at two reading levels were asked to read an expository text, summarize it, reflect on the processes involved in summarizing and identify good and bad summaries. Findings were that good and poor fifth grade readers were adept at identifying good summaries. For production and reflection tasks, poor readers were significantly less efficient than good readers. However, both proficiency groups performed below the ceiling level on production and reflection measures.

Garner and her colleagues (1985) concluded that fifth grade readers had a notion of what a summary required, but not the production proficiency to meet the requirements. They suggested that if teachers want students to summarize textbook content, explicit instruction in rule-driven production of summaries is necessary.

Winograd (1984) asked good and poor eighth-grade readers and adult readers to read expository texts and produce 60-word summaries. Subjects were also required to rate the importance of individual sentences to the entire text and to select the five most important sentences. Prior to working with the texts, subjects were interviewed about their strategies for writing summaries. Winograd found that good and poor eighth grade readers were aware that it was necessary to include the most important points in summaries by their explicitly stated comments in their interviews. There was a higher correlation between good readers' judgements of importance and those of adults than between those of poor readers and adults. Furthermore, the information judged important was weak for poor readers, moderate for good readers and good for adult readers. Good and poor readers also differed in their ability to transform the original texts into summaries. Winograd (1984) concluded that there was more to text summarization than mere comprehension and indicated that teachers should assess students' use of strategic skill and train them in summary writing rules.

Other investigators have studied the effects of "text engineering" on summarizing proficiency. Garner and McCaleb (1985) systematically manipulated cueing, organization and reduction constraints in a descriptive passage. Three levels of cueing were used: none, semantic (explicit topic sentences for paragraphs containing the four pieces of information previously judged most important in the text), and semantic and lexical (words that were "important" or served as links or "controls" within these topic sentences). Two levels of organization were used: massed (the four most important pieces of information appearing in the first four paragraphs of the passage) and distributed (the same

information distributed across the seven paragraphs of the text). Two levels of reduction constraints were imposed: highly constrained (a three sentence summary limit) and moderately constrained (a seven-sentence summary limit). The passage was presented to 120 undergraduate subjects.

The number of important ideas in the subject's summary products, the number of words, the integration level of important ideas and deviations in the order of presenting important ideas were measured. Performance across 12 text manipulated combinations on all measures was far below ceiling level.

Garner and McCaleb (1985) argued that text manipulation was not effective for exemplary summary performance by college students and advised that a strategy training route rather than a text engineering route held more promise for improving written summaries.

Studies examining training to summarize text prove that summarization can be taught (Day, 1980; Hare & Borchardt, 1984).

Summarization Instructional Studies

Through varying degrees of instruction, Day (1980) trained junior college students to apply rules of summarization and investigated whether the students applied the rules appropriately. Two groups of subjects were involved: average students with no reading problems and a remedial group that possessed normal reading ability, but was deficient in writing skills. Within each of those groups were four instructional conditions which varied along a continuum of explicitness. Subjects in the first condition (Self-Management) were not given the rules for writing summaries but were provided with general ideas regarding

how to write good summaries. The second, Rules Only group, was given explicit instruction and modeling in the use of summarization rules. The third group was named Rules Plus Self- Management. Subjects in this group received a combination of instruction, the general self-management training that was given in condition 1 and rules instruction as presented to group 2. The integration of these rules was left to the subjects themselves. However, subjects in the fourth and most explicit training condition received direct explicit instruction in how to check, monitor and evaluate their application of the rules.

Training took place over two 60-minute class sessions. Materials were expository texts constructed so that they contained all of the elements necessary for applying the summarization rules taught in the training sessions. The readability level of texts was at the grade 5 level.

Findings were that before training, all students applied the deletion rules appropriately. After training, performance on the more difficult rules improved but there were differences between ability groups. Training in rule use only was effective but the addition of self-management components enhanced performance. Average students benefited under all training conditions. Their performance varied very little in the two most explicit conditions. The results suggested that the more mature subjects benefited from instruction and needed less explicit instruction. On the other hand, poorer subjects needed the most explicit instruction to perform satisfactorily. The pattern of performance was similar for an immediate posttest administered 2-4 days after training and a delayed posttest administered 2-3 weeks after training that was completed at home.

However, in spite of the promising results of Day's (1980) study, design deficits are obvious including (a) the short training phase, (b) the unjustified use of very easy reading material, (c) the brief lapse between training and maintenance tests, and, (d) the differing conditions under which posttests were administered.

Based on Day's (1980) investigation, Hare and Borchardt (1984) attempted to teach slightly younger students the rules Day taught, plus a paragraph combining rule and a polishing or revising rule. Subjects were 22 low income minority high school juniors. They were assigned to conditions of inductive and deductive instruction. Instruction was provided for 2 hours per day over 3 consecutive days.

Some of the procedures used were adaptations of Day's (1980) most explicit procedure. (See Table 1.) A rule sheet provided steps for checking the comprehension of the texts to be summarized and steps for planning, creating, and revising the summary. (See Table 2.) Several expository texts were used for pretesting, training and posttesting. Some were the same as those used in Day's (1980) investigation. Others were naturally occurring passages selected from high school texts. Help sheets demonstrating application of the summarization rules were prepared for various training selections. Trainers used prepared scripts during instruction and were monitored to ensure that they adhered to the procedures.

Experimental subjects outperformed control subjects in rule application on both a specially constructed test passage and a naturally occurring test passage. Their summaries and efficiency were superior as well. These differences were maintained two weeks after instruction ended. No difference in performance was found between the inductive

and deductive groups. However, the invention rule was not used effectively by any group of subjects.

Like Day (1980), Hare and Borchardt showed that summarization can be taught, but their design also had some weaknesses: their instructional phase was too short as was the interval between training and maintenance testing.

TABLE 1

Day's (1980, pp. 57-58) Handout for the Rules Integrated Training Condition

Five General Steps to Help with the Five Rules for Writing a Summary

1. MAKE SURE YOU UNDERSTAND THE TEXT. Ask yourself "What was this text about?" "What did the writer say?" Try to say the general theme to yourself.
2. LOOK BACK. Reread the text to make sure you got the theme right. Also read to make sure that you really understand what the important parts of the text are. Star important parts.

NOW USE THE FIVE SPECIFIC RULES FOR WRITING A SUMMARY

3. RETHINK. Reread a paragraph of the text. Try to say the theme of that paragraph to yourself. Is the theme a topic sentence? Have you underlined it? Or is the topic sentence missing? If it is missing, have you written one in the margin?
4. CHECK. Did you leave in any lists? Make sure you don't list things out in your summary. Did you repeat yourself? Make sure you didn't.
5. DOUBLE-CHECK. Did you skip anything? Is all the important information in the summary? Are there any paragraphs that you forgot to summarize?

Five Specific Rules for Writing a Summary

1. REDUCE LISTS. If you see a list of things try to think of a one or two word name for the whole list. For example, if you saw a list like eyes, ears, neck, arms and legs, you could say "parts of the body" - or "body parts." Just write the name of the things in on the text - right above the examples.
2. USE A TOPIC SENTENCE IF ONE IS GIVEN YOU. Often authors write a sentence that summarizes a whole paragraph. It is called a topic sentence. If the author gives you one, underline it and use it in your summary. Just copy it down from the text into your summary.
3. MAKE UP YOUR OWN TOPIC SENTENCE. Unfortunately, not all paragraphs have topic sentences. That means that you may have to make one up for yourself. If you don't see a topic sentence, write one of your own in the margin. Use your sentence in the summary.
4. GET RID OF REPEATED STUFF. Go through the text and cross out stuff that is repeated. Get rid of it. Use the red pencil to cross out repeated stuff.

TABLE 2

Hare and Borchardt's (1984, p. 66) Rule Sheet

Four General Steps to Help with the Four Specific Rules
for Writing a Summary

1. MAKE SURE YOU UNDERSTAND THE TEXT. Ask yourself "What was this text about?" "What did the writer say?" Try to say the general theme to yourself.
2. LOOK BACK. Reread the text to make sure you got the theme right. Also read to make sure that you really understand what the important parts of the text are. Star important parts.

NOW USE THE FOUR RULES FOR WRITING A SUMMARY

3. RETHINK. Reread a paragraph of the text. Try to say the theme of that paragraph to yourself. Is the theme a topic sentence? Have you underlined it? Or is the topic sentence missing? If it is missing, have you written one in the margin?
4. CHECK AND DOUBLE-CHECK. Did you leave in any lists? Make sure you don't list things out in your summary. Did you repeat yourself? Did you skip anything? Is all the important information in the summary?

Four Rules for Writing a Summary

1. COLLAPSE LISTS. If you see a list of things, try to think of a word or phrase name for the whole list. For example, if you saw a list like eyes, ears, neck, arms and legs, you could say "body parts." Or, if you saw a list like ice skating, skiing or sledding, you could say "winter sports."
2. USE TOPIC SENTENCES. Often authors write a sentence that summarizes a whole paragraph. It is called a topic sentence. If the author gives you one, use it in your summary. Unfortunately, not all paragraphs contain topic sentences. That means you may have to make up one for yourself. If you don't see a topic sentence, make up one of your own.
3. GET RID OF UNNECESSARY DETAIL. Some text information can be repeated in a passage. In other words, the same thing can be said in a number of different ways, all in one passage. Other text information can be unimportant or trivial. Since summaries are meant to be short, get rid of repetitive or trivial information.
4. COLLAPSE PARAGRAPH. Paragraphs are often related to one another. Some paragraphs explain one or more other paragraphs. Some paragraphs just expand on the information presented in other paragraphs. Some paragraphs are more necessary than other paragraphs. Decide which paragraphs should be kept or gotten rid of, and which might be joined together.

TABLE 2 (continued)

A Final Suggestion

POLISH THE SUMMARY. When a lot of information is reduced from an original passage, the resulting concentrated information often sounds very unnatural. Fix this problem and create a more natural-sounding summary. Adjustments may include but are not limited to paraphrasing, the insertion of connecting words like "and" or "because" and the insertion of introductory or closing statements. Paraphrasing is especially useful here for two reasons, one, because it improves your ability to remember the material, and two, it avoids using the author's words otherwise known as plagiarism.

Summary

The ability to summarize is important for understanding and retaining information from texts. This is particularly critical at upper elementary school levels where students are beginning to read to learn.

There are also strong theoretical reasons to develop students' summarizing ability. Several current theories of text understanding suggest that a higher-order representation of text structure is automatically abstracted during comprehension and that it is the macro-structure that enables the production of recall. Thus, the act of comprehension itself involves the creation of a summary or gist of the text. However, there is evidence that summary writing is not merely a by-product of comprehension. It involves fine judgements regarding the importance of textual information and deliberate efforts in the application of macrorules. Summarizing text is a difficult reading and composing task.

Empirical evidence points to the difficulties associated with summarizing.

1. Rules for summarizing have predictable difficulty levels rank ordered as follows: (a) delete trivia, (b) delete redundancy, (c) substitute a superordinate for a list of items, (d) substitute a superordinate for a list of actions, (e) select a topic sentence if one is available, and (f) invent a topic sentence if none is given.
2. Deletion rules are used effectively by students as young as those in grade 4 but generally students in grades 5, 7, 11 and in college underutilize condensing and revising activities particularly in the absence of space constraints.

3. Rules of selection and invention are particularly difficult for younger and less successful readers in grades 4 and 6.
4. Some college level students have difficulty applying the topic invention rule.
5. Poor readers in grade 8 do not match adults in their judgement of what is important to include in a text summary.
6. Grade 5 students can recognize the superiority of concise summaries compared to long text verbatim detail summaries but cannot themselves write succinct summaries.

Due to documented difficulties evident in summary writing, the implication is that students must be trained to summarize. Day (1980) and Hare and Borchardt (1984) have shown that summary writing can be taught, however, their studies concentrated on high school and college students. Given that summarization is a critical study skill in the middle years, there is a need to determine whether grade six students can summarize text.

Conclusion

In this chapter, a general overview of what is meant by a strategy was presented before an indepth examination of theoretical aspects of metacognition and summarization and research into teaching metacognition through summary writing was presented. Various conclusions that have importance for developing instructional strategies may be drawn. Learners must understand how to employ strategies to master reading skills. Strategies consist of sequences of activities and learners need to develop both processes for applying a strategy and a routine

for organizing those processes. A strategy is an intentional and effortful selection of a means to an end and must be under the control of learners. Strategies must be used flexibly and, therefore, learners must know when, why and how to use them. Metacognitive skills play an important role in effective strategy use and the inclusion of instruction in metacognition in strategy training is critical.

Metacognitive theory establishes that to be strategic, learners must exhibit awareness and control over their own learning and thinking processes. Consequently, learners should be able to access various kinds of knowledge (declarative, procedural and conditional) as well as institute executive processing. Although learners are highly dependent on these forms of knowledge and on executive processing, they are deficient in their use. This is even more characteristic of less competent learners. Metacognitive skills can be taught and in preparing for instruction, the tetrahedral nature of learning is useful. To that end, consideration must be given to four variables: the learner, the criterial task, the instructional materials and the learning activities.

With respect to reading, any strategy to be trained must have flexibility, should promote text interaction, comprehension, self-monitoring and be cost effective. It is necessary to know the component processes of the training strategy and the success of strategy training should be based on immediate improvement in performance, transfer of training effects, and strategy maintenance over a period of time.

Different interventions, blind, informed, and self-control training have been developed to help learners become strategic. Self-control training has proved to be superior to the other interventions in terms of efficacy, durability and transfer of training. This is mainly because self-control training involves direct explicit instruction in how to employ, monitor and evaluate strategy use. But there is still controversy over whether the intensive nature of self-control training is needed by all students, particularly the more competent.

It is acknowledged that reading to learn begins in the upper elementary grades, therefore, study skills are needed by students in those grades. Summarization is one such critical study skill because it aids comprehension and recall. But summary writing is difficult to teach; it is not a by-product of comprehension. Various rules for summarizing have been identified, differing in difficulty: (a) delete trivia, (b) delete redundancy, (c) substitute a superordinate for a list of items, (d) substitute a superordinate for a list of actions, (e) select a topic sentence if one is available, and, (f) invent a topic sentence if none is given.

Empirical evidence reveals what students of various ages can or cannot do regarding summarization. Most students use the deletion rules effectively, but generally grades 5, 7, 11 and college students under-use condensation rules. Other students, as young as grade 5, recognize the superiority of good summaries. It has been noted that although grade 6 is representative of upper elementary grades where reading to learn begins, very little analyses of their summarization strategies have been examined. However, given the weaknesses of students in higher grades, it may be assumed that sixth graders are also deficient in the development of summarizing skills.

One encouraging revelation for empirical investigation is that summarizing skills can be taught. Day (1980) and Hare and Borchardt (1984) have shown that use of self-control training with direct explicit instruction in how to use, monitor, and evaluate a summarization strategy is very effective. Unfortunately, their studies have focused on older college and high school students. There were also weaknesses in the designs of their studies. Among these are short training sessions, unjustified use of ecologically invalid training materials and short time lapses between the conclusion of training and maintenance testing.

Accordingly, this study was designed in keeping with the theoretical notions and research caveats discussed. Summarization was selected for study in grade 6 because it is a skill sixth graders should be able to use as they are beginning to read to learn. Summarization meets the criteria of being a good reading skill to train because it is flexible and not restricted to any single text or material type. The ability to summarize is valuable for monitoring comprehension and because it is difficult to teach, the time spent on teaching it is justified. Sixth grade subjects were selected as opposed to high school or college-age students with whom studies on summarization have already been conducted.

One of the experimental treatments used self-control training and was adapted from the studies conducted by Day (1980) and Hare and Borchardt (1984). These investigators have shown that the inclusion of self-control strategies in training has been most effective at helping high school and college students write summaries. In that experimental treatment, particular attention was given to the interactive nature of

learning as displayed in the tetrahedral model. This treatment was contrasted with the effects of informed training and blind training. The effects of the interventions were examined for both competent and less competent sixth grade readers because it is still questionable whether students, particularly more competent learners, need the extensive explanations presented in self-control training. The investigation results were measured under immediate conditions as well as under delayed and transfer conditions. Material used during the investigation was selected from social studies texts at the grade six level. Instructional material was from the field of history while transfer material was from the field of sociology.

Finally a six week instructional program was provided and delayed posttesting conducted two months after training.

CHAPTER 3

METHODOLOGY

The general objective of this study was to determine the degree of instructional explicitness required to help competent and less competent sixth grade readers understand that a summarization intervention procedure was appropriate to use in future independent learning. More specifically, this study examined whether (a) subjects applied a summary intervention procedure in a new situation using sociology passages when instruction involved summarizing history selections, and (b) whether use of the summarizing strategy was maintained over time through administering delayed posttests. To this end, summary writing performance of students in two experimental treatment groups was compared to the summary writing performance of students in a control group. The experimental treatments included two different levels of metacognitive training: (a) informed training (in which subjects were taught to summarize texts and told that the strategy was a useful study strategy) and (b) self-control training (in which subjects were instructed not only in the use and significance of the summarization strategy but also received explicit instruction in how, when and why to employ the strategy and to monitor, check and evaluate strategy use). There was also a control or blind training group in which subjects were only taught the summarization strategy with no reference to or specific training regarding its significance. The summaries of both competent and less competent readers were examined to establish whether the intervention affected sixth grade readers of different abilities in similar ways.

Three sixth grade classes participated in the study. Each class was registered in a different school in relatively the same type of middle class socio-economic community. To identify levels of reading competency and to establish that there were no significant initial differences in reading among the groups, reading achievement was measured through administration of the comprehension subtest of the Gates-MacGinitie Reading Tests (Gates & MacGinitie, 1965) Level D-Form 1. To obtain a pretest measure of summary writing ability, subjects were asked to summarize two passages, one based on history, the other on sociology in one sixty minute period. After training, subjects' summary writing performance was similarly assessed by having students summarize another history passage and another sociology passage. A delayed summary writing posttest, similar to the previous tests, was administered two months following intervention.

Before conducting the study, the investigator ensured that ethical standards required for research involving human subjects were met. This was certified by the research ethics committee of the University of Manitoba. (See Appendix A.)

A description of the specific methodologies for conducting the investigation is presented next.

Subjects

A sample of 51 sixth graders participated in the study. Two of the participating classes had 16 students while the third had 19. Each class was heterogenous and comprised of boys and girls between the ages of 11 and 12 years.

Since the participating classes were from different schools, it was difficult to randomly assign students to different treatment groups. Therefore, each class was randomly assigned to either the blind, informed or self-control training condition. To conduct this random assignment, each class was given a number between one and three. The class with the first number drawn was named the blind training group, the second was the informed training group while the third became the self-control training group.

Analysis of variance using the scores on the comprehension subtest of the Gates-MacGinitie Reading Tests (Gates & MacGinitie, 1965) was conducted to establish that there were no significant initial differences among the groups. Every student in each class participated in the training. For data analysis, scores from the competent and less competent readers in each group were used. Competency levels were established by using scores on the comprehension subtest of the Gates-MacGinitie Reading Tests. The competent group was made up of students receiving the median score across training groups or above, the less competent group being made up of the remaining students. Grouping subjects in this way made it possible to address the issue of how the different levels of intervention affected readers of differing ability.

Instructional Passages

Five history passages were used as training passages during the instructional phase of the investigation. Passages were naturally-occurring texts extracted from an authorized sixth grade social studies textbooks entitled Canada Growth of a Nation by Stan Garrod, Fred McFadden and Rosemary Neering (Fitzhenry & Whiteside Limited, 1980).

The passages were modified slightly so that they conformed in terms of length, coherence and concept load. It was realistic to use naturally-occurring texts as such texts were representative of passages normally used for instruction in sixth grade classes. The selection used in the introductory lesson was 212 words, 21 lines long and at the grade 6 readability level. The other texts were approximately equal in length (296- 319 words, 25-30 lines) but varied in terms of readability level (7.0, 7.0, 9.0, and 12.0 as measured by the Fry readability formula - Fry, 1977). For instructional purposes the passages were ranked in order of difficulty (easiest to the hardest). That is, instruction began with the passages rated lowest on the Fry readability graph (Fry, 1977).

As shown in the accompanying table (Table 3), the first passage, "Toronto in the 1870s", used for introduction, was relatively short and easy. It was selected because it elicited only 3 of the 4 summarization rules that were the focus of instruction. The more difficult invention rule (create a topic sentence if one is not stated explicitly by the author) was introduced in the second lesson. The second passage was "Vancouver in the Late Nineteenth Century". It was selected because it required the application of all of the summarization rules taught. The next text, "The Search for the North West Passage" was useful in helping reinforce the use of the invention rule as most of its constituent paragraphs did not have explicit topic sentences. The final two passages "Halifax During the War of 1812" and "Settlers on the Prairies" were presented last. They required application of all four summarization rules and provided further practice opportunity to reinforce the summary writing rules. An additional polishing rule was applied to the last three passages. (See Appendix B for copies of the instructional passages). Table 4 displays the four summarization rules and the polishing rule taught during the investigation.

TABLE 3

Instructional Passages

Passages	No. of Words	No. of Lines	Readability Level - Grade	Summarization Rules Applicable
Toronto in the 1870s	212	21	6	Deletion, Superordination, Selection
Vancouver in the Late Nineteenth Century	319	30	7	Deletion, Superordination, Selection, Invention
The Search for the Northwest Passage	296	25	7	Deletion, Superordination, Selection, Invention
Halifax during the War of 1812	314	29	9	Deletion, Superordination, Selection, Invention
Settlers on the Prairies	316	30	12	Deletion, Superordination, Selection, Invention

TABLE 4

Four Rules for Writing a Summary Plus One Polishing Rule (Adapted from Day, 1980 p.40 and Hare and Borchardt, 1984 p.66)

Deletion

Since a summary is a restatement of the main ideas of a passage and is meant to be short, it should not contain information which is trivial or repetitive.

Superordination

Words can be conserved by using a superordinate in place of a list of examples.

Selection

A topic sentence is a summary statement of a paragraph and should be included in the summary.

Invention

Not all paragraphs have topic sentences. In such cases, such sentences must be created for use in the summary.

Polishing

When information is reduced from an original passage, the resulting contracted information sounds unnatural. This can be fixed by making adjustments and creating a more natural-sounding summary.

Prior to the investigation, the investigator held meetings with class teachers in order to discuss topics and portions of the authorized social studies texts that had not been covered with the students. All passages selected constituted new material to the students.

Pre-Instructional Activities

Before commencement of the instructional phase of the study, the investigator met each class in order to introduce herself to the students and to explain the investigation to them. Students were informed that they were selected to participate in the project and that their involvement would help to reveal more about the summary writing abilities of grade 6 students. The subjects were told that they would be working on social studies passages from their own textbooks and that they should work as dilligently as they normally did so that the efficacy of the methods or interventions employed would be seen clearly and genuinely.

Following that introduction, students were told that it was important to know how well they read in general. Then the comprehension test of the Gates-MacGinitie Reading Tests (Gates & MacGinitie, 1965) Level D-Form 1 was administered to the students.

Instructional Activities

Six, 60 minute sessions were devoted to each treatment group. In the first session focus was on the deletion, superordination and selection rules of summary writing. The more difficult invention rule was introduced in the second session and reinforced in the third lesson.

The polishing rule was introduced in the fourth session. The fifth and sixth sessions provided for further practice and the reinforcement of all summarization rules and the polishing rule.

Both the blind and the informed training groups received a handout on summary writing which included the definition of a summary and specific rules for summary writing. (See Appendix C.) Day's (1980) definition of a summary was used because it was clear for subjects at this level. Summary writing rules were patterned after Day (1980) and Hare and Borhardt (1984). Day's superordinate rule "reduce lists" was used and her selection and invention rules, "use a topic sentence if one is given to you" and "make your own topic sentence if one is not given", were retained. Hare and Borhardt's modification of Day's deletion rules regarding the omission of redundant and unimportant information being consolidated into "get rid of unnecessary detail" was used. It was felt, too, that a polishing rule was important. As Hare and Borhardt argued, this rule helped make the differentiation between good and draft only summaries. Thus, a total of four summarization rules and one polishing rule were included in the handout given to the blind and informed training groups.

During instruction the informed training group received additional strategy value information about summarization and the use of the rules. The blind training group received none. The self-control training group was also given handouts, one containing the definition of a summary and the other, the four specific summary writing rules and the polishing rule. However, for the self-control training group the rules were explained in more detail and the five self-management steps created by Day to facilitate the learning of college students were also

incorporated in the handout. (See Appendix D.) The self-control training group also received a personal checklist for evaluating their summary writing performance. (See Appendix E.) For this group, to explain the when and why regarding application of the summary intervention strategy, the tetrahedral model was presented on the overhead projector.

In each lesson all treatment groups were provided with duplicated copies of the social studies selections to be summarized. In keeping with the phases of learning developed by Gagné (1985), lessons in general included presentation of a model summary to focus attention on the salient points of summary writing, practice to develop skill in summary writing and written feedback to reinforce performance for the informed and self-control training groups only.

All groups were given the same introduction to each selection. Every introduction included background information about what was to be read and a vocabulary review. The vocabulary portion of the lessons focused on unfamiliar words. Such introductions were considered important because they constituted traditional teaching approaches, developed or activated relevant background knowledge and helped build motivation for reading.

In general, each lesson presented to the training groups focused on the learning processes - executive, attention, encoding, retention, retrieval, response, reinforcement - (Rohwer Jr., Rohwer, and B-Howe, 1980).

In the blind training condition, however, the executive and reinforcement processes were not instituted. In informed training only mentioning of the importance of the strategy for subsequent use was given, thereby activating the executive processes in a limited way. In self-control training, consideration was given to all of the learning processes. To reinforce executive processing regarding the when and why of the strategy, the tetrahedral model was presented to stress the importance of knowing how each variable contributed to learning.

The steps of a general lesson for each of the training groups follow. (See Appendix F for a more specific lesson example for each group.)

Lesson Outlines

Blind Training Group

Preparation

- 5 minutes - Teacher introduced selection and new vocabulary and provided/retrieved background for reading.
- 10 minutes - Using a Directed Reading Thinking Approach (DRTA), teacher had students read and helped them understand the selection.

Demonstration

- 5 minutes - Teacher informed students of the task to be done (summarizing the text) and elicited from them a definition for a summary.
- Teacher presented example of a passage and a summary of the passage on the overhead projector.
- 15 minutes - Teacher showed students how to apply the rules of summarization to the passage.
- 5 minutes - Teacher concluded and reviewed the process of summarization.

Practice

- 20 minutes - Students wrote a summary of the selection.
No feedback was given.

Informed Training Group

Preparation

5 minutes

- Teacher introduced selection and new vocabulary and provided/retrieved background for reading.

10 minutes

- Using a Directed Reading Thinking Approach (DRTA), teacher had students read and helped them understand the selection.

Demonstration and Explanation of Strategy Value

5 minutes

- Teacher explained that students' task was to summarize selection and attempted to elicit a definition of summary from students.
- Teacher presented definition of summary on overhead projector and explained importance of summarization.
- Teacher presented example of a passage and a summary of the passage on the overhead projector.
- Teacher presented rules for writing summary on overhead projector and explained rules and when they could be applied.

20 minutes

- Teacher showed students how to apply the rules of summarization and emphasized the importance of each one.

5 minutes

- Teacher concluded and reviewed lesson by reminding students of the importance of the rules of summarization and when they could be used. Teacher told students that as a result of their use of the rules they had a basic procedure for writing a summary that they could use in any situation which required one.

Practice and Feedback

15 minutes

- Students wrote a summary of the selection.

Students were given individual written feedback on their summary writing performance for the next lesson.

Self-Control Training Group

Preparation

- 5 minutes - Teacher introduced selection and new vocabulary and provided/retrieved background for reading.
- 10 minutes - Using a Directed Reading Thinking Approach (DRTA), teacher had students read and helped clarify their understanding of the selection.

Demonstration

- 10 minutes - Teacher informed students that the task was to summarize the passage and elicited from them a definition of a summary. Teacher presented an example of a passage and a summary of the passage on the overhead projector.

Strategy Value Information

- Teacher introduced Jenkins (1979) tetrahedral model to reinforce students' awareness of the task of summarization. This included their part in the success or failure of task implementation and the strategies involved in summarizing as opposed to applying other strategies for retelling type tasks. Teacher presented specific and general rules for summarizing and explained the importance of the rule application and when they could be used.

Direct Explicit Instruction

- 30 minutes - Teacher led students through the rules of summarization. She modeled and gave explicit instruction in how to use, monitor and check summarization strategy using the selection. During this phase, teacher as well as students produced summary of selection.
- 5 minutes - Teacher concluded and reviewed lesson.

Students' summaries were collected; they were given individual written feedback on their summary writing performance.

Note: The instruction process included a gradual guided shift of responsibility of learning from the teacher to the students.

Administration of Tests

A pretest, immediate posttest and a delayed posttest were administered during the investigation. Each subject was expected to summarize one history and one sociology passage during each testing session. The pretest was conducted during a one to two week interval before training commenced. The immediate posttest took place three to five days after training, while the delayed posttest was administered two months after training over a period of seven days. Each test lasted one hour and was strictly supervised by the investigator.

Test Passages

Three history passages and three sociology passages were used during the measurement phases of the investigation. (See accompanying Table 5.) The passages were extracted from authorized grade six social studies text books entitled Canada Growth of a Nation by Stan Garrod, Fred McFadden and Rosemary Neering (Fitzhenry & Whiteside Limited, 1980), Colonists at Port Royal (Ginn & Company, 1970), Nomads of the Shield (Ginn & Company, 1970) and Caleb Seaman: A Loyalist (Ginn & Company, 1970).

The test passages were of similar length (between 305 and 333 words, 28 and 31 lines) and were at the grade 6 readability level (Fry, 1977). (See Table 5.) History passages were used to determine whether students could apply summarization strategies to passages similar to those used during training while the sociology passages were used to determine whether training transferred to other types of texts. (See Appendix G for the actual copies of test passages.)

TABLE 5

Test Passages

History Passage	Sociology Passage	No. of Words	No. of Lines	Readability level - grade
The Prairies at the Turn of the Century		333	31	6
Winnipeg in 1895		313	29	6
A Place to Settle		305	29	6
	Child Labour and the Growth of Unions	330	30	6
	The Family	314	28	6
	A July Day	319	30	6

There are no sociology textbooks at the grade six level therefore, sociology passages were selected from authorized social studies textbooks concerned mainly with history. They were classified as sociology passages by the investigator because they displayed characteristics of sociology texts outlined by Chace and John (1978): they described and analyzed patterns or regularities in social behaviour, and focused on groups such as a family, a tribe or labour and the effects of group membership on individual behaviour. On the other hand, history passages examined single past chronological events.

Table 6 shows the number of times each of the summarization rules could be applied to the test passages.

Since the number of times rules could be applied to each passage was different, the administration of the test passages was counter-balanced across testing times. For each testing session (pre, post and delayed posttests) students received different combinations of the three history and three sociology test passages. The objective was to control for passage differences and testing order effects. Test packets were prepared for each subject prior to the investigation. Each set of history and sociology passages was randomly assigned to subjects using the 36 combinations displayed in Table 7.

TABLE 6

Use of Deletion, Superordination, Selection and Invention Rules on Test Passages

Rules	Test Passages	The Prairies at the Turn of the Century	Winnipeg in 1895	A Place to Settle	Child Labour and the Growth	The Family	A July Day
Deletion		8	3	3	6	6	9
Superordination		2	2	1	3	1	1
Selection		3	5	4	3	3	3
Invention		3	2	3	3	3	4

TABLE 7
Thirty-six Possible Combinations of History and Sociology Passages

Combination	History Passages	Sociology Passages	Combination	History Passages	Sociology Passages
01	ABC	123	19	ABC	213
02	BAC	123	20	BAC	213
03	CBA	123	21	CBA	213
04	ACB	123	22	ACB	213
05	BCA	123	23	BAC	213
06	CAB	123	24	CAB	213
07	ABC	132	25	ABC	312
08	BAC	132	26	BAC	312
09	CBA	132	27	CBA	312
10	ACB	132	28	ACB	312
11	BCA	132	29	BCA	312
12	CAB	132	30	CAB	312
13	ABC	231	31	ABC	321
14	BAC	231	32	BAC	321
15	CBA	231	33	CBA	321
16	ACB	231	34	ABC	321
17	BCA	231	35	BCA	321
18	CAB	231	36	CAB	321

Key:

History Passages

- A. The Prairies at the Turn of the Century
- B. Winnipeg in 1895
- C. A Place to Settle

Sociology Passages

- 1. Child Labour and the Growth of Unions
- 2. The Family
- 3. A July Day

The letters A, B, and C each represents a different history passage while the numbers 1, 2, and 3 each stands for a different sociology passage.

The summarizing of history passages always preceded the summarizing of sociology passages. Typically, a subject who received the first combination (ABC 123), for example, would be required to summarize history passage A and sociology passage 1 during the pretest. The subject would summarize history passage B and sociology passage 2 for the immediate posttest and history passage C and sociology passage 3 for the delayed posttest. That subject's counterpart might receive combination BAC 231 and would summarize history passage B and sociology passage 2 during the pretest, history passage A and sociology passage 3 during the immediate posttest and history passage C and sociology passage 1 during the delayed posttest.

In administering the pretest, students were each given a package with a history passage and a sociology passage and writing paper. They were told that they were to summarize the passages. This was done only after the meaning of a summary was explained to them. During the posttests similar packages were distributed to the subjects along with red and green pencils. The subjects were then simply asked to summarize the two passages that were given.

Scoring Procedure

Gates-MacGinitie Reading Tests

The comprehension subtest of the Gates-MacGinitie Reading Tests Level D-Form 1 (Gates & MacGinitie, 1965) was used to measure students' reading achievement levels. This subtest was selected because of its high reliability and validity (Calfee, 1985; Rupley, 1985). Rupley (1985) notes that as a measure for evaluation purposes any subtest of the Gates-MacGinitie Reading Tests serves a good purpose and Calfee (1985) believes that the tests contribute to sound education decisions. The comprehension subtest requires inferencing and abstracting of information and is not reliant on mere recognition of ideas in the short passages presented and items are passage dependent progressing in difficulty level (Rupley, 1985). Further, the items represent content found in most public schools such as social sciences.

The raw score on the test was the total number of correct items.

Summaries

All test papers were coded so that it would not be possible for raters to know group membership. Each set of tests was marked independently by the investigator. A fellow graduate student subsequently scored 10 percent of the summary protocols. Interrater reliabilities were 0.98, $p < .01$ for main idea scores; 0.98, $p < .01$ for efficiency scores and 0.87, $p < .01$ for rule application scores.

Scoring related both to the summary product and the summary process. A process score for application of each of the four summarization rules and polishing rule was also given. This approach to eval-

uating the summaries was selected because both aspects of summarization were considered important - the summary product is the result of the summary process. As Durkin (1981) and Irwin (1986) suggest, the quality of a product depends on the effectiveness of the process used. A description of the scoring procedure follows.

Product Scores

Main idea. Subjects' summaries were first scored for main ideas. In order to quantify the number of main ideas in each passage and the number of unnecessary details, a system devised by Garner (1982) and employed successfully in previous research such as Hare & Borchardt (1984) was used. A scoring template was developed by having five graduate students independently rate each sentence in each test passage as 3 ("very important information that should appear in some form in a summary"), 2 ("moderately important information that might or might not appear"), or 1 ("unimportant information that should not appear in any form in a text summary"). All of the sentences unanimously assigned "3" were considered main idea sentences. They included, but not exclusively topic sentences. All of the sentences receiving a unanimous "1" were regarded as unnecessary idea sentences.

Following this preliminary designation of main ideas, a panel of two graduate students reviewed the ratings. It was important to determine what made each sentence important, moderately important or unimportant. It was expected that redundancy would be found in sentences receiving "3" in the importance ratings and that those would be deleted. The raters, therefore, agreed that only the first mention of an important idea would be counted as important. Scoring templates for the test passages are included in Appendix H.

In essence, the main idea score for each summary was computed by comparing the main ideas included by each subject with a template of main ideas from the original passage and then converting the number included to a percentage. The main idea score was equal to the percentage of main ideas that each subject included in a summary.

Efficiency scores. Given the main idea scores, efficiency of summarization (a ratio of the number of main ideas included to the number of words used) was subsequently computed for each summary. This was done by dividing the number of main ideas used by the total number of words used in a summary (Garner, 1982). See Appendix I for an example.

Scores calculated for main ideas and efficiency constituted the summary product scores.

Process Score

A scoring template for rule application was developed for each passage (see Appendix J). The procedure employed was adapted from Hare and Borhardt (1984). Prior to conducting the study, each passage was reviewed by separate raters who were graduate students for the instances in which it was possible to apply the superordination rule, the two topic sentence rules and the deletion rule. Specific counts were made of lists, explicit and implicit topic sentences and previously rated unimportant information. Templates were then constructed for each passage showing lists to be reduced, topic sentences to be selected, paragraphs for which topic sentences must be created and unnecessary details to be deleted.

Subjects' summaries were scored against the templates as showing none or little, moderate or appropriate evidence of rule usage receiving a corresponding rating number of 1, 2, or 3.

In the case of the application of the superordination rule, subjects were expected to reduce to superordinate terms all lists embedded in main ideas. However, credit was given for reduction of any less important lists and failure to reduce less important lists was counted against subjects' ratings.

In rating subjects' attempts at polishing their summaries, the criteria used by Hare & Borchardt (1984) was followed. Heavy copying from the original text, incomplete sentences, run-ons, and incorrect representation of ideas due to rewording all added up to the lowest rating of 1. A summary exhibiting moderate use of the polishing rule included the rewording of only a few phrases from the original text and/or which exhibited little or no writing problems, received a score of 2. A summary which was accepted as "fluent, organized, accurate or concise and in students' own words" was rated as demonstrating appropriate rule usage and received a score of 3.

Scores computed for rule usage constituted the summary process scores.

Separate scores were calculated for each subject for each rule application and then totalled.

Descriptive Data

At the end of the investigation, students' metacognitive knowledge regarding the salience of the summary writing intervention procedure they had been taught was probed. Responses were sought to three basic interview questions: What were you doing? How did you do it? Why is it important to know how to do it? Five students were randomly selected from each training group for the interviews.

Responses to the first question were rated on a 3 point scale - 0 to 2. A highly rated response had to include specific reference to the task of summarizing and received 2 points. Less specific responses were awarded 1 point and inaccurate responses received no points. Responses to the second question were rated on a 4 point scale. A highly rated response described an appropriate sequence of steps to follow in carrying out the summary writing task and received 3 points. Incomplete responses omitting some summary writing steps were given 2 points. Responses which were not specific to the process involved in summarizing received 1 point. An inaccurate response making no sense received no points. The third question was also rated on a 4 point scale - 0 to 3. A highly rated response received 3 points and had to specify both the context in which the summary writing skill could be useful and what could be done within that context. A response which referred to a specific general category but not to the specific use received 2 points, while a response which was not specific but related to reading and/or writing was awarded 1 point. No response was rated 0. (See Appendix K for example of responses to interview questions and Appendix L for rating scales.)

All interviews were transcribed and rated independently by the investigator. A graduate student then rescored all responses. Interrater reliability was 0.94, $p < 0.01$.

Analysis of Data

In order to establish that there were no statistically significant differences among the treatment groups the Gates-MacGinitie comprehension subtest scores were treated statistically by using analysis of variance.

Analysis of variance was conducted on all pretest, immediate and delayed posttest dependent measures except for summary rule application for history passages. Separate approximate t-tests were used for these data. Since the design involved unbalanced sample sizes, least-squares means were used to test for main effects revealed through the analysis of variance.

In addition, performance across test times from pre to immediate posttest and from immediate to delayed posttest was examined by conducting multiple posthoc comparisons on all pairs of means using the t-test procedure.

Analysis of variance was also conducted on the interview ratings that assessed students' metacognitive knowledge regarding the importance of being able to summarize text.

CHAPTER 4

RESULTS

This study, involving 51 competent and less competent grade six readers, examined the implementation of three summarization intervention strategies. The objective was to determine the level of instructional explicitness required to understand a summarization intervention strategy for independent learning. Related goals were to establish whether sixth graders used the intervention in a transfer situation and long term effects. To this end, two different levels of instructional explicitness involving metacognition were employed: informed and self-control training. A control treatment in the form of blind training was also instituted.

Initial Differences Among Treatment Groups and Competency Levels

Any statistically significant differences among treatment groups with respect to their general reading ability and their ability to write summaries prior to the investigation would have implications for the subsequent data analysis. Therefore, it was imperative to establish whether such differences existed.

Reading Competence

Before commencement of the investigation, the comprehension subtest of the Gates-MacGinitie Reading Tests (Gates & MacGinitie, 1965) level D-Form 1 was administered to the treatment groups, not only for the purpose of assigning individuals within the groups to reading com-

petency levels but also for determining whether there were differences in reading ability among the groups. When analysis of variance was conducted on the reading achievement scores, no significant initial differences were detected among the groups, $F(2,47) = 1.85$, $p > 0.05$. (See Table 8 for reading achievement means and standard deviations and Appendix M - Table M1 for ANOVA.)

TABLE 8
Means and Standard Deviations for Gates-MacGinitie Comprehension Subtest^a

Training Group	N	\bar{X}	SD
Self-control	19	43.95	8.11
Informed	15	40.33	6.85
Blind	16	44.88	5.30

^aTotal possible score = 52

Summary Writing

In addition to determining whether there were significant initial differences in reading among the treatment groups, it was important to establish if there were a priori differences in the training groups' ability to summarize informational text. Pretreatment product scores (main ideas and efficiency) and the process summary scores (summary writing rule application) were analyzed for both the history and the sociology passages. However, before conducting the a priori tests an unbalanced data set had to be dealt with and there had to be the assurance that the assumptions underlying the analysis of variance were met.

Subjects who had not written the pretest and/or subsequent post-test summaries were dropped from the study. Thus, although 51 subjects participated in the training, only scores from 43 subjects were included in the analysis because of an unbalanced data set. Table 9 provides a breakdown of subjects who took part in the investigation and the number of subjects whose scores were included in the analysis.

TABLE 9
Subjects in Study and Subjects Whose Scores were Analyzed

Training Group	Reading Competence	Number in Study	Number Whose Scores Were Analyzed
Self-control	Less Competent	8	8
	Competent	11	11
Informed	Less Competent	12	6
	Competent	4	4
Blind	Less Competent	5	4
	Competent	11	10
TOTAL		51	43

Preliminary analysis of variance applied to the data revealed generally weak R-squares (≤ 0.3). R-square measures how much variation in the dependent variable can be accounted for by the analysis of variance model. R-square can range from 0 to 1. In general, the larger the value of R-square, the better the fit of the analysis of variance model. Thus, the models did not appear to fit well to any of the data. Further, when residual analysis was used to evaluate the aptness of the

analysis of variance model for the data on each of the dependent measures for both history and sociology passages, there were departures from the condition assumed by the analysis of variance model - nonconstancy of error variance. This was most evident in the case of the main idea scores.

Consequently, an arc sine transformation was conducted on main idea scores in order to obtain errors whose distributions had approximately equal variances. To meet analysis of variance assumptions, all further analysis of pretest main idea scores was based on transformed scores.

Further statistical analysis of pretest summary writing scores included a test for equality of variances for treatment groups on all summary pretest dependent measures for both history and sociology passages. When the Bartlett test of equal variances was applied to the pretest data, homogeneity of variance was established on all dependent measures except in the case of the application of summary writing rules to summaries of history passages. Separate approximate t-tests were therefore conducted on the means for rule application for history passages because approximate t-tests can be done even if variances are not assumed equal (Steel & Torrie, 1980).

Thus, analysis of variance was conducted on all pretest dependent variables except for summary rule application for the history passages. These scores were analyzed through approximate t-tests. Since the design involved unbalanced sample sizes, least-squares means or population marginal means were used to test for main effects indicated through the analysis of variance.

An indepth analysis to identify the source of the initial differences on each summary writing dependent variable as shown by pretest scores was conducted. Product scores (main idea and efficiency) were analyzed first, followed by the process scores (rule application) for each type of passage (history and sociology). The following findings from these analyses are presented.

Product Scores

Main ideas - history passages. Analysis of variance run on the arc sine transformed proportion of main ideas for summaries of history passages revealed significant initial differences among the training groups, $F(2, 37) = 6.50, p < 0.05$. When pairs of means were contrasted significant differences were found between the blind and the informed training groups, $F(1, 37) = 10.52, p < 0.05$ and the blind and the self-control training groups, $F(1, 37) = 9.34, p < 0.05$. The informed and self-control training groups however, had equivalent starting points, $F(1, 37) = 0.46, P > 0.05$. Inspection of the least-squares means for main ideas in summaries of history passages indicated superior starting performance for the blind training group over both the informed and self-control training groups. (See Table 10.)

Analysis of variance also showed no initial significant differences between reading competency levels across treatment groups, $F(1, 37) = 6.05, p > 0.05$ and no significant treatment by reading competency interaction, $F(2, 37) = 0.47, p > 0.05$. (See Appendix M - Table M2 for ANOVA.)

Main ideas - sociology passages. As in the case of the summaries of history passages, analysis of variance on the arc sine transformed

proportion of main ideas in the summaries of sociology passages yielded significant differences among treatment groups, $F(2, 37) = 4.96$, $p < 0.05$. However, the pattern of variation was not identical to that found in the summaries of the history passages. When mean scores were contrasted, findings showed that the informed training group was significantly different from both the self-control training group, $F(1, 37) = 6.38$, $p < 0.05$ and the blind training group, $F(1, 37) = 9.11$, $p < 0.05$. There was however, no significant difference between the blind and the self-control training groups, $F(1, 37) = 0.71$, $p > 0.05$. An examination of the least-squares means for main ideas in the summaries of the sociology passages indicated that the performance of the informed training group was far below that of the other training groups. (See Table 10.)

No significant differences between reading competency levels across treatments were detected, $F(1, 37) = 0.65$, $p > 0.05$ and there was no treatment by reading competency interaction, $F(2, 37) = 0.54$, $p > 0.05$. (See Appendix M - Table M2 for ANOVA.)

Efficiency - history passages. When efficiency scores for the summaries of history passages were analyzed for initial differences, no significant differences were found among treatment groups ($F(2, 37) = 0.20$, $p > 0.05$), between reading competency levels ($F(1, 37) = 0.03$, $p > 0.05$) and for treatment by reading competency interaction ($F(2, 37) = 0.51$, $p > 0.05$). (See Appendix M - Table M2 for ANOVA.) That is, in terms of efficiency for summaries of history passages, all training groups were initially equal.

Efficiency - sociology passages. Analysis of the efficiency scores for the summaries of sociology passages was similar to that of the history passages. There were no significant initial differences among treatment groups ($F(2, 37) = 2.76, p > 0.05$), or between reading competency levels ($F(1, 37) = 0.47, p > 0.05$). There was no treatment by reading competency interaction ($F(2, 37) = 0.85, p > 0.05$). (See Appendix M - Table M2 for ANOVA.)

Process Scores

Summary writing rule application - history passages. Approximate t-tests conducted on scores for the application of summarization rules to history passages revealed no significant differences between reading competency levels across the self-control group, $t(15.7) = -0.38, p > 0.05$ and the informed training group $t(7.9) = 0.68, p > 0.05$. There was however, a significant difference between competency levels on summary writing rule application for the blind training group, $t(11.8) = 2.52, p < 0.05$; the scores of the more competent readers being significantly better than the scores of the less competent readers.

With the exception of the less competent readers in the blind training group, means for all other groups were equivalent. (See Appendix M - Table M3 for approximate t-test results and Table 11 for means and standard deviations.)

TABLE 11

Rule Application: Pretest Means and Standard Deviations for History Passages and LS Means for Sociology Passages

	Process			
	Rule Application (History Passages)		Rule Application (Sociology Passages)	
	\bar{x}	SD	LS Mean	
<u>Treatment Group</u>				
Self-control	8.16	1.68	7.57	
Informed	8.10	1.45	6.58	
Blind	7.57	1.16	6.80	
<u>Competence</u>				
Less Competent	7.83	1.34	6.51	
Competent	8.04	1.57	7.46	
<u>Treatment Group x Competence</u>				
Self-Control:	Less Competent	8.00	1.07	6.88
	Competent	8.27	2.05	8.27
Informed:	Less Competent	8.33	1.75	6.67
	Competent	7.75	0.96	6.50
Blind:	Less Competent	6.75	0.50	6.00
	Competent	7.90	1.20	7.60

Summary writing rule application - sociology passages. Results of the analysis of variance conducted on the scores for applying summary writing rules to summaries of sociology texts showed that there were no significant main effects for treatment ($F(2, 37) = 1.31, p > 0.05$), no significant differences between reading competency levels ($F(1, 37) = 2.75, p > 0.05$) and no significant effects for treatment by reading competency interaction, ($F(2, 37) = 0.84, p > 0.05$). (See Appendix M - Table M2 for ANOVA and Table 11 for LS Means.)

Summary of Initial Differences Among Treatment Groups and Competency Levels

Although no significant differences in general reading ability as measured by the Gates MacGinitie reading comprehension subtest were found among the training groups, the percentage of main ideas included in summaries of both history and sociology passages revealed different variations. In selecting main ideas for summaries of history passages, the self-control and informed training groups were identical while the blind training group was superior to both of them. On the other hand, subjects in the informed training group included fewer main ideas in their summaries of sociology passages than did the blind and self-control training groups. On the other hand, in terms of summary writing efficiency, the performances of all groups were similar for both history and sociology passages.

Moreover, analysis of scores for the application of summarization rules suggested no differences among the training groups.

Similarly, there were no significant differences between reading competency levels or treatment by reading competency interaction on any of the dependent measures.

Resultant Data Analyses

Since differences found in the number of main ideas in posttest summaries might be due partially to the differences on pretest summaries, the possibility of carrying out analysis of covariance, using pretest main idea scores as concomitant variables in later analyses was considered. However, this was not possible. When plotted against the scores on the Gates-MacGinitie comprehension subtest, summary main idea scores proved inappropriate as covariates. Consequently, in an attempt to respond to the research questions, analysis of subsequent data was based on the analysis of variance model and least-squares means, except in the case of scores for summary rule application to summaries of history texts. Accordingly, follow-up approximate t-tests were conducted on the means and results especially those related to the summary main idea scores have to be interpreted cautiously.

In addition, performance across test times from pre to immediate posttest and from immediate to delayed posttest was examined by conducting multiple post-hoc comparisons on all pairs of means. Results of the analysis in regard to each research question are presented next. Questions related to immediate and delayed summaries are treated separately.

Experimental Findings

Immediate Posttest Summaries

The first concern of this study was the examination of the degree of instructional explicitness necessary for subjects to write effective summaries and to establish whether instruction was transferred and

helped students cope with new material (sociology text). The first questions of this study, therefore, were: for competent and less competent readers at the grade six level, are there significant differences in the summaries of history and sociology texts written immediately after an instructional program in terms of product (main idea and efficiency) and process (rule application) between:

1. students given informed training and students given self-control training?
2. students given informed training and students given blind training?
3. students given self-control training and students given blind training?

Product Scores

Main ideas - history passages. Analysis of variance conducted on the immediate posttest percentages of main ideas included in summaries of history passages indicated significant main effects for treatment, $F(2, 37) = 18.69, p < 0.05$. Contrasts of training groups' performance means revealed a significant difference between the informed and self-control training groups, $F(1, 37) = 26.51, p < 0.05$ and a significant difference between the informed and blind training groups, $F(1, 37) = 32.76, p < 0.05$. The self-control and blind training groups had no significant difference, $F(1, 37) = 1.49, p > 0.05$. Inspection of the least-squares means for training groups indicated that training had the least effect on the informed training group. (See Table 12.)

TABLE 12

Main Idea and Efficiency: Immediate Posttest LS Means for Self-control, Informed and Blind Training Groups

	Product LS Means			
	Main Ideas (History Passages)	Main Ideas (Sociology Passages)	Efficiency (History Passages)	Efficiency (Sociology Passages)
<u>Treatment Group</u>				
Self-control	74.04	66.77	0.07	0.07
Informed	43.38	45.40	0.07	0.07
Blind	80.90	52.78	0.07	0.05
<u>Competence</u>				
Less competent	61.04	47.58	0.07	0.05
Competent	71.18	62.38	0.07	0.07
<u>Treatment Group x Competence</u>				
Self-control: Less	67.20	62.18	0.07	0.07
Competent	80.88	71.37	0.08	0.07
Informed: Less	36.58	40.80	0.08	0.05
Competent	50.18	50.00	0.07	0.09
Blind: Less	79.34	39.77	0.06	0.04
Competent	82.47	65.78	0.07	0.06

For competency levels, the analysis of variance revealed a significant difference between reading competency levels, $F(1, 37) = 4.20$, $p < 0.05$. That is, competent readers incorporated more main ideas in their summaries of history passages than less competent readers. (See Table 12.) There was no significant treatment by reading competency interaction, $F(2, 37) = 0.05$, $p > 0.05$. (See Appendix M, Table M4 for ANOVA.)

A post-hoc comparison among pre and immediate posttest means suggested that the self-control training group as a whole made no significant improvement on the number of main ideas included in their summaries of history passages, $t = 1.37$, $p > 0.05$. The performance of the informed group dropped from pretest to immediate posttest, although this drop was not statistically significant, $t = -1.9$, $p > 0.05$. For the blind training group, however, performance across test times dropped significantly from pretest to immediate posttest, $t = 2.27$, $p < 0.05$. Thus, while performance in terms of the number of main ideas included in the summaries of the blind training group was initially superior, this superiority was not maintained across test times. Students in the self-control group were nevertheless able to achieve their performance level after training.

For competency levels across test times, post-hoc comparisons of mean scores indicated that there was no significant increase in the performance of competent readers from pre to immediate posttest, $t = 0.72$, $p > 0.05$ but that the performance of the less competent readers dropped significantly, $t = 2.42$, $p < 0.05$.

The fact that there was no significant interaction between treatment and reading competency suggested that with respect to the inclusion of main ideas in summaries of history passages, the three instructional effects did not affect reading competency levels differently.

A post-hoc comparison of pre and immediate posttest performance means of competency levels within treatment groups showed that there was no significant difference in main ideas used by competent readers in the self-control, informed and blind training groups, $t = 1.90$, $p > 0.05$, $t = -0.32$, $p > 0.05$ and $t = 1.91$, $p > 0.05$, respectively, although the enhanced performance of competent readers in the self-control training group approached significance. There was no significant difference in the performance of the less competent readers across pre and immediate posttest times in the self-control and blind training groups, $t = -0.44$, $p > 0.05$ and $t = -1.06$, $p > 0.05$. However, there was a significant decrease in the performance of the less competent readers of the informed training group, $t = 5.97$, $p < 0.05$ accounting for the overall drop in the performance of less competent readers.

(See Appendix N, Table N1 for t-test comparisons.)

Main ideas - sociology passages. Analysis of variance conducted on the percentage of main ideas found in the summaries of sociology passages disclosed no significant main effects for treatment, $F(2, 37) = 3.04$, $p > 0.05$. There was no significant difference between competency levels, $F(1, 37) = 3.75$, $p > 0.05$ and no significant interaction between treatment and reading competency, $F(2, 37) = 0.54$, $p > 0.05$.

When the mean performance on pre and immediate posttests were compared in a post-hoc analysis, it was found that the self-control and

the informed training groups had made significant gains, $t = 1.76$, $p < 0.05$ and $t = 2.41$, $p < 0.05$, respectively. There was no significant difference in the performance of the blind training group across pre and immediate posttest times, $t = -1.23$, $p > 0.05$.

The t-test procedure conducted on differences between pre and immediate posttests indicated no significant difference in the number of main ideas included in the sociology text summaries of either competent, ($t = 1.04$, $p > 0.05$) or less competent readers ($t = 1.19$, $p > 0.05$).

Although there was no significant interaction between treatment and reading competency, a comparison of pre and immediate posttest means revealed that while there was no significant difference in the performance of competent and less competent readers in the self-control and blind training groups, $t = 1.13$, $p > 0.05$ and $t = 1.18$, $p > 0.05$, competent readers in the informed training group did significantly better on the immediate posttest, $t = 3.19$, $p < 0.05$. Differences in pre and immediate posttest means were not significant for less competent readers in either the self-control, informed or blind training group, $t = 1.50$, $p > 0.05$, $t = 1.13$, $p > 0.05$, $t = -0.47$, $p > 0.05$, respectively.

When the means for main idea scores for sociology passages were compared with the means for main idea scores for history passages, no significant differences were detected for the self-control and the informed training groups, $t = 1.61$, $p > 0.05$ and $t = 0.50$, $p > 0.05$, respectively. However, the blind training included significantly fewer main ideas in their summaries of sociology passages than their summaries of history passages, $t = 2.82$, $p < 0.05$.

Competent readers included significantly fewer main ideas in summaries of sociology texts than they did for history texts, $t = 2.16$, $p < 0.05$ while less competent readers did not perform significantly differently, $t = 1.60$, $p > 0.05$. Competent readers in the self-control, informed and blind training groups did not perform significantly differently across text types, $t = 1.32$, $p > 0.05$, $t = 0.03$, $p > 0.05$, $t = 1.76$, $p > 0.05$, respectively. As well, there was no significant difference in the performance of less competent readers in the self-control, informed and blind training groups, $t = 0.87$, $p > 0.05$, $t = 0.58$, $p > 0.05$ and $t = 2.63$, $p > 0.05$, respectively. (See Appendix N, Tables N2 and N3 for t-tests.)

Summary and discussion. Overall analysis of variance on the number of main ideas found in history text summaries during the immediate posttest indicated significant treatment effects. The performance of the self-control and blind training groups was significantly better than that of the informed group. For main ideas in the summaries of sociology text however, there were no significant differences among the groups. Competent readers wrote better history text summaries than less competent readers in terms of the number of main ideas present, but for sociology text summaries, there were no significant differences between the summaries of competent and less competent readers. In addition, there was no overall significant treatment by competency interaction for either history or sociology text summaries.

Post-hoc comparisons of means for main ideas in history text summaries showed no significant gains from pretest to immediate posttest for the self-control group although the gains in the performance of competent readers approached significance. While the performance of

the informed group dropped, this drop was not significant. The performance of the blind training group dropped significantly, however, suggesting that the initial superiority of this group was not sustained over the training period. While the performance of competent readers improved, the performance of less competent readers dropped overall across treatment groups. Inspection of the mean performance within each treatment group indicated that it was the performance of the less competent readers in the informed training group that accounted for the significant decrease in performance.

Post-hoc analysis on the sociology text summary writing scores for main ideas showed that both the self-control and informed training groups made significant gains while the initially high performance of the blind training group was simply maintained. While there were no differences in the sociology text summaries of competent and less competent readers in the self-control and blind training groups, competent readers in the informed training group outperformed less competent readers, suggesting that treatment had some effect for good but not for poor readers.

Product Scores

Efficiency - history passages. Analysis of the scores for the efficiency of summary writing in regard to history passages revealed no significant main effects for treatment, $F(2, 37) = 0.37$, $p > 0.05$, nor for reading competency level, $F(1, 37) = 0.33$, $p > 0.05$. There was no treatment by reading competency interaction, $F(2, 37) = 0.96$, $p > 0.05$. (See Appendix M, Table M4 for ANOVA.)

A post-hoc comparison of pre and immediate posttest efficiency means showed that the self-control training group made significant gains, $t = 2.11$, $p < 0.05$. There was no significant difference in the performance of the informed and blind training groups from pretest to immediate posttest, $t = 1.38$, $p > 0.05$ and $t = 0.49$, $p > 0.05$, respectively.

There were also no significant differences in the pre and immediate posttest means for competent and less competent readers, $t = 1.77$, $p > 0.05$ and $t = 1.76$, $p > 0.05$. Results also revealed that there were no significant differences in scores for competent readers in the self-control training group, $t = 1.95$, $p > 0.05$, the informed training group, $t = 0.40$, $p > 0.05$ and the blind training group, $t = 0.40$, $p > 0.05$. There were also no significant differences in pre and immediate posttest efficiency means for less competent readers in the self-control training group, $t = 0.87$, $p > 0.05$, the informed training group, $t = 2.00$, $p > 0.05$, or the blind training group, $t = 0.40$, $p > 0.05$. (See Appendix N, Table N4 for t-tests.)

Efficiency - sociology passages. In the analysis of efficiency scores for summaries of sociology passages, no significant treatment effect ($F(2, 37) = 2.27$, $p > 0.05$) or significant treatment by reading competency interaction, ($F(2, 37) = 1.67$, $p > 0.05$) was detected. However, for competency levels, as depicted in the least-squares means, competent readers exercised a significantly greater degree of efficiency than less competent readers in their summaries of sociology passages ($F(1, 37) = 7.36$, $p < 0.05$). (See Table 12 for least-squares means and Appendix M - Table M4 for ANOVA.)

T-tests conducted on pre and immediate posttest mean scores revealed that the self-control and informed training groups improved significantly, $t = 3.52, p < 0.05$ and $t = 2.92, p < 0.05$. There was no improvement in scores for the blind training group, $t = 0.51, p > 0.05$.

Competent readers across treatment groups made significant improvements from pre to immediate posttest, $t = 3.18, p < 0.05$. Less competent readers also made significant gains, $t = 2.19, p < 0.05$. Analysis of mean performance within training groups showed that although there was no significant treatment by reading competency interaction, competent readers in the self-control and informed training groups made significant gains, $t = 3.34, p < 0.05$ and $t = 7.51, p < 0.05$, respectively. However, competent readers in the blind training group made no improvement, $t = 0.52, p > 0.05$. Less competent readers in the self-control group improved significantly on the immediate posttest, $t = 2.54, p < 0.05$, while there was no significant difference in pre and immediate posttest scores for less competent readers in either the informed or blind training groups, $t = 1.15, p > 0.05$ and $t = 0.00, p > 0.05$, respectively.

When immediate posttest efficiency scores for summaries of history and sociology texts were contrasted, no significant differences were detected for the self-control, informed and blind training groups, $t = 1.26, p > 0.05$, $t = 0.56, p > 0.05$ and $t = 1.77, p > 0.05$, respectively. No significant differences were revealed either for competent readers, $t = 0.95, p > 0.05$ or less competent readers, $t = 2.16, p > 0.05$. Further, no significant differences were found for competent readers in the self-control, informed and blind training groups, $t = 1.42, p > 0.05$, $t = -2.83, p > 0.05$, $t = -1.05, p > 0.05$ or for less

competent readers in the self-control, informed and blind training groups, $t = 0.38$, $p > 0.05$, $t = 1.76$, $p > 0.05$ and $t = 2.83$, $p > 0.05$. (See Appendix N, Tables N5 and N6 for t-tests.)

Summary and discussion. In terms of the efficiency of summary writing for both history and sociology texts, there was no significant overall effect for treatment and no overall treatment by reading competency interaction. While for the efficiency of history text summaries there was no significant effect for competency level suggesting that training was equally effective for less competent and competent readers, overall, competent readers significantly outperformed less competent readers in writing efficient sociology text summaries.

Post-hoc comparisons for summary writing efficiency on history passages indicated that while the blind and informed training groups made no gains from pre to immediate posttest, students in the self-control treatment group made significant gains. For sociology text, both the self-control and informed training groups enhanced their performance while the blind training group did not, suggesting that training had some effect on enhancing summary writing efficiency performance. For sociology text, the performance of both competent and less competent students improved in terms of summary writing efficiency. Inspection of the performance of competent and less competent readers within treatment groups suggested that competent readers in both the self-control and informed training groups made significant gains but those in the blind training condition did not. For less competent readers, only those in the self-control training group profitted from training, less explicit training seeming to have no transfer effect on summary writing efficiency.

Process Scores

Summary rule application - history passages. Results for the application of summary writing rules to summaries of history passages showed no significant differences in scores gained on the immediate posttest for any of the groups. Application of the approximate t-test procedure indicated no significant difference between reading competency levels for the self-control training group ($t(12.2) = -1.23, p > 0.05$) or the informed training group ($t(7.2) = -1.83, p > 0.05$). However, in the blind training group competent readers were significantly better at applying summary writing rules in their summaries of history texts than less competent readers, ($t(8.5) = -3.64, p < 0.05$).

TABLE 13
Rule Application: Immediate Posttest Means and Standard Deviations for History Passages and LS Means for Sociology Passages

	Process			
	Rule Application (History Passages)		Rule Application (Sociology Passages)	
	\bar{x}	SD	LS Mean	
<u>Treatment Group</u>				
Self-control	10.47	1.39	9.81	
Informed	9.20	2.10	8.96	
Blind	10.29	1.77	8.73	
<u>Competence</u>				
Less Competent	9.11	1.75	8.51	
Competent	10.84	1.34	9.82	
<u>Treatment Group x Competence</u>				
Self-Control:	Less Competent	10.00	1.60	9.63
	Competent	10.82	1.17	10.00
Informed:	Less Competent	8.33	1.97	8.17
	Competent	10.50	1.73	9.75
Blind:	Less Competent	8.50	1.00	7.75
	Competent	11.00	1.49	9.70

(See Appendix M, Table M5 for approximate t-tests and Table 13 for means and standard deviations.) In general, except for the competent readers in the blind training group, means for the groups were similar.

In comparing pre and immediate posttest means across test times, significant improvements were detected for the self-control training group, $t = 4.91$, $p < 0.05$ and the blind training group, $t = 6.59$, $p < 0.05$. There was no significant difference in pre and immediate posttest means for the informed training group, $t = 1.82$, $p > 0.05$.

For rule application to history passages generally, there was a significant increase in the performance of both competent and less competent readers from pre to immediate posttest, $t = 7.97$, $p < 0.05$ and $t = 2.94$, $p < 0.05$, respectively. Analysis of pre and immediate posttest means showed that in the self-control, informed and blind training groups, competent readers made significant gains, $t = 4.08$, $p < 0.05$, $t = 3.67$, $p < 0.05$ and $t = 6.15$, $p < 0.05$. Less competent readers in the self-control and blind training groups also made significant improvements, $t = 2.65$, $p < 0.05$ and $t = 3.66$, $p < 0.05$, respectively. In the informed training group however, less competent readers made no significant gains, $t = 0.00$, $p > 0.05$. (See Appendix N, Table N7 for t-tests.)

Summary rule application - sociology passages. Analysis of variance showed no significant treatment effects for rule application to summaries of sociology texts, $F(2, 37) = 1.50$, $p > 0.05$ and no significant interaction between treatment and reading competency $F(2, 37) = 0.78$, $p > 0.05$. However, competent readers scored significantly better than less competent readers (LS Mean 9.82 and 8.51, respectively), $F(1, 37) = 4.78$, $p < 0.05$. (See Appendix M - Table M4 for ANOVA and Table 13 for LS Means.)

Post-hoc analysis applied to mean differences of pre and immediate posttest scores showed that the self-control, informed and blind training groups all improved significantly, $t = 3.98$, $p < 0.05$, $t = 3.24$, $p < 0.05$ and $t = 3.55$, $p < 0.05$, respectively.

Overall, competent readers made significant improvements from pre to immediate posttest, $t = 4.20$, $p < 0.05$, while less competent readers also did significantly better, $t = 5.34$, $p < 0.05$. Examination of competency level performance within treatment groups indicated that in the self-control group, competent readers made no significant improvement, $t = 2.00$, $p > 0.05$; however, in both the informed and blind training groups, competent readers made significant gains, $t = 3.43$, $p < 0.05$ and $t = 2.74$, $p < 0.05$. While less competent readers in the self-control group improved significantly, $t = 5.60$, $p < 0.05$, less competent readers in the informed and blind training groups did not make significant gains, $t = 1.69$, $p > 0.05$ and $t = 2.78$, $p > 0.05$.

When rule application scores for summaries of history passages were compared with rule application scores for summaries of sociology passages no significant differences were detected for the self-control group, $t = 1.79$, $p > 0.05$. However, in the informed and blind training groups, scores for rule application to summaries of sociology passages were significantly lower, $t = 2.45$, $p < 0.05$ and $t = 3.04$, $p < 0.05$. As well, competent readers did significantly less well for their summaries of sociology than history passages ($t = 3.69$, $p < 0.05$) even if there was an improvement from pre to immediate posttest for sociology summaries. There was no significant difference between scores obtained for rule application to sociology and history passage summaries by less competent readers, $t = 1.33$, $p > 0.05$.

In the self-control training group, competent readers did not perform significantly differently across text types, $t = 1.69$, $p > 0.05$. As well, competent readers in the informed training group showed no significant difference in performance across text types, $t = 3.00$, $p > 0.05$, while in the blind training group, competent readers performed significantly less well for sociology passages than for history passages, $t = 3.07$, $p < 0.05$. No significant differences were detected for less competent readers in the self-control ($t = 0.70$, $p > 0.05$), informed ($t = 1.00$, $p > 0.05$) and the blind ($t = 0.88$, $p > 0.05$) training groups. (See Appendix N, Tables N8 and N9 for t-tests.)

Summary and discussion. Except for competent readers in the blind training group, there was no overall difference in terms of rule application for summaries of history text. For rule application in sociology text summaries, competent readers in all groups outperformed less competent readers overall.

Post-hoc comparisons of the means from pre to immediate posttest showed that for rule application in history text, students in the self-control and blind training groups benefitted significantly from training, while students in the informed training group did not. Competent readers benefitted more than less competent readers in general, but within treatment group analysis showed that less competent readers in both the self-control and blind training groups benefitted more from treatment than those in the informed group.

For rule application in sociology text summaries, the transfer task, post-hoc comparisons of mean performance showed that the performance of all groups improved significantly suggesting that training had a transfer effect. One possible explanation for the fact that initial

performance on sociology text summaries was lower than performance on history text summaries is that students may have more experience with history than sociology text in school. Analysis of results for competency level showed that increases in performance were significant overall for both good and poor readers. Within group analysis showed that while competent readers in the self-control group failed to make significant performance gains, those in both the informed and blind training groups improved significantly. Results for less competent readers however, showed enhanced rule application performance for the self-control group but not the other two groups, suggesting that rule application did not increase for less competent students when instruction was not explicit.

Delayed Posttest Summaries

The second area of concern in this study was the question of strategy maintenance over time. Questions addressing this issue were: for competent and less competent readers at the grade six level, are there significant differences in the summaries of history and sociology texts written two months after an instructional program in terms of product (main idea and efficiency) and process (rule application) between:

1. students given informed training and students given self-control training?
2. students given informed training and students given blind training?
3. students given self-control training and students given blind training?

Product Scores

Main ideas - history passages. Analysis of variance results revealed significant main effects for treatment, $F(2, 37) = 9.95, p < 0.05$. Contrasts of all pairs of treatment group means confirmed a significant difference in terms of the percent of main ideas included in summaries of history texts by subjects given informed and self-control training, $F(1, 37) = 17.29, p < 0.05$. There was also a significant difference between the informed and blind training groups, $F(1, 37) = 14.30, p < 0.05$. There was however, no significant difference in the performance of the self-control and blind training groups, $F(1, 37) = 0.00, p > 0.05$. The least-squares means in Table 14 indicate that the performance of the informed training group continued to be less effective than the performance of the other training groups.

No significant differences between reading competency levels ($F(1, 37) = 3.00, p > 0.05$) were detected. There was, however, significant treatment by reading competency interaction, $F(2, 37) = 3.72, p < 0.05$. Inspection of the least-squares means suggested that the effect of treatment was different for different competency levels. (See Table 14.) Competent readers fared better with self-control training, while less competent readers performed better when given blind training. The initial high mean performance of the less competent readers in the blind training group may be responsible for such a spurious effect. (ANOVA can be found in Appendix M - Table M6.)

A post-hoc comparison of immediate and delayed posttest scores revealed that students in the self-control and informed training groups maintained their performance, there being no significant change in delayed posttest scores, $t = 1.59, p > 0.05$ and $t = 0.03, p > 0.05$. The performance of students in the blind training group dropped, however, $t = -4.42, p < 0.05$, suggesting that their summarizing skill as measured by the number of main ideas was not maintained after training.

While in general competent readers did not sustain performance on the delayed posttest ($t = -2.74, p < 0.05$), less competent readers maintained their immediate posttest performance level $t = -1.17, p > 0.05$. When data for competency levels within each treatment was analyzed, it was found that competent readers in the self-control and informed training groups maintained their scores from the immediate to the delayed posttest period $t = -1.24, p > 0.05$ and $t = -1.24, p > 0.05$ and $t = 0.51, p > 0.05$; while performance of competent readers in the blind training group declined significantly, $t = -4.49, p < 0.05$. Less competent readers in all training groups, self-control, informed and blind, succeeded in maintaining their scores from the immediate post to the delayed posttest period, $t = -0.94, p > 0.05, t = -0.28, p > 0.05, t = 1.88, p > 0.05$. (See Appendix N, Table N10 for t-tests.)

Main ideas - sociology passages. Regarding the percentage of main ideas included in summaries of sociology texts, there were significant main effects for treatment, $F(2, 37) = 6.63, p < 0.05$. Mean contrasts showed no significant difference between the informed and the blind training groups ($F(1, 37) = 0.45, p > 0.05$). However, there was a significant difference between the self-control and informed training groups, $F(1, 37) = 10.70, p < 0.05$ and between the self-control and blind training groups, $F(1, 37) = 7.15, p < 0.05$. Least-squares means for training groups disclosed superior performance for the self-control training group. (See Table 14.)

A significant difference between competency levels, $F(1, 37) = 7.56, p < 0.05$ in favour of the competent readers was detected. There was no significant treatment by competency interaction, $F(2, 37) = 1.32, p > 0.05$.

Post-hoc comparisons, that compared all possible pairs of means across test times, indicated that the self-control and informed training groups showed no significant differences in their performances from immediate to delayed posttest, $t = -0.01$, $p > 0.05$ and $t = -1.95$, $p > 0.05$ while the blind training group did not maintain their initially high performance level, $t = 2.20$, $p < 0.05$. Thus, their performance dropped significantly from immediate to delayed posttesting.

When competency levels were examined across treatment, no significant differences were found from immediate to delayed posttest for competent readers, $t = -0.53$, $p > 0.05$. The performance of less competent readers, however, dropped substantially, $t = -2.28$, $p < 0.05$.

Comparisons of mean scores within treatment groups indicated that there were no significant differences across test times for competent and less competent readers as indicated by the following: self-control competent, $t = 1.38$, $p > 0.05$, less competent, $t = -0.96$, $p > 0.05$; informed competent, $t = 1.53$, $p > 0.05$, less competent, $t = -1.19$, $p > 0.05$; blind competent, $t = -1.17$, $p > 0.05$, less competent, $t = -2.27$, $p > 0.05$.

In comparing text type means on the delayed posttest, no significant differences were found in the number of main ideas included in the summaries of history and sociology passages for the self-control ($t = 0.26$, $p > 0.05$), informed ($t = 1.23$, $p > 0.05$) and blind ($t = 1.63$, $p > 0.05$) training groups. Generally, no differences across text types were detected for competent readers, $t = 0.47$, $p > 0.05$, while performance was significantly lower on sociology passages for less competent readers, $t = 2.49$, $p < 0.05$. Further examination of across text type

performance for competency levels within individual treatment groups revealed that competent readers in the self-control, informed and blind training groups did not include a significantly different number of main ideas in summaries of sociology and history texts, $t = 0.98$, $p > 0.05$, $t = 1.20$, $p > 0.05$ and $t = 0.27$, $p > 0.05$, respectively. Further, no differences were found for less competent readers in the self-control and informed training groups, $t = -1.28$, $p > 0.05$ and $t = 0.27$, $p > 0.05$. Less competent readers in the blind training group however performed significantly less well in summarizing sociology passages, $t = 4.09$, $p < 0.05$. (See Appendix N, Tables N11 and N12 for t-tests.)

Summary and discussion. For main ideas in summaries of history texts, the performance of students in the informed training group continued to be significantly lower than the performance of students in either the self-control or the blind training group, while competent readers in the self-control group did better than competent readers in either of the other two groups across the testing delay. Students in the self-control and informed training groups maintained performance levels over time. On the other hand, the performance level of the blind training group showed a significant drop.

When overall performance was examined across competency level, less competent readers were able to sustain training gains after a delay, while the performance of more competent readers dropped significantly. A further analysis of this phenomenon within treatment groups showed that the source of this discrepancy was the significantly lower performance of competent readers in the blind training group. This finding would seem to support the main thesis of this study that meta-

cognitive training along with an intervention strategy is more effective than instructional intervention alone.

When the overall performance on main ideas for summaries of sociology passages after a testing delay was analyzed, the performance of the self-control training group was significantly superior to the performance of the other two groups. Competent readers significantly outperformed less competent readers.

Post-hoc analyses that contrasted all pairs of means across immediate and delayed posttests confirmed that as far as the number of main ideas contained in students' summaries, competent students in the self-control training group made gains in the expected direction from pre to immediate posttest and sustained those gains after a two month delay. The scores of the less competent readers in the self-control training group did not increase as a result of training, but mean performance was nonetheless sustained over the testing delay. On the other hand, there was a significant drop in the performance of the blind training group, reinforcing the need for self-control training.

Product Scores

Efficiency - history passages. Analysis of variance applied to the efficiency scores of summaries of history texts revealed no significant treatment effects, $F(2, 37) = 0.39, p > 0.05$, no significant difference between competency levels across treatments, $F(1, 37) = 3.06, p > 0.05$ and no treatment by reading competency interaction, $F(2, 37) = 0.29, p > 0.05$. (See Appendix M - Table M6 for ANOVA.)

Post-hoc comparisons of immediate and delayed posttest means revealed that the self-control, informed and blind training groups maintained their performance level, $t = -0.54, p > 0.05$, $t = -0.71, p > 0.05$ and $t = 0.26, p > 0.05$.

Overall, competent and less competent readers across all training groups maintained their mean performance level $t = 0.36, p > 0.05$ and $t = -0.93, p > 0.05$, respectively. In the self-control, informed and blind training groups, competent readers maintained performance, $t = 0.52, p > 0.05, t = 0.40, p > 0.05$ and $t = -0.60, p > 0.05$. In addition, less competent readers in the self-control training group ($t = 1.27, p > 0.05$), the informed ($t = -1.63, p > 0.05$) and blind training groups ($t = 0.48, p > 0.05$) also maintained their level of performance. (See Appendix N, Table N13 for t-tests.)

Efficiency - sociology passages. Unlike the findings for efficiency in summarizing history passages, there was a significant difference in terms of efficiency performance among treatment groups, $F(2, 37) = 3.80, p < 0.05$. A contrast of group performance means showed a significant difference between the self-control and informed training groups, $F(1, 37) = 5.4, p < 0.05$ and between the self-control and blind training groups, $F(1, 37) = 5.21, p < 0.05$. However, there was no significant difference between the blind and the informed training groups, $F(1, 37) = 0.01, p > 0.05$. The groups' least-squares means confirmed that subjects receiving self-control training were most efficient at writing summaries. (See Table 14.)

No significant main effect for reading competency level was detected, $F(1, 37) = 1.98, p > 0.05$. In addition, there was no significant treatment by reading competency interaction, $F(1, 37) = 2.49, p > 0.05$. (See Appendix M - Table M6 for ANOVA.)

Post-hoc contrasts of immediate and delayed posttest mean scores showed that the self-control, informed and blind training groups maintained their level of performance, $t = 1.7, p > 0.05, t = 1.70,$

$p > 0.05$ and $t = 0.22$, $p > 0.05$. Competent readers generally maintained their scores $t = 0.39$, $p > 0.05$ as did less competent readers, $t = -0.05$, $p > 0.05$. In the self-control, informed and blind training groups, competent readers showed no significant differences in their mean scores, $t = 1.09$, $p > 0.05$, $t = -2.20$, $p > 0.05$ and $t = 0.85$, $p > 0.05$. Less competent readers in the self-control, informed and blind training groups also maintained their mean scores, $t = 1.27$, $p > 0.05$, $t = -0.27$, $p > 0.05$ and $t = -1.67$, $p > 0.05$.

When mean scores for the delayed summaries of history and sociology passages were compared, no significant differences in efficiency scores were found for the self-control ($t = -14$, $p > 0.05$), informed ($t = 1.20$, $p > 0.05$) and the blind ($t = 0.72$, $p > 0.05$) training groups. No differences were found for competent ($t = -0.00$, $p > 0.05$) and less competent ($t = 0.74$, $p > 0.05$) readers. Competent readers in the self-control, informed and blind training groups displayed no differences, $t = -0.48$, $p > 0.05$, $t = 1.60$, $p > 0.05$ and $t = -0.48$, $p > 0.05$, respectively. Less competent readers in the self-control, informed and blind training groups also displayed no significant differences $t = 1.07$, $p > 0.05$, $t = 0.52$, $p > 0.05$ and $t = 4.63$, $p > 0.05$. (See Appendix N, Tables N14 and N15 for t-tests.)

Summary and discussion. With regard to the efficiency of summary writing for history texts, there was no overall effect for treatment or competency level and there was no treatment by competency interaction. On the other hand, a main effect was found for efficiency in the summarization of sociology text; the self-control group outperformed both the informed and blind training groups. There was however, no main effect for competency level and no treatment by reading competency interaction.

Post-hoc comparisons for summary writing efficiency for history texts revealed that the self-control training group maintained the gains achieved on the immediate posttest. The post-hoc comparisons also indicated that the blind and informed training groups that had shown no significant growth from pre to immediate posttest managed to maintain their level of performance on the delayed posttest. In addition, the self-control group sustained training gains for efficiency in summarizing sociology text after a delay. Although there were drops in the scores of the informed and blind training groups after a delay, those decreases were not significant. The competent and less competent readers of the self-control group maintained their training gains. Although the competent readers in the informed training group lost some of their training gains, performance drops were not significant. The less competent readers in the informed and blind training group seemed to sustain mean summary writing efficiency levels, while students in the blind training group did not.

Process Scores

Summary rule application - history passages. When separate approximate t-tests were conducted on all pairs of means for rule application in the history passages, there was no significant difference between reading competency levels in either the informed ($t(7.6) = -1.56, p > 0.05$) or blind ($t(7.3) = -1.29, p > 0.05$) training groups. There was however, a significant difference in performance between competency levels in the self-control training group ($t(16.8) = -3.76, p < 0.05$) with the more competent readers outperforming the less competent readers ($\bar{x} = 11.55$ and 9.50 , respectively). Inspection of the

means for the treatment groups suggested that although the competent readers of the self-control group displayed superior performance in terms of summary rule application, training groups generally performed similarly. (See Table 15 for means and standard deviations and Appendix M - Table M7 for approximate t-tests.)

Post-hoc comparisons showed that all training groups maintained their performance from immediate to delayed posttest: $t = 0.47$, $p > 0.05$ for the self-control group; $t = 1.82$, $p > 0.05$ for the informed training group; and $t = 0.74$, $p > 0.05$ for the blind training group. Competent and less competent readers also maintained their mean scores, $t = 0.00$, $p > 0.05$ and $t = -1.41$, $p > 0.05$.

TABLE 15
Rule Application: Delayed Posttest Means and Standard Deviations for History Passages and LS Means for Sociology Passages

Treatment Group	Process			
	Rule Application (History Passages)		Rule Application (Sociology Passages)	
	\bar{x}	SD	LS Mean	
Self-control	10.68	1.60	10.48	
Informed	9.10	2.13	7.83	
Blind	10.00	1.56	7.78	
Competence				
Less Competent	9.05	1.51	7.60	
Competent	10.84	1.62	9.80	
Treatment Group x Competence				
Self-control:	Less Competent	9.50	0.93	9.88
	Competent	11.55	1.43	11.09
Informed:	Less Competent	8.33	2.76	7.17
	Competent	10.25	1.71	8.50
Blind:	Less Competent	9.25	1.26	5.75
	Competent	10.30	1.64	9.80

Within treatment post-hoc analysis revealed that competent readers in the self-control, informed and blind training groups maintained their mean level of performance, $t = 1.70$, $p > 0.05$, $t = -0.24$, $p > 0.05$ and $t = -1.91$, $p > 0.05$, respectively. Less competent readers in the self-control, informed and blind training groups also maintained their performance levels, $t = 0.58$, $p > 0.05$, $t = 0.00$, $p > 0.05$ and $t = 0.88$, $p > 0.05$, respectively. (See Appendix N, Table 16 for t-tests.)

Summary rule application - sociology passages. For the application of rules to summaries of sociology texts, there was a significant main effect for treatment, $F(2, 37) = 6.76$, $p < 0.05$, favouring self-control training. A significant difference was evident between the self-control and informed training groups, $F(1, 37) = 8.47$, $p < 0.05$ and between the self-control and the blind training groups $F(1, 37) = 9.89$, $p < 0.05$. No significant difference between the informed and blind training groups was evident, $F(1, 37) = 0.00$, $p > 0.05$.

In addition, there was a significant main effect for reading ability, $F(1, 37) = 8.45$, $p < 0.05$. As revealed in Table 15, competent readers were better at using summary writing rules in generating summaries of sociology texts (LS Mean 9.80 and 7.60 for competent and less competent readers, respectively). The interaction of treatment and reading competency was not significant, $F(2, 37) = 1.51$, $p > 0.05$. (See Appendix M - Table M6 for ANOVA.)

Post-hoc contrasts of immediate and delayed posttest means showed that the self-control, informed and blind training groups maintained their scores $t = 1.71$, $p > 0.05$, $t = -1.52$, $p > 0.05$ and $t = -1.13$, $p > 0.05$. As well, competent and less competent readers across training groups also maintained their performance levels, $t = 0.81$, $p > 0.05$

and $t = -1.41$, $p > 0.05$. In addition, competent readers in the self-control, informed and blind training groups maintained their performance levels, $t = 1.88$; $p > 0.05$, $t = -0.84$, $p > 0.05$, $t = 0.26$, $p > 0.05$, respectively. Less competent readers in the self-control, informed and blind training group also sustained their performance levels, $t = 0.39$, $p > 0.05$, $t = -1.22$, $p > 0.05$ and $t = -2.19$, $p > 0.05$.

No significant differences in scores obtained for rule application to summaries of history and sociology texts were found for the self-control training group, $t = 0.22$, $p > 0.05$, the informed training group $t = 2.09$, $p > 0.05$ and the blind training group, $t = 2.30$, $p > 0.05$. Competent and less competent readers across treatment groups also displayed no significant differences across text types, $t = 1.76$, $p > 0.05$ and $t = 1.68$, $p > 0.05$, respectively. Analysis of performances of competency level within treatment groups showed no significant differences; self-control training group, competent readers, $t = 0.79$, $p > 0.05$; less competent, $t = -0.46$, $p > 0.05$; informed group competent, $t = 1.85$, $p > 0.05$, less competent, $t = 1.19$, $p > 0.05$; the blind training group, competent $t = 0.79$, $p > 0.05$, less competent, $t = 12.12$, $p > 0.05$. (See Appendix N, Tables N17 and N18 for t-tests.)

Summary and discussion. Except for the competent readers in the self-control group who scored highest on the delayed posttest in the application of summary writing rules to history passages, all students across training groups performed similarly. With respect to sociology text summaries, the self-control group outperformed the informed and blind training groups. Although there was no treatment by competency interaction, competent readers continued to outperform less competent readers in applying summary writing rules to sociology texts.

Post-hoc comparisons of mean performance from immediate to delayed posttest showed that students across all training groups maintained their scores for the application of summary writing rules to history texts. This included the less competent readers of the informed group who had made no improvement on their initial pretreatment performance. For sociology texts summaries, students of the self-control group sustained their training gains. Although scores from the immediate to the delayed posttest dropped for the informed and blind training groups, the decreases were not significant. Within group analysis revealed that competent readers across all training groups and the less competent readers in the self-control group maintained training achievement levels. Although scores for less competent readers in the informed and blind training groups decreased, these drops were not significant. No differences were found in the way students of the various training groups applied summary writing rules across text types.

It should be noted that all post-hoc findings must be considered tentative because of unequal variances within and across groups. A second major concern regarding the post-hoc analysis is that multiple unplanned posthoc comparisons increase experimentwise errors, increasing the possibility that hypotheses are accepted when they are false.

Summary of Overall Findings - Immediate and Delayed Posttest Summary
Writing Performance

Main Ideas

Immediate training effects. There was no significant difference in the number of main ideas included in history text summaries by sub-

jects given self-control training and subjects given blind training. The informed training group included significantly fewer main ideas in their summaries of history passages than either of the other training groups.

Post-hoc comparisons of mean scores for history indicated that the initial superiority of the blind training group dropped significantly while performance of the self-control training group increased in the expected direction even if that increase was not significant. There was no significant difference in the performance of the informed training group. History passage main idea scores were consistently lower for this group than for the other two groups.

Immediate transfer effects. For main ideas included in summaries of sociology passages, no significant difference was found among training groups from pretest to immediate posttest. There was no overall main effect for competency level and no treatment by competency interaction.

Post-hoc comparisons of pre and immediate posttest mean scores indicated significant gains for the self-control and blind training groups. The initially high scores of the blind training group were only maintained. A comparison of performance across text-types revealed that the self-control and informed training groups each performed similarly for both texts. However, the blind training group included significantly fewer main ideas in their sociology text summaries than their history text summaries. It may be that students are more familiar with history than sociology text.

For main ideas in history text summaries, competent readers in the self-control training group seemed to profit most from training. The performance of less competent readers in the informed group dropped. For main ideas in sociology text, both competent and less competent readers in the informed group improved their performance, although means never reached the same high levels as either competent or less competent readers in the self-control training group. Thus, while informed training seemed helpful, it was not helpful to the same extent as self-control training.

Delayed training effects. In terms of the number of main ideas included in history text summaries, no significant difference was found between the self-control and blind training groups. The informed training group continued to include significantly fewer main ideas in their summaries than either of the other training groups. However, students in the self-control and informed training groups maintained their performance from the immediate posttest, while students in the blind training group made further significant drops.

Across test times analyses revealed less competent readers generally sustained their performance, while the performance of competent readers in the blind training group dropped significantly. The performance of the latter caused the overall performance of competent readers to decline. Blind training therefore, had the least effect in terms of maintenance.

There was a significant treatment by competency interaction which suggested that self-control training was best for competent readers while blind training was most effective for less competent readers. This seems to be a contradiction since the opposite effect would be expected. Discussion with the class teacher revealed that students in the blind training group had been taught to outline.

Delayed transfer effects. With respect to the number of main ideas included in the summaries of sociology passages the performance of the self-control training group was significantly higher than that of the informed and blind training groups. Although post-hoc analysis suggested no significant drops in the performance of the latter training groups, higher mean scores seem to support the efficacy of self-control training. In addition, although there was no treatment by competency level interaction, competent readers significantly outperformed less competent readers. Thus treatment affected competency levels to different degrees but for transfer and maintenance no treatment was better for any competency level. Self-control training was best for both competency levels overall.

Efficiency

Immediate training effects. There was, overall, no significant treatment effect for efficiency in summarizing history texts. There was no main effect for competency and no treatment by reading competency interaction. Post-hoc comparisons however, indicated a significant improvement in the mean performance of the self-control training group. Still for summary writing efficiency no one treatment was more effective than any other.

Immediate transfer effects. No overall treatment effect or treatment by competency interaction was revealed for efficiency in summarizing sociology text. Competent readers across training groups generally outperformed less competent readers.

Post-hoc comparisons of pre and immediate posttest results showed that both the self-control and informed training groups enhanced their performance in writing summaries of sociology text, while the blind group did not. Overall both competent and less competent readers improved their performance significantly. However, there was no significant treatment by reading competency interaction suggesting that treatment had no differential effect on competency level. Within group analysis by competency level indicated significant improvement for both competent and less competent readers of the self-control group and competent readers in the informed training group.

Delayed training effects. There was no significant treatment or competency level effect for efficiency in summarizing history texts. There was no significant treatment by reading competency interaction. All students across all training groups maintained their immediate post instruction performance.

Delayed transfer effects. Although drops in performance from immediate to delayed posttest were not significant for the informed and blind training groups, the self-control training group wrote significantly more efficient summaries than the other two groups on the delayed posttest. There was no significant difference in the performance of competent and less competent readers and there was no significant treatment by reading competency interaction. This was supported by the within group comparisons of all pairs of means. Thus, with respect to efficiency, self-control training appeared most advantageous in the long run for both competency levels.

Rule Application

Immediate training effects. Except for competent readers in the blind training group who scored higher than their less competent counterparts, students across training groups performed similarly in applying summary writing rules to history text summaries. Post-hoc comparisons suggested that all students made significant gains from the pretest to the immediate posttest except less competent readers in the informed training group.

Immediate transfer effects. No treatment effect was found for the application of rules to summaries of sociology texts. Competent readers outperformed less competent readers.

Overall, the summary writing rule application for all training groups improved significantly from pre to immediate posttest. That is, all students in all treatment groups benefitted from instruction in terms of rule application. There were also significant improvements for competent and less competent readers in general.

Within group analysis revealed significantly improved performance for competent readers in the blind and informed training groups and the less competent readers in the self-control training group. However, there was no significant interaction. Thus, no treatment was more effective than any other for any competency level.

No significant differences were revealed for the way in which students across training groups applied summary writing rules to sociology text. As might be expected, competent readers were significantly better at rule application than less competent readers although both levels improved in terms of rule application in summary writing. Central to the thesis of this study was the finding that less competent readers in the self-control training group outperformed less competent readers in the other two groups.

Delayed training effects. Except for competent readers in the self-control training group who scored highest, all other students across training groups applied summary writing rules to history text summaries in a similar way. Mean performance across all training groups showed that students maintained their performance levels from the immediate to the delayed posttest.

Delayed transfer effects. Decreases in performance for the application of summary writing rules to sociology texts were not significant for the informed and blind training groups. The self-control training group nevertheless applied the summary writing rules significantly better than either of the other two groups. Competent readers significantly outperformed less competent readers. However, there was no treatment by reading competency interaction, implying that no treatment was better for any competency level. Self-control training was most advantageous for both competency levels. Training was least effective for less competent readers in the blind training group.

TABLE 16

Main Idea and Efficiency: Pretest (Pre) and Immediate (Im) and Delayed (De) Posttest LS Means for Self-Control, Informed and Blind Training Groups

Treatment Group	Product LS Means											
	Main Ideas (History Passages)			Main Ideas (Sociology Passages)			Efficiency (History Passages)			Efficiency (Sociology Passages)		
	Pre	Im	De	Pre	Im	De	Pre	Im	De	Pre	Im	De
Self-Control	65.84	74.04	67.62	53.88	66.77	65.33	0.06	0.07	0.07	0.04	0.07	0.08
Informed	58.23	43.38	44.38	22.62	45.40	29.66	0.06	0.07	0.07	0.03	0.07	0.04
Blind	88.42	80.90	67.65	62.18	52.78	37.74	0.06	0.07	0.07	0.05	0.05	0.05
Competence	72.20	61.04	55.86	41.44	47.58	31.78	0.06	0.07	0.06	0.04	0.05	0.05
Less Competent	69.46	71.18	63.90	51.01	62.38	56.70	0.06	0.07	0.07	0.04	0.07	0.07
Treatment Group x Competence												
Self-control:												
Less Competent	70.76	67.20	61.27	49.22	62.18	51.79	0.06	0.07	0.07	0.04	0.07	0.08
Competent	60.93	80.88	73.97	58.53	71.37	78.86	0.06	0.08	0.07	0.05	0.07	0.08
Informed:												
Less Competent	59.31	36.58	33.63	25.76	40.80	27.49	0.06	0.08	0.06	0.03	0.05	0.05
Competent	57.16	50.18	55.13	19.49	50.00	31.82	0.06	0.07	0.07	0.02	0.09	0.04
Blind:												
Less Competent	86.54	79.34	72.67	49.35	39.77	16.07	0.06	0.06	0.07	0.04	0.04	0.02
Competent	90.30	82.47	62.62	75.00	65.78	59.42	0.07	0.07	0.07	0.06	0.06	0.08

TABLE 17

Rule Application: Pretest (Pre) and Immediate (Im) and Delayed (De) Posttest Means and Standard Deviations for History Passages and LS Means for Sociology Passages

Treatment Group	Process									
	Rule Application (History Passages)					Rule Application (Sociology Passages)				
	Pre \bar{X}	Im \bar{X}	De \bar{X}	LS Mean	De	Pre LS Mean	IM LS Mean	De LS Mean	LS Mean	LS Mean
Self-control	8.16	10.47	10.68			7.57	9.81			10.48
Informed	8.10	9.20	9.10			6.58	8.96			7.83
Blind	7.57	10.29	10.00			6.80	8.73			7.78
Competence										
Less Competent	7.83	9.11	9.05			6.51	8.51			7.60
Competent	8.04	10.84	10.84			7.46	9.82			9.80
Treatment Group x Competence										
Self-control: Less Competent	8.00	10.00	9.50			6.88	9.63			9.88
Competent	8.27	10.82	11.55			8.27	10.00			11.09
Informed: Less Competent	8.33	8.33	8.33			6.67	8.17			7.17
Competent	7.75	10.50	10.25			6.50	9.75			8.50
Blind: Less Competent	6.75	8.50	9.25			6.00	7.75			5.75
Competent	7.90	11.00	10.30			7.60	9.70			9.80

Descriptive Data

At the conclusion of the study a sample of 5 students was selected at random from each training group. The fifteen students were interviewed to discern their degree of understanding regarding the summary writing intervention procedure and its significance. (See Appendix K.)

Responses to interview questions were rated (Refer to Appendix L) and analysis of variance conducted to assess students' metacognitive knowledge. Findings revealed significant main effects for treatment, $F(2, 12) = 12.67$, $p < 0.05$. When mean ratings were contrasted, significant differences were found between the students in the self-control and informed training group, $F(1, 12) = 9.00$, $p < 0.05$ and between students in the self-control and blind training group, $F(1, 12) = 25.00$, $p < 0.05$. No differences were found between students in the informed and the blind training group, $F(1, 12) = 4.00$, $p < 0.05$.

Examination of mean ratings showed that students in the self-control group had a higher level of metacognitive knowledge in relation to summary writing two months after instruction than students in either of the other two groups. (See Table 18 for mean ratings and standard deviations and Appendix O for ANOVA.)

TABLE 18

Means and Standard Deviations for Metacognitive Knowledge Ratings

	Sample n	\bar{x}	SD
Treatment Group			
Self-control	5	6.80	0.45
Informed	5	5.60	0.55
Blind	5	4.80	0.84

A comprehensive discussion of the findings in relation to each research question will be presented in Chapter 5 together with relevant recommendations.

CHAPTER 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Metacognition and the teaching of summary writing skills provided the framework for this study. The investigation explored levels of explicit instruction in teaching competent and less competent sixth grade readers to write summaries. The instructional goal was to teach students not only to write better summaries but to discover whether instruction was effective in helping students transfer and maintain their summary writing skill. In essence, the general objective of the study was to determine the degree of instructional explicitness required to ensure that sixth grade readers understood that an intervention procedure for creating text summaries was useful for facilitating future independent learning.

The problem studied is pertinent because summary writing is important to students in the upper elementary grades who must read to increase learning. Further, the literature (Adams, Carnine & Gersten, 1982; Baker & Brown, 1984; Brown, Campione & Barclay, 1979; Day, 1980; Derry & Murphy, 1986; Garner, 1987; Hare & Borchardt, 1984; Jones, Palincsar, Ogle & Carr, 1987; Meyer & Paris, 1978; Swafford, 1979) on instruction in metacognition indicates that such instruction assists students in gaining awareness and control over their own learning processes, enabling them to become more strategic independent learners.

While summarizing has been recognized as a viable means of helping students gain essential information (Rubin, 1983), make cognitive progress and monitor it (Garner, 1987); documented evidence demonstrates

students' lack of summary writing proficiency (Baker & Brown, 1984; Brown, Campione & Day, 1981; Brown & Day, 1983; Brown, Day & Jones, 1983; Winograd, 1984). Little research has been conducted on summary writing involving grade six students as subjects.

Empirical research suggests summarization can be taught (Day, 1980; Hare & Borhardt, 1984). Day emphasizes that direct explicit instruction together with routines for overseeing the successful application of summary writing skills is most beneficial. However, Day herself questions the need for detailed explanations for competent students.

This study, therefore, included sixth graders of two reading ability levels, competent and less competent, and three levels of instruction varying in terms of explicitness, self-control, informed and blind training. The sixth graders belonged to three different classes each of which was in a different school. Each class was randomly assigned to one of the training conditions. Self-control and informed training involved different levels of instruction in metacognition. In the most explicit self-control training condition, sixth graders were taught how to use a summarization strategy and given direct explicit instruction in its significance and how to employ, monitor and check strategy use to guarantee future application. In informed training, subjects were shown how to use the strategy and only told of the importance of its use in other situations.

This investigation borrowed from the work of Day (1980) and Hare and Borhardt (1984). Their research indicated that self-control training had a facilitative effect on students' ability to summarize informational text. However, the design and methodological conditions under which their investigations were conducted had deficits: (a) the short

training phase, (b) the unjustified use of very easy material, (c) the brief lapse between training and maintenance tests and (d) the varying conditions under which posttests were conducted.

To overcome some of these design and methodological weaknesses, the study was conducted over six, 60 minute sessions, excluding testing periods. The increase in sessions permitted more progressive teaching of skills. Materials for the investigation were taken from authorized grade six social studies texts and were, therefore, more ecologically valid. History passages were used for instruction, while both history and sociology texts were used for testing. History texts were used to measure training effectiveness and sociology passages to determine whether there was transfer of training. In keeping with theoretical requirements (Garner, 1987), training effectiveness was evaluated through (a) immediate posttesting of summary writing ability and (b) delayed posttesting to assess maintenance. Maintenance testing was conducted two months after instruction.

Subjects' summaries were assessed in terms of product (main idea and efficiency) and process (rule application). Summary writing performance was then compared to establish the effects of different levels of instructional explicitness.

The following is a summary and interpretation of findings pertaining to the research questions of the study.

Summary of Experimental Findings

The first issue of the study was to examine the degree of instructional explicitness necessary for competent and less competent sixth grade readers to write effective summaries and to establish whether the effects of instruction transferred and helped students cope with new material (sociology text). The first questions of the study, therefore, concerned determining whether there were significant differences in summaries of history and sociology texts written immediately after an instructional program in terms of product (main idea and efficiency) and process (rule application) by competent and less competent sixth grade readers given self-control, informed and blind training.

The second major issue of the study involved the question of strategy maintenance over time to discover whether there were significant differences in summaries of history and sociology texts written two months after an instructional program in terms of product (main idea and efficiency) and process (rule application) by competent and less competent sixth grade readers given self-control, informed and blind training. The summary of findings will address the issue of training efficacy first and maintenance second.

Immediate Posttest Summaries

Training and Transfer Effects

Main ideas. The results of the study revealed no significant difference in main ideas included in summaries of history passages by sixth graders given self-control training and sixth graders given blind train-

ing. Subjects who received informed training included significantly fewer main ideas in summaries of history texts than subjects in the other treatment groups. Post-hoc comparisons of means across pre and immediate posttest times indicated that the initial superiority of the blind training group dropped significantly. The informed training group experienced decreases but these were not significant. The students in the self-control training group, on the other hand, increased their level of performance in terms of the number of main ideas included in their history text summaries, though not significantly.

Sixth graders in the self-control, informed and blind training groups displayed no significant differences in the percent of main ideas included in their summaries of sociology texts, to which they were expected to transfer summary writing skills.

For summaries of sociology text, post-hoc analysis of pre and immediate posttest means revealed that the self-control and informed training groups made significant gains over test times, while the initial mean of the blind training group was only maintained. A comparison of performance across text types suggested that subjects in the self-control and informed training groups each included a similar percent of main ideas in their summaries of either history or sociology text. Students in the blind training group however, included fewer main ideas in sociology text summaries than history text summaries.

Efficiency. Analysis of scores for the second summarization product variable, efficiency, indicated no significant differences among the self-control, informed and blind training groups for efficient summary writing of history passages. Post-hoc comparisons however, suggested a

significant increase in efficiency for the self-control training group. No significant improvement was evident for the informed and blind training groups.

Subjects in the self-control, informed and blind training groups displayed no significant difference in their efficiency in summarizing sociology passages. However, post-hoc comparisons of pre and immediate posttest means indicated that while the self-control and informed training groups enhanced their summary efficiency, the blind training group did not.

Rule application. In general, results showed no significant difference among treatment groups for the process variable, the application of summary writing rules to summaries of history text. All students improved significantly on their performance except less competent readers in the informed training group, who only maintained initial mean performance levels.

No significant difference was found among the training groups for the application of summary writing rules to sociology passages. Posthoc analysis of pre and immediate posttest means showed that all training groups improved significantly in the use of summary writing rules. No significant differences were found for the way in which subjects in any of the training groups applied summary writing rules across texts.

Competency Levels

Competent readers included significantly more main ideas in summaries of history texts than less competent readers. There were no significant differences between competency levels in summary writing efficiency and rule application ability for the summarization of history

text. Comparisons of pre and immediate posttest means suggested that competent readers in the self-control training group improved their main idea scores in the appropriate direction even if improvement was not significant. While no significant increases were detected for either competent or less competent readers in regard to summary writing efficiency, significant increases were noted for both competent and less competent readers in the application of summarization rules.

In the transfer situation (summarizing sociology passages), there was no significant difference between competency levels for the main idea measure. However, competent readers obtained significantly higher efficiency and summary writing rule application scores than less competent readers. Overall, competent and less competent readers significantly increased their efficiency and rule application means from pre to immediate posttest.

There was no treatment by competency interaction on the immediate posttest for any of the summarization measures for either history or sociology text.

Delayed Posttest Summaries

Training and Transfer Effects

Main ideas. When the delayed posttest summarization maintenance and transfer protocols were examined, results of the study indicated that the trend in the performance of the self-control and blind training groups continued. There was no significant difference in the number of main ideas included in summaries of history passages for those two groups. The informed training group continued to display significantly lower main idea scores. However, post-hoc analysis of differences

between immediate and delayed posttest mean performance revealed that the self-control and informed training groups maintained their performance, while the blind training group had a further significant drop.

With regard to main ideas in summaries of sociology texts, results indicated significantly superior performance by students given self-control training. There was no significant difference in the performance of students given informed and blind training. Students in the self-control training group maintained their mean performance from the immediate to the delayed posttest. Drops were evident for the informed training group but decreases were not significant. On the other hand, significant drops were evident for the blind training group.

Efficiency. Results for summary writing efficiency for history text summaries revealed no significant differences among training groups. Findings also showed that all training groups maintained their efficiency performance across immediate and delayed posttest times.

In terms of efficiency in summarizing sociology passages, findings revealed significantly superior performance by the self-control training group. In contrast, there was no significant difference between the informed and blind training group. The self-control training group maintained its mean performance across immediate and delayed posttest times. The mean performance of the informed and blind training groups dropped, but decreases were not significant.

Rule application. No significant treatment effect was found for the application of summary writing rules to history text summaries. In addition, all training groups maintained their rule application performance across immediate and delayed posttest times.

On the other hand, the self-control training group applied significantly more summary writing rules to their delayed sociology text summaries than the informed and blind training groups. The self-control training group also maintained its mean performance on the delayed posttest. Drops were evident for the informed and blind training groups but they were not significant.

Competency Levels

No significant differences in percent of main ideas, summary writing efficiency and rule application were found between competent and less competent readers for summaries of history passages. Analysis of performance across posttest times indicated a significant decrease in main ideas used by competent readers in the blind training group, causing the overall main idea performance of competent readers to decline significantly. However, both competency levels maintained mean efficiency and summary rule application performance. There was a significant delayed posttest treatment by competency interaction for use of main ideas in history text. These results suggest that blind training was more appropriate for less competent readers, while explicit self-control training was appropriate for competent readers. The initial high performance level of less competent readers in the blind training group regarding the inclusion of main ideas in history text summaries may account for this spurious effect.

In the delayed posttest transfer situation (summarizing sociology texts), competent readers continued to achieve significantly higher efficiency and summary writing rule application scores than less competent readers. As well, competent readers achieved significantly higher main

ideas scores. With the exception of less competent readers in the blind training group, competency levels across training groups maintained mean performance levels on all summary writing variables from immediate to delayed posttest. There was no evidence of treatment by reading competency interaction for main ideas as had been the case with history passage main ideas. There was also no significant treatment by reading competency interaction for either writing efficiency or rule application.

Interview Results

Analysis of variance conducted on the interview ratings that assessed students' metacognitive knowledge regarding the importance of being able to summarize revealed a significant main effect in favour of the self-control training group. There was no significant difference in the ratings of students in the informed and blind training groups.

Examination of the interview responses collected two months after instruction showed why ratings for students in the self-control training groups were higher than that of students in the other training groups. Overall, students in the self-control training group had better procedural and conditional knowledge. They were able to provide more summary writing steps and at the same time give insights into their ability to control their use of the summary writing strategy. With regard to control, some typical explanations were "First you read the passage and understand it and then you star all important points" and after using the summary writing rules, "...you check it and polish it." Students in the self-control training group were able to explain that summary writing was important because it was not possible to recall and write

everything read in any passage and that the skill could be used in taking notes, in shortening any passage or story.

On the other hand, although students in the informed training group were taught the significance of the summary writing strategy, their metacognitive knowledge was not very different from that of students in the blind training group who had to develop their own metacognitive knowledge. Students in the informed training group could not remember precisely the value of summarizing. Some of their explanations included "It makes it easier on you when you have a long story to tell" and "...like say you won't...wh...do a lot of work." In the blind training group, very few students had ideas of the significance of summarizing. For example, after much deliberation a competent reader had to acknowledge, "I don't know." Such findings reinforced the need for self-control training and indicated why students in the self-control training group had better overall performance on the delayed posttest.

Discussion

Training Groups

Findings for main ideas included in history text summaries suggested that both the self-control and informed training groups were at least able to maintain their initial performance on immediate post treatment summaries. The blind training group, on the other hand, did not maintain its initially high history main idea scores. This could have been the result of the fact that the blind training group was not made aware of the significance of the summarization intervention strategy, a contention which would be strongly supported by Brown, Campione and Day (1981) and Brown, Bransford, Ferrara and Campione (1982).

Findings for main ideas used in summaries of sociology texts indicated gains in the immediate posttest situation for the self-control and informed training groups, thus suggesting a transfer of training effect. In addition, individual group performance was not significantly different for history and sociology passages. Gains were not evident for the blind training group, that in contrast to their performance on history text incorporated fewer main ideas in summaries of sociology text. This finding suggests that with respect to the main idea measure, blind training resulted not only in failure to maintain originally high performance levels but also failure to generalize the strategy to a new or similar situation. Again, this could be attributed to the exclusion of metacognitive strategies in the instructional intervention (Brown et al., 1981; Brown et al., 1982).

Thus, findings suggest that with respect to the main idea variable, self-control training may have a more facilitative effect than either informed or blind training. While students in the informed training group did not make significant drops in their history main idea mean performance they were nonetheless unable to achieve at the same performance level as the self-control training group with whom they were initially equal.

Much could be discerned from the findings on the efficiency and summary writing rule application scores for history and sociology passages. The non-significant differences among training groups on both variables for both types of text on the immediate posttest suggest that self-control, informed and blind training generally facilitated sixth graders' efficiency and rule application ability not only in regard to summarizing history text but also sociology text to which such skills

were to be transferred. Although the blind training group did not improve on its efficiency in summarizing sociology passages, findings generally demonstrated that despite differences in instructional explicitness, level of explicitness did not make a difference in how well grade six students applied summary writing rules to history and sociology text and how efficient summaries were immediately after an instructional phase.

The results of the two-month delayed summaries suggested that self-control, informed and blind training continued to facilitate sixth graders' efficiency and rule application in summarizing history passages in a similar manner since all groups sustained their mean performance levels and there were no significant differences in sixth graders' performance on either of these two measures. However, as described previously, a comparison of immediate and delayed posttest data indicated a decline in the blind training groups' main idea summary writing performance, suggesting that blind training was inadequate for helping students understand the reason for including main ideas in summaries. This could be a result of excluding the teaching of metacognitive strategies in the training, since both the self-control and the informed training groups maintained their performance levels.

Although decreases in scores on all summary writing variables for sociology texts were evident for the informed and blind training groups, they were not significant. On the other hand, the self-control training group experienced no performance drops; they included significantly more main ideas, were significantly more efficient, and applied significantly more rules in summarizing sociology passages. Study findings suggest that while self-control, informed and blind training help sixth graders

maintain efficiency and rule application strategies in the context of history text, self-control training is most appropriate for generalization. With respect to main ideas, blind training proved inadequate both immediately after the instructional phase and after a two month delay. Informed training facilitated transfer after instruction, however, after a delay, self-control training was more facilitative than informed training.

The superior performance of the self-control training group in the transfer situation could be attributed to the fact that after a two month delay their metacognitive knowledge regarding summary writing was higher than that of the informed and blind training groups.

Competency Levels

While there were indications that immediately after the instructional phase, competent readers outperformed less competent readers in the number of main ideas included in history text summaries and in efficiency and rule application in the transfer situation, interactions between training conditions and reading competency were not significant. The findings therefore suggest that for the summary writing measures employed, competent and less competent sixth grade readers were affected by self-control, informed and blind training but to different degrees. Nevertheless, this research provided no evidence that competent and less competent readers require different levels of instructional explicitness. This finding may be peculiar to this study and may be explained by the fact that there was no clear demarcation in reading competency levels which was determined by the median score of 46 on the Gates MacGinitie comprehension subtest: 46 and above for competent readers; be-

low 46 for less competent readers. Thus a sufficiently clear distinction was not made between competent and less competent readers. Further, the sample size was small, resulting in reduced power for the tests of significance.

Thus, the findings of this study suggest that self-control, informed and blind training do not have any differential effect on competent and less competent sixth grader readers' ability to write summaries immediately after an instructional phase in terms of efficiency and summary rule application. All treatments are equally effective for both groups of sixth graders. The findings, however, suggest that with respect to the main idea variable, self-control training may be most helpful for both competency levels.

For delayed posttest summaries of history passages, findings revealed no significant differences between competent and less competent sixth grade readers on any of the dependent measures. Each competency level generally maintained performance levels over posttest times. In the transfer situation (summarizing sociology texts), competent readers achieved significantly higher main idea, efficiency and summary writing rule application scores. However, since there was spurious interaction between treatment and reading competency for history main ideas on the delayed posttest, it must be concluded that none of the treatments - self-control, informed and blind training - affected competent and less competent readers differently. No treatment was significantly better for one reading competency level or the other.

In summary, self-control, informed and blind training facilitate summary writing efficiency and rule application both competent and less competent readers with respect to history passages. Self-control train-

ing appears to be most effective for history main ideas. However, with respect to sociology text summaries, the transfer task, self-control training appeared to be most advantageous for continued generalization of all summary writing measures.

Overall, the findings of this study suggest that the most explicit level of instruction, self-control training is most effective for helping competent and less competent readers realize that an intervention strategy for creating text summaries is appropriate and effective for independent learning. Like informed and blind training, self-control training was useful in helping students use summary writing rules and in facilitating summary writing efficiency for history text. However, self-control training seemed most useful for the inclusion of main ideas in history text summaries and was most appropriate for all summary writing measures in the transfer situation of summarizing sociology text.

Conclusions

In summary, the following conclusions are drawn:

1. The most beneficial summary writing intervention strategy for grade six is the most explicit level of self-control training because self-control training is facilitative not only of strategy maintenance in the trained context, but also for the continued transfer of strategy use.
2. Self-control, informed and blind training do not interact with reading competency. Therefore treatments do not have differential effects on the summary writing ability of competent and less competent sixth grade readers. Nevertheless, self-control training is most appropriate for both competency levels since it is facilitative of strategy maintenance and most facilitative of continued transfer.

Educational Implications

Two major conclusions were drawn, one relating to treatment effect, the other to competency level.

Students given self-control training maintained strategy use in the context in which they were taught (summarizing history text) and in comparison with students in the other training groups were most proficient in continuing to apply the intervention in a transfer situation (summarizing sociology text).

Results indicated that with respect to summary writing efficiency and rule application, sixth graders receiving self-control, informed and blind training applied summarization intervention strategies in much the same way immediately after an instructional phase both in the context in which they were taught and in a transfer situation. Results also suggested that immediately after instruction self-control training seemed most facilitative of summary writing as measured by the main idea variable. After a time lapse of two months, students given informed and blind training were able to maintain strategy efficiency and rule application use in the context in which they were taught. The performance of the informed training group on the two measures dropped on the transfer task but not significantly. The blind training group made no gains on the efficiency measure but performance dropped, although not significantly, on rule application.

Accordingly, it is recommended that in teaching grade six students to summarize, self-control training should be employed using the tetrahedral model which proved to be effective in helping students understand the generalizability of the intervention strategy.

With the exception of one unusual case, the effects of self-control, informed and blind training were not found to interact with reading competency. Although competent readers were generally better at transferring the summarization strategy taught, findings suggest that generally, in the long run, self-control training best facilitates summary writing for both competent and less competent readers. Based on the results, self-control training is recommended in order to enhance the development of learning independence.

Limitations of the Study

Although the results of this study are revealing, all conclusions must be considered within the framework of the study's limitations.

These are:

1. Because subjects were from three different classes, randomization of subjects of treatment groups was impracticable. Each class was in a different school.
2. Due to a small overall sample size, it was impossible to make a clear delineation between reading competency levels. In addition, there were small numbers in some cells, notably competent and less competent readers in the informed training group and less competent readers in the blind training group. This resulted in lack of statistical power.
3. The Gates McGinitie standardized text did not seem to be sensitive enough measure to discriminate between competent and less competent readers.

4. Instruction was carried out using passages from the field of history. Generalizability of findings are therefore limited due to the use of only one text type - social studies. Reading materials from different content areas are characterized by different features. While it would have been ideal to study the effects of summarization intervention strategies on students' ability to summarize texts from different content areas, such a study would need to take place over a much longer time period.
5. Transfer must be treated with some caution since sociology passages used to test transfer of strategy use were selected from textbooks concerned mainly with history.
6. It was not possible to determine the reliability of the testing instruments. The instances in which summary writing rules were applicable to each passage varied. It was assumed, however, that these shortcomings would affect each treatment group to the same degree because testing passages were counterbalanced across testing times.
7. Post-hoc analysis must be treated with caution because of unequal variances across training groups on some summary writing measures. Besides, multiple unplanned post-hoc comparisons increase experimentwise errors, the possibility that hypotheses are accepted when they are not true.

Suggestions for Further Research

This study should be replicated to help establish the effects of self-control, informed and blind training on summary writing performance

using a larger sample of competent and less competent sixth grade readers. A cloze test might be a better measure than the Gates McGinitie to delineate competent from less competent readers.

The effects of self-control, informed and blind training on sixth graders' summary writing ability could also be investigated using content other than social studies to establish whether the same trends result using different text types.

Another suggestion for future research is to explore the correlation between sixth graders' metacognitive knowledge (gathered through a pretreatment interview) and their summary writing ability.

Students in the blind training group had been taught to outline content area text prior to the experiment. An interesting study would be to compare the summaries of subjects taught to summarize using the procedure used in the study with the summaries of subjects taught to outline and those taught alternative summarization strategies such as that suggested by Taylor (1982).

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APPENDIX A

ETHICAL APPROVAL OF RESEARCH AND EXPERIMENT DEVELOPMENT PROJECTS
INVOLVING HUMAN SUBJECTS

This form is to be completed in accordance with the Faculty of Education policy on ethical review. This policy requires that Committee members take into account the relevant standards of the discipline concerned as well as, where appropriate, the standards specified by certain external funding bodies.

Project Identification

(to be filled in by investigator)

Investigator(s) Rosalind Burnette

Title The Effects of Instruction in Metacognition on the
Comprehension Performance of Sixth Grade Students.

If applicant is a student, name the faculty member supervising the proposed research

Dr. Beverly L. Zakaluk

This is to certify that the Review Committee has examined the research and experimental development project indicated above and concludes that the research meets the appropriate standards of ethical conduct in research with human subjects.

Date: Nov. 30, 87

Signature of Chairperson: J. F. May

APPENDIX B
Instructional Passages

TORONTO IN THE 1870s

Toronto in the 1870s was important as a trading centre. It was a fast growing city of 100,000 people. It was the centre of government, of commerce and of banking. There were as yet few heavy industries to block the view of the lake or fill the sky with smoke. Hamilton and Montreal were the industrial cities. Toronto was more important as a trading centre.

The railways had made Toronto the great trading centre it was. In the 1850s, railways had been built linking Toronto with Montreal, Kingston, Hamilton, London, Collingwood, Windsor, and Sarnia. By the 1870s, branch lines reached towns as far away as Sudbury. The tracks of the Great Western, the Northern, the Grand Trunk, and the Toronto and Grey Bruce Railways fanned out from Toronto Harbour. They looked like the fingers of a giant hand. The rail lines connected with steamships and sailing schooners to carry goods from Europe and the United States.

Union Station

The pride of Toronto's waterfront in the 1870s was the new Union Station. The cornerstone had been laid in 1872. A year later, its three towers reflected in the water of the lake. Passengers entering the city at Union Station saw the busy boats just outside the window. People were sailing and rowing for fun. Ships were bringing cargoes to the docks.

Garrod, S., McFadden, F., & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), p. 222.

VANCOUVER IN THE LATE NINETEENTH CENTURY

Vancouver became a city in April, 1886. In the same month, a hospital was built. There were many accidents in the forests and sawmill - so many that the hospital had to put up tents to house the injured workers. Houses and other buildings were going up all over the city.

On June 13th, 1886, disaster struck the fastgrowing new city. Fire swept through the newly built wooden buildings. In minutes the whole city was on fire. Twenty people died in the fire and the town lay in ruins.

Recovery and Growth

A week later, 100 new buildings had been built. Vancouver never looked back. By spring 1887, it was a bustling young city with many stores, warehouses, hotels and houses. Wooden sailing ships stood side by side with steam ships at the many docks along the harbour. There were a roller-skating rink. An opera house was under construction. And there was a railroad station. In May of 1887, the first passenger train from Montreal arrived in Vancouver. The passengers were met by excited crowds, brass bands, and flags and streamers flying everywhere.

Vancouver's population grew quickly. People came by train and ship to find work in the forests, mines and the new businesses of the city. There were black and white Americans; there were French and English Canadians from the east; there were new immigrants from the British Isles; and there were Chinese who had been brought over to build the railroad and work in the mines. There were still Indian villages around the city.

The streets of the expanding city were poorly paved. Granville Street was still a sea of mud for most of the year. In the heart of the town, a few streets were paved with wooden planks or blocks. The first asphalt pavement was laid along Cordova Street in 1891. Soon other streets were paved. Water and sewer systems were installed under the streets at the same time.

Garrod, S., McFadden, F., & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), p. 278.

THE SEARCH FOR THE NORTHWEST PASSAGE

America was definitely in the way. You couldn't go over it to reach China and Japan. You couldn't go through it - at least, no one had found a water route to the west. Yet there must be some way of getting past this bulky continent that barred the way to the orient.

Henry Hudson

One explorer to tackle the north was Henry Hudson. An Englishman who sailed for Holland, Hudson explored Hudson Strait and Hudson Bay in 1610. But Arctic ice is cruel to men at sea. The nights are long and lonely and the weather freezing cold. Soon Hudson's men demanded that the ships return home. Hudson refused. The crew threw Hudson, his son and the loyal crew members into a small boat and set them adrift. They were never seen again. The mutineers set off for home. Four stood trial for piracy. Robert Bylot, who had joined the mutineers, was not tried. He went on to an honoured career as an Arctic explorer himself.

The Passage Is Found

In the following years, more ships came to the bay. These ships and the men aboard were more interested in the furs that might be found on land than they were in breaking through the ice to the west. The search for the passage continued, however. Finally, at the beginning of the twentieth century, a Norwegian, Ronald Amundsen, made the trip through the Northwest passage in the Gjoa. The Gjoa was so small that she only held a crew of six. The ship took three years to make the trip from 1903 to 1906. In 1942, an RCMP ship, the St. Roach, captained by Sergeant Henry Larsen, made an uninterrupted journey through the Northwest Passage from the west to the east. In 1944, the voyage was repeated from the east to the west.

Garrod, S., McFadden, F., & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), pp. 62-63.

HALIFAX DURING THE WAR OF 1812

Halifax was a town of merchants in the early 1800s. Ships chandlers' and provisioners' shops lined Water Street. Other merchants sold timber to markets in Britain. Most of the goods sold in Halifax shops were imported from Britain or New England. Several merchants grew wealthy selling these imported goods.

Shop clerks worked as many as twelve hours a day. They began early in the morning, often before daylight. The floors had to be swept, fires lit, candles and lamps trimmed, and stocks arranged. Many young clerks lived in the shops where they worked. Their bedrooms were cubbyholes beneath the shop counters.

The Town Clock, set into the hill beneath the Citadel, was very useful. Many people had no watches. The time was also called out by the night watchman going about his rounds: "Ten o'clock and all's well." Often he could not call "all's well." Drunken soldiers and sailors would get into fights.

Fires were common. Halifax was largely wooden houses, built close together. Homes were heated with wood or coal fires. Candles or oil lamps lit the rooms. Fires were fought by volunteer groups called Fire Clubs. There were several rival fire clubs; they competed to see which club could be the first to reach a fire. The volunteers would be alerted by the ringing of the fire bell. When the bell rang, they would rush from their jobs, often in their best clothes. Fires were fought with bucket brigades. Long lines of sweating leather-caped firemen passed buckets from hand to hand.

Halifax had no water mains and no running water in homes. The water supply came from big wooden pumps in the streets. Most streets were unpaved. Water Street was paved in 1816-17. But the pavement began to sink into the mud almost at once. Wooden sidewalks ran along the main street. There were no sewers or public garbage collection.

Garrod, S., McFadden, F., & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), pp. 158-159.

SETTLERS ON THE PRAIRIES

The great flood of immigrants from Europe and the United States made the Prairies the fastest growing area of Canada at the end of the nineteenth century. The railway carried the European settlers from the ports of eastern Canada to cities like Winnipeg.

On their arrival at Winnipeg, the new immigrants were housed for a short time in Immigration Hall. There they were fed and clothed until they were able to find land or jobs. At Immigration Hall, Canadian doctors checked the newcomers carefully. Some of the immigrants might have become sick during their long trip from Europe. No one wanted an epidemic of sickness to spread.

Some of the immigrants stayed in the cities. Others became farmers on the cheap or free land that was available. Some of the immigrants who wished to farm came on their own. Others were brought in groups by companies. Some groups came together because they came from the same country. Others were members of the same religious groups.

Ukrainian Settlers

A number of immigrants came from the area we now know as the Ukraine. This is a flat region, similar in climate and landscape to the Prairies. Wheat and other grains are grown there.

The Ukrainians would usually settle together in the same area. They would share such tasks as clearing land, building houses and barns and harvesting the crops. They continued to speak their own language dress according to their own ways and keep their own religion. They wanted to preserve their own culture. This sometimes meant that English-speaking people did not like them because they were different.

Religious Groups

Many immigrants came in order to be able to practice their religion freely. Among them were the Mormons, the Hutterites, the Mennonites and the Doukhobors.

The Mormons came from the United States. The Hutterites, Mennonites and Doukhobors fled from Europe. They refused to fight as soldiers in the armies of Russia and Prussia.

Garrod, S., McFadden, F., & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), p. 268.

APPENDIX C

Summary Definition and Rules for Blind and Informed Training Groups

Definition

A summary is a shortened form of a passage. It says basically the same thing as the original passage does, but it says it in fewer words. That is why it is called a summary.

A summary does not contain your opinions. You may think that the author of the passage is crazy and that the passage is full of lies. But you do not say so in your summary. A summary is only a shortened version of the passage, nothing more.

Four Rules for Writing a Summary

1. Reduce lists: one way to reduce lists is to use a word or phrase name for each list.
2. Use the topic sentence from a paragraph if one is given to you. It is a summary of the paragraph.
3. Make your own topic sentence if one is not given. Not all paragraphs have topic sentences.
4. Get rid of unnecessary detail. Since a summary is meant to be short, it should not include repeated or unimportant information.

A Final Idea

Polish the summary. When a lot of information is reduced from an original passage, the remaining information often sounds unnatural. Fix this problem by making a better sounding summary.

APPENDIX D

Additional Summary Writing Rules for Self-Control Training Group

Five General Steps to Help with the Four Rules for Writing a Summary

MAKE SURE YOU UNDERSTAND THE PASSAGE. Ask yourself "what was this passage about?" "What did the writer say?" Try to say the central idea to yourself.

LOOK BACK. Reread the passage to make sure you got the central idea right. Also read to make sure that you really understand what the important parts of the passage are. Star important parts.

NOW USE THE FOUR SPECIFIC RULES FOR WRITING A SUMMARY

RETHINK. Reread a paragraph of the passage. Try to say the main idea of the paragraph to yourself. Is the main idea a topic sentence? Have you underlined it? Or is the topic sentence missing? If it is missing, have you written one in the margin?

CHECK. Did you leave in any lists? Make sure you do not list things out in your summary. Did you repeat yourself? Make sure you did not.

DOUBLE-CHECK. Did you skip anything? Is all the important information in your summary? Are there any paragraphs that you forgot to summarize?

Four Specific Rules for Writing a Summary

REDUCE LISTS. If you see a list of things try to think of a word or phrase name for the whole list. For example, if you see a list like eyes, ears, neck, arms and legs, you could say "parts of the body" - or "body parts". Just write the name of the things on - right above the examples.

USE A TOPIC SENTENCE IF ONE IS GIVEN TO YOU. Often authors write a sentence that summarizes a whole paragraph. It is called a topic sentence. If the author gives you one, underline it and use it in your summary.

MAKE YOUR OWN TOPIC SENTENCE. Unfortunately, not all paragraphs have topic sentences. That means that you may have to make up one for yourself. If you do not see a topic sentence, write one of your own in the margin. Use your sentence in the summary.

GET RID OF UNNECESSARY DETAIL. Some information can be repeated in a passage. In other words, the same thing can be said in a number of different ways, all in one passage. Other information can be unimportant. Since summaries are meant to be short, get rid of repeated or unimportant information. Use a red pencil to cross repeated information. Use a green pencil to cross out unimportant information.

A Final Idea

POLISH THE SUMMARY. When a lot of information is reduced from an original passage, the remaining information often sounds unnatural. Fix this problem by making a better sounding summary. You may add words like "and" or "because".

APPENDIX E

Checklist Used by Self-Control Training Group

CHECKLIST

Write 'yes' or 'no' in the space provided at the beginning of each of the following statements.

1. I made sure that I understood the passage. I asked myself "what was the passage about?" "What did the writer say?"
2. I reread the passage to make sure that I understood what the important parts were and starred the important parts.
3. I found all lists and reduced each to a word or phrase name.
4. I underlined all topic sentences.
5. I made up topic sentences for paragraphs that did not have them.
6. I crossed out information that was repeated.
7. I crossed out information that was not important.
8. I wrote my summary using the information that was left.
9. I rechecked my work to make certain that all four summarization rules were used.
10. I polished my summary and made it sound better.

Complete the following:

Other times I might read through a passage and make a summary are:

APPENDIX F

Sample Lesson Plans for Training Groups

Blind Training Group

Class: Grade 6
Age Range: 11 - 12
Topic: Summary Writing
Time: 60 minutes

Objective:

Students will be able to summarize the passage entitled "Toronto in the 1870s".

Materials:

Chalkboard and chalk; overhead projector; passage entitled "Toronto in the 1870s" extracted from an authorized Grade 6 social studies textbook, "Canada Growth of a Nation"; handout on summary writing which includes specific rules for summarizing texts.

Previous Knowledge:

Students have notions of main ideas of a passage and redundant and unimportant information in a passage. They are able to use superordinates in place of a list of examples. They have ideas about Toronto.

PREPARATION

Introduction (5 mins.):

The investigator informs students that they are going to read a passage about Toronto in the early days and then creates interest in the topic and activates students' previous knowledge through questioning. Investigator introduces new words in passage in context - commerce, schooner and connected (in relation to the railroad) - and discusses them with students.

Development:

Step 1 (10 mins.):

Teacher asks students to preview or survey the selection. They must read the title and other subheadings (DR-TA).

After reading the title and first sentence of the first section of the passage, students are asked questions like "What do you think this section is going to be about?" "What else?" "Why?" The questions are designed so that students are involved in predicting and hypothesizing.

Students are asked to check their predictions. They must read to find out if they are right or to find out who is right.

Students are asked to read the first section silently.

Students are stopped so that they can verify or reject predictions through discussions.

Before reading the next section "Union Station" students are asked to predict what they believe that section is about.

DEMONSTRATION

Step 2 (5 mins.):

After the passage has been completely read and understood by students, the investigator tells students that she is going to teach them how to summarize the text. She elicits a definition of a summary. After receiving students' explanations, the investigator presents definition of a summary on the overhead projector.

Then the investigator presents a different passage entitled "Potlatch" on the overhead projector followed by a summary of it.

The investigator then presents rules for constructing a summary on the overhead projector.

Step 3 (15 mins.):

The investigator shows students how to apply the rules of summarization to "Toronto in the 1870s". First students are taught to reduce lists such as "centre of government, of commerce and of banking" (centre of business).

Then students are shown how to select topic sentences from paragraphs.

Students are later shown how to get rid of repeated information such as "Toronto was more important as a trading centre". They are asked to delete such information with a red pencil.

Students are finally shown how to get rid of unimportant information such as "There were as yet few heavy industries to block the view of the lake". They are asked to delete such information with a green pencil.

Conclusion (5 mins.):

The investigator concludes by reviewing the rules for summarization through questioning. She asks for example: What is a summary? What are the rules for summary writing?

PRACTICE

Evaluation (20 mins.):

Students are asked to write their summary of "Toronto in the 1870s".

(Students receive no feedback on their summary writing performance.)

Informed Training Group

Class: Grade 6
Age Range: 11 - 12
Topic: Summary writing
Time: 60 mins.

Objective:

Students will be able to summarize the passage entitled "Toronto in the 1870s".

Materials:

Chalkboard and chalk; overhead projector; passage entitled "Toronto in the 1870s" extracted from an authorized grade 6 social studies textbook, "Canada Growth of a Nation"; handout on summary writing which includes specific rules for summarizing texts.

Previous Knowledge:

Students have notions of main ideas of a passage and redundant and unimportant information in a passage. They are able to use superordinates in place of a list of examples. They have ideas of Toronto.

PREPARATION

Introduction (5 mins.):

The investigator informs students that they are going to read a passage about Toronto in the early days and then creates interest in

the topic and activates students' previous knowledge through questioning. The investigator introduces new words in passage in context - commerce, schooner, and connected (in relation to the rail) - and discusses them with students.

Development

Step 1 (10 mins.):

Teacher asks students to preview or survey the selection. They must read the title and other subheadings (DR-TA).

After reading the title and first sentence of the first section of the passage, students are asked questions like "What do you think this section is going to be about?" "What else?" "Why?" The questions encourage students to predict and hypothesize.

Students are asked to check their predictions. They must read to find out if they are right or to find out who is right.

Students are asked to read the first section of the selection silently.

Students are stopped so that they can verify or reject predictions through discussion.

Before reading the next section "Union Station" students are asked to predict what they believe that section is about.

DEMONSTRATION AND EXPLANATION OF STRATEGY VALUE

Step 2 (5 mins.):

After the total passage has been completed the investigator informs students that one way to help us remember what we are reading when we are reading to find out is to summarize the text. The investigator asks students questions like "What is a summary?" After receiving students' explanations, the investigator presents definition of a summary on the overhead projector.

The investigator explains to students that it is good to summarize the passage because there is too much information to remember. If the information is condensed and the important points are written down it will be easier to remember it.

The investigator presents a different text entitled "Potlatch" and a summary of it on the overhead projector.

The investigator presents rules for writing summary on the overhead projector and explains that students can use those summary writing rules for practically any passage they need and want to remember. The passage may be based on any aspect of social studies or any other subject area.

Step 3 (20 mins.):

The investigator shows students how to apply the rules of summarization to the selection and emphasizes the importance of each of the rules.

The investigator shows students how to reduce lists in the passage such as "centre of government, of commerce and of banking" (centre of

government and business). Students are told that when lists are reduced they help to get rid of words in the passage and focus on the most important idea/category the writer wishes to convey.

The investigator introduces the concept of main ideas and important detail.

Students are shown how to get rid of repeated information such as "Toronto was more important as a trading centre". Students are asked to delete repeated information with red pencils.

Students are shown how to get rid of unimportant information such as "There were as yet few heavy industries to block the view of the lake". Students are asked to use green pencils to delete unimportant information.

Conclusion (5 mins.):

The investigator reviews lesson through questioning. For example she asks:

What is a summary?

Why is summary writing important?

What are the rules of summarization?

Why are the rules important?

When is it possible to use the rules of summarization?

The investigator tells students that as a result of their application of the rules to the selection, they now have a good basis for writing a summary of "Toronto in the 1870s".

PRACTICE AND FEEDBACK

Evaluation (15 mins.):

Students are asked to summarize the selection. Students' summaries are collected. Students are given individual written feedback on their summary writing performance for the next lesson.

Self-Control Training Group

Class: Grade 6
Age Range: 11 - 12
Subject: Language Arts
Topic: Summary writing
Time: 60 minutes

Objective:

Students will be able to summarize passage entitled "Toronto in the 1870s."

Materials:

Chalkboard and chalk; passage entitled "Toronto in the 1870s" extracted from an authorized Grade 6 social studies textbook, "Canada Growth of a Nation"; handout with general and specific rules for summarizing texts; personal checklists for students to evaluate their own summary writing performance.

Previous Knowledge:

Students have notions of main ideas of a passage and of redundant and unimportant information in a passage. They are able to use superordinates in place of lists of examples. They have ideas of Toronto.

PREPARATION

Introduction (5 mins.):

The investigator tells students that they are going to read a passage about Toronto in the early days and then tries to generate interest in the topic and activate the students' previous knowledge through questioning. The investigator introduces new words in the passage in context - commerce, schooner and connected (in relation to the railroad) - and discusses them with students.

Development

Step 1 (10 mins.):

The investigator asks students to preview or survey the passage. They must read the title and other subheadings (DR-TA).

After reading the title and first sentence of the first section of the passage, students are asked questions such as: "What do you think this section is all about?" "What else?" "Why?" Questions are asked in order to encourage students to predict and hypothesize.

Students are asked to check their predictions. They must read silently the first section in order to find out if they are right or to find out who is right.

Students are stopped so that they can verify or reject their predictions through discussion.

Before reading the next section "Union Station", students are asked to predict or hypothesize what that section is about. On reading the section they are asked to confirm or reject their predictions.

DEMONSTRATION AND STRATEGY VALUE INFORMATION

Step 2 (10 mins.):

After reading and understanding the passage students are informed that they are going to summarize it.

The investigator asks students whether they ever have tests or examinations and asks them to explain how they prepare themselves for such activities. The investigator tells students that what they do depends on the type of task they have to perform. The investigator shows students that if they are preparing for a multiple choice test or a short answer test, for example, they may have to reread and review the text underlining main ideas. She explains that when students have to tell what they know about the topic in a long answer they might use a different strategy. One way in which they could attempt to remember the information is through summarizing.

The investigator introduces Jenkins' (1979) tetrahedral model to help develop students' awareness of the task of summarization. This includes the success or failure of the task of summarization and the strategies involved in summarizing as against other criterial tasks. They are informed too that they must pay attention to the type of material (story or informational text) that they have to use.

The investigator tells students that other students who do well at summary writing have a system they work at preparing for the task. She explains that in order to summarize effectively students must be able to apply general and specific rules. She tells them that the material which they are going to use is an informational passage from their social studies textbook.

The investigator introduces the concept of summarization and tries to get a definition from students. After receiving students' explanations, the investigator presents a definition on the overhead projector.

The investigator explains to students that it is good to summarize a passage since there is too much information in it to remember. If the information is condensed and the main points are written down, it will be easier to remember it.

The investigator presents a different passage on the overhead followed by a summary of it.

The investigator presents rules for summary writing on the overhead projector and explains that students can use those rules for practically any passage that they need to summarize to remember. The passage may be based on any aspect of social studies or any other subject area.

DIRECT EXPLICIT INSTRUCTION

Step 3 (30 mins.):

The investigator walks students through the general and specific rules. She models and gives explicit instruction in how to use, monitor and check the summarization strategy using the selection "Toronto in the 1870s."

The first two control steps are demonstrated. The investigator asks students to refer to the text again and to think of a statement to tell the gist of the entire passage. The investigator does the same. The investigator then shows her statement and asks if students' state

ments are similar. Students are then asked to identify the main points in the passage. The investigator compares her main ideas with those identified by students. The investigator and students star all important parts of the text.

Students are taught to apply the superordination, selection and deletion rules.

The investigator walks the students through the rules explaining the importance of each.

After having applied the rules, students are informed that they have the basis of a good summary and are asked to write one using the information left in the text. The investigator completes a summary as well.

The investigator then models the use of the last three general rules and students apply them.

Conclusion:

The lesson is reviewed through questioning. Students are asked both process and product questions in which they model processes for the investigator. Questions include:

What is a summary?

What is the importance of a summary?

When can one use summarization rules?

What are those rules? Give examples of how the rules can be applied?

What is the importance of each of the rules?

The investigator reinforces that students have a strategy for learning informational text and reminds them that they are in control of their own learning. They are like the executive in the learning situation.

Students' summaries are then collected. They are given individual written feedback for the next lesson.

Following the lesson students are provided with a personal checklist so that they can evaluate their own performance in the use of the summarization strategy.

APPENDIX G

Test Passages

History Passages

THE PRAIRIES AT THE TURN OF THE CENTURY

For their first year or so on the Prairies, the new settlers might live in a sod house. These houses were made of grass and earth. The sods were cut from the ground like bricks. Later, if times were good, the family would be able to build a wood-frame house.

It could take three years or more to bring a prairie farm into production. But once the farm was firmly set up, it was worth the struggle. The 1880s and 1890s saw great world need for wheat. Prices were high. The prairie farmers grew rich. Homemade ploughs and horses gave way to machinery.

In the Northwest Territories and Manitoba, the farmers were doing well. At first, the early frosts and short growing season of this area made growing wheat risky. The development of new types of wheat such as Fyfe and Marquis changed things. They were created to suit the Western Prairies. The new grains grew very quickly. They could be harvested before fall frosts set in.

Towns and cities grew fast all across the Prairies. Cities like Winnipeg, Regina and Calgary were along the railway. Edmonton grew from a North West Mounted Police (NWMP) post. Smaller centers grew up at grain collection points along the way. The towns and cities were places where farmers could buy seeds, tools and other supplies. They were where one could buy a newspaper, collect mail or see a play. Doctors, dentists and lawyers set up their practices in the towns to meet the needs of the settlers.

By the turn of the century, there were buildings of brick and stone. These began to replace the wooden false-front stores of the 1880s. Dirt roads and wooden sidewalks remained in the small towns and villages. But in the cities there were fine paved streets lined with trees. There were modern services in the cities.

Merchants grew rich. Professionals prospered. They built large homes. They rode in fine carriages. They brought in the best goods from New York.

Garrod, S., McFadden, F., & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), p. 270.

WINNIPEG IN 1895

Curling bonspiels and canoeing, wheat and railway: this is Winnipeg in 1895. And if you doubt that curling was important you might note this: a year earlier, the legislature didn't have enough people present to meet. Too many members had gone curling.

It was quiet in Winnipeg in 1890's. The great railway boom had passed. The immigration boom had not occurred. The city was growing at a rate of about five percent a year. The population moved from just over 25,000 in 1891 to just over 31,000 in 1896.

Of the population, over a quarter had been born in Ontario. A fifth were born in Manitoba and more than a quarter in Great Britain. Most of the rest of the immigrants were from other parts in Canada, Europe and the United States. And 90 percent of the population was less than 45 years old.

Quiet or not, Winnipeg was still the main city of the Prairies. Wide main streets were built. They took trucks to the grain market, the farm equipment dealers and the railyard.

The unions were growing. In 1895, the Independent Labour Party was formed. It was the first labour party in Canada.

At the same time women were given the right to vote in city elections. Of course, both men and women still had to own a certain amount of property in order to be allowed to vote. And women still could not hold public office.

Swimming, cricket, canoeing, yachting, and curling were loved. They were the pasttimes of the rich people who could afford such things. In summer, people would go to the Lake of the Woods. It was a growing summer resort. There were other sports, too. In 1896, the Winnipeg Victorias won hockey's Stanley Cup.

The city had begun a tree-planting program a few years before. As a result, the first cyclists could ride on shady streets.

Garrod, S., McFadden, F., & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), p. 264-265.

A PLACE TO SETTLE

On March 7, 1604 in France, a ship was being made ready for a voyage. When the work was completed, soldiers, seamen, and skilled workers climbed aboard. Then the ship headed for the open sea. It was headed for Canada. The captain was Piere Du Gua de Monts.

The trip across the Atlantic to Canada was a bad one. Icebergs added to the perils of the trip. But on May 8, the ship reached Nova Scotia. It turned south to look for a place to stop.

The next day the ship was exploring a sheltered bay. One of the sheep fell overboard and it drowned. De Monts called that bay Port-au-Mouton.

Samuel de Champlain was on the trip. He was a very shrewd and bright man. He had already been in the West Indies. De Monts had appointed Champlain as the navigator, geographer, and map-maker of the trip.

From Port-au-Mouton, de Monts with Champlain and ten other men got into a long boat. They explored the coast of Nova Scotia around Cape Sable and into St. Mary Bay but they did not find a good place to set up a village. They went back to Port-au-Mouton and there, a second ship carrying more people had arrived.

The captain of the second ship was Francois Grave' Du Pont. He was important to the trip because he was a merchant. He was good at trading with the Indians. De Monts had made him his deputy. The second ship sailed to the Gulf of St. Lawrence to trade for furs before returning to France for fresh supplies.

The Nova Scotia ports on the Atlantic Coast were still too far from good fur-trading country. So the explorers who remained on the Atlantic Coast crossed into New Brunswick looking for furs. Finally, the explorers decided to stay for the winter on an island, Ile-Ste-Croix, now Dochet Island, in the St. Croix River.

Colonists at Port Royal. (Ginn & Company, 1970), pp. 4-5.

Sociology Passages

CHILD LABOUR AND THE GROWTH OF UNIONS

Children worked with adults in the workshops, factories, and mines of nineteenth century Canada. Some employers hired children as young as eight. A child could be paid much less than an adult worker. The less money an employer paid for workers the more the profit.

Children in cigar factories earned about \$1.00 a week. (Adults got the same in a day.) The factories were ill-lit, hot sweaty places. They were long sheds. Beatings and other forms of punishment were common. A child was even beaten for talking to another child while working.

Young boys worked in the coal mines of Nova Scotia. The shafts and tunnels of the mines were sometimes too tight that only a small boy could reach the coal on his hands and knees. For this risky work, the boys were paid 60¢ to 80¢ a day.

In 1889, children of eight working under bad conditions in a Montreal cotton mill earned \$92.00 a year. To earn this money, they worked from six in the morning to six at night, six days a week. Clothing factories were called 'sweatshops' as they were often hot and airless. Many workers and machines were crammed into a small room. The Hochelage Cotton Mill near Montreal employed 1100 in 1880. Of these, half were girls and young women. They were paid less than 75¢ a day. Men doing the same job earned a dollar.

The early trade unions fought for an end to child labour. They wanted it to be illegal to hire a child younger than 16. Change was slow. Even in the early 1900s, one in every 30 factory workers in Canada was a child. The first child labour act was passed in 1908 by Ontario. The new law made 14 the minimum age for working in factories.

By the end of the nineteenth century, thousands of people became members of trade unions. The unions ensured fair wages and good working conditions. They fought for the good of Canadians.

Garrod, S., McFadden, F. & Neering, R. (1980). Canada Growth of a Nation. (Fitzhenry & Whiteside Limited), p. 254.

THE FAMILY

An Ojibwa family was like a modern one. It had a mother, a father and children. It might also have the father's parents. The family lived in its own dwelling. It was called a wigwam. Nearby, the father's brothers and their families also lived in wigwams.

The Ojibwa family moved often. Therefore, they needed the wigwam. It could be put up easily, taken down, moved great distances, and erected again. The wigwam would protect them from severe weather.

In the winter months, single family groups lived in hunting areas. They went hunting every year. Their closest neighbours, other families or groups of families, might live miles away. For this reason, each family was closely knit. Mothers, fathers, boys and girls, and grandparents all worked together at their tasks. They used every skill they could muster. This was the only way they could stay alive and well in the harsh months of winter.

Family groups united to form communities as soon as the snow began to melt in early spring. These groups were called bands. Some bands were quite small. They included a few related families and others were larger. In some cases, the bands were made up of many hundreds of people. Each band was quite independent. There was no central government and no chief or council of chiefs to rule the bands. But no matter how far the bands may have been scattered, every member because of language, customs, religion and general way of life, was an Ojibwa.

Each Ojibwa belonged to his own family band. Each Ojibwa was also born into his own clan. There were many clans. Each clan had its own special symbol or totem, often an animal creature.

It has been said that there were almost two dozen clan totems. They included the catfish, crane, lynx, duck, wolf, and bear. Clans were common to many Indian groups in North America.

Nomads of the Shield. (Ginn & Company, 1970), pp. 5-6.

A JULY DAY

It is a warm 1795 July morning in Elizabethtown. There are now eleven children in the Seaman family. Three more have been born since the move to Elizabethtown. A square addition had been made to the log-house.

In the vegetable garden, Smith and Stephen are weeding. Smith is eleven and Stephen is nine. The drone of the bees flying over the small field of flax adds rhythm to the movement of hoes. The flax is growing well. It will give plenty of thread for Martha's winter spinning and weaving. The boy's arms move slowing in the heat. Only the thought of big brother Nehemiah's promise to take them swimming in the pond below the falls before supper keeps them going.

Elizabeth is in the house. She is sixteen. She is finishing a deerskin dress for herself. She is looking forward to the arrival of Sam Shipman. He is the man she is planning to marry. Elizabeth wants to wear the new dress to impress Sam.

Sarah, aged ten, is kneading bread in a big wooden bowl, listening as her mother drills six-year-old Robert and five-year-old Margaret in their ABC's. James, who is three plays on the floor and Baby Polly, has her cradle rocked by her mother.

Nehemiah, now fifteen, has been in the blacksmith's shop since dawn. He likes working inside the heat of the forge. He does not like to work in the garden, meadow, or with horses. His father Caleb is showing him how to use the tools to shape metal.

Caleb Junior and Samuel are away for summer. Caleb Junior is helping Mr. Abel Stevens clear the land for new settlers. Samuel is helping to bring the hay crop from a meadow. The meadow is some distance from the farm.

The busy day ends as Sarah and her mother clear the table, wash the dishes and sweep the kitchen. Then they put the little ones to bed.

Caleb Seaman: A Loyalist. (Ginn & Company, 1970), pp. 16-17.

APPENDIX H

Scoring Template for Main Ideas in Test Passages

The main ideas for each test passage is presented. The number of main ideas included in a summary was compared with the template of the main ideas of the original passage and then converted to a percentage.

History Passages

THE PRAIRIES AT THE TURN OF THE CENTURY

1. For the first year or so, on the Prairies, the new settlers might live in a sod house.
2. Later if times were good, the family would be able to build a wood-frame house.
3. It could take three years or more to bring a prairie farm into production.
4. The 1880s and 1890s saw great world need for wheat.
5. Prices were high.
6. The Prairie farmers grew rich.
7. Homemade ploughs and horses gave way to machinery.
8. In the Northwest Territories and Manitoba, the farmers were doing well.
9. The development of new types of wheat such as Fyfe and Marquis changed things.
10. Towns and cities grew fast all across the Prairies.
11. By the turn of the century, there were buildings of brick and stone.
12. Merchants grew rich.
13. Professionals prospered.

WINNIPEG IN 1895

1. Curling bonspiels and canoeing, wheat and railway: this is Winnipeg in 1895.
2. And if you doubt that curling was important you might note this: a year earlier, the legislature did not have enough people present to meet.
3. It was quiet in Winnipeg in the 1890s.
4. The population moved from just over 25,000 in 1891 to just over 31,000 in 1896.
5. Quiet or not, Winnipeg was still the main city of the Prairies.
6. The unions were growing.
7. In 1895, the Independent Labour Party was formed.
8. At the same time, women were given the right to vote in city elections.
9. Swimming, cricket, canoeing, yachting and curling were loved.
10. In 1896, the Winnipeg Victorias won hockey's Stanley Cup.
11. The city had begun a tree planting program a few years before.

A PLACE TO SETTLE

1. On March 7, 1604, in France, a ship was being made ready for a voyage.
2. It was headed for Canada.
3. The Captain was Pierre Du Gua de Monts.
4. The trip across the Atlantic to Canada was a bad one.
5. But on May 8, the ship reached Nova Scotia.
6. The next day the ship was exploring a sheltered bay.
7. De Monts called that bay Port-au-Mouton.

8. Samuel de Champlain was on the trip.
9. De Monts had appointed Champlain as the navigator, geographer, and map-maker of the trip.
10. They explored the coast of Nova Scotia around Cape Sable and into St. Mary Bay, but did not find a good place to set up a village.
11. There, a second ship carrying more people had arrived.
12. The captain of the second ship was Francois Gravé Du Pont.
13. The ship sailed to the Gulf of St. Lawrence to trade for furs before returning to France for fresh supplies.
14. The Nova Scotia ports on the Atlantic coast were still too far from good fur-trading country.
15. Finally, the explorers decided to stay for the winter on an island, Ile-Ste-Croix, now Dochet Island, in the St. Croix River.

Sociology Passages

CHILD LABOUR AND THE GROWTH OF UNIONS

1. Children worked with adults in the workshops, factories, and mines of nineteenth century Canada.
2. Children in cigar factories earned about \$1.00 a week.
3. The factories were ill-lit, hot sweaty places.
4. Beatings and other forms of punishment were common.
5. Young boys worked in the coal mines of Nova Scotia.
6. In 1899, children of eight working under bad conditions in a Montreal cotton mill earned \$92.00 a year.
7. Men doing the same job earned a dollar.
8. The early trade unions fought for an end to child labour.

9. The first child labour act was passed in 1908 by Ontario.
10. The new law made 14 the minimum age for working in factories.
11. By the end of the nineteenth century, thousands of people became members of trade unions.

THE FAMILY

1. An Ojibwa family was like a modern one.
2. It had a mother, a father and children.
3. It might also have the father's parents.
4. The Ojibwa family moved often.
5. Therefore, they needed the wigwam.
6. In the winter months, single family groups lived in hunting areas.
7. Family groups united to form communities as soon as the snow began to melt in early spring.
8. Each Ojibwa belonged to his own family band.
9. Each was also born into his own clan.
10. Each had its own special symbol or totem, often an animal creature.
11. It has been said that there were almost two dozen clan totems.

A JULY DAY

1. It is a warm 1795 July morning in Elizabethtown.
2. There are now eleven children in the Seaman family.
3. In the vegetable garden, Smith and Stephen are weeding.
4. Only the thought of big brother Nehemiah's promise to take them swimming in the pond below the falls before supper keeps them going.

5. Elizabeth is in the house.
6. She is finishing a deerskin dress for herself.
7. Sarah, aged ten, is kneading bread in a big wooden bowl, listening as her mother drills six-year-old Robert and five-year-old Margaret in their ABC's.
8. James who is three plays on the floor.
9. Baby Polly has her cradle rocked by her mother.
10. Nehemiah, now fifteen, has been in the blacksmith's shop since dawn.
11. His father, Caleb, is showing him how to use the tools to shape metal.
12. Caleb junior and Samuel are away for the summer.
13. The busy day ends as Sarah and her mother clean the table, wash the dishes and sweep the kitchen.
14. Then they put the little ones to bed.

APPENDIX I

Example of Calculation of Summarization Efficiency Score

Example of Student's Summary

THE FAMILY

An Ojibwa family was like a modern one, except they lived in wigwams. They moved often, which was why their portable easy to assemble wigwam was handy. They went hunting annually, and their closest neighbors were often miles away. Families worked together at their tasks. Families united to form bands which varied in size in early spring. They had no chiefs or government. Each Ojibwa belonged to his/her own family band and clan which had its own symbol.

Summarization efficiency is the ratio of main ideas to the number of words in a summary. The summary above includes 7 of the 11 main ideas in the original passage. The number of words used is 79. Therefore, the efficiency is 7 divided by 79 giving an efficiency score of 0.09.

APPENDIX J

SCORING TEMPLATE FOR SUMMARY RULE APPLICATION TO TEST PASSAGES

Each template was established so that summaries could be scored to indicate little or no, moderate and appropriate evidence of rule usage. Corresponding ratings of 1, 2, and 3 respectively were assignable. Because naturally occurring texts were used the number of times each of the summary writing rules could be applied in each passage varied. Scoring for rules varied for each passage as outlined below. (As explained in Chapter 3 passage variability for summary rule application was controlled for in passage assignment.)

History Passages

The Prairies at the Turn of the Century

Superordination

Lists for Reduction

1. Homemade ploughs and horses
2. Fyfe and Marquis

(Use of 2 superordinates scores 3.

Use of 1 superordinate scores 2.

Use of 0 superordinate scores 1.)

Selection

Topic Sentences to be Selected

1. For the first year or so on the Prairies, the new settlers might live in a sod house.
2. In the Northwest Territories and in Manitoba, the farmers were doing well.

3. Towns and cities grew fast across the Prairies.

(Inclusion of 3 topic sentences scores 3.

Inclusion of 1 - 2 topic sentences scores 2.

Inclusion of 0 topic sentence scores 1.)

Invention

Topic sentences must be invented for:

1. Paragraph 2 ("It could take. . . .").
2. Paragraph 5 ("By the turn of the century. . . .").
3. Paragraph 6 ("Merchants grew. . . .").

(Invention of 3 topic sentences scores 3.

Invention of 1 - 2 topic sentences scores 2.

Invention of 0 topic sentence scores 1).

Deletion

Sentences which are either redundant or unimportant and must be deleted.

1. The sods were cut from the ground like bricks.
2. These houses were made of grass and earth.
3. But once the farm was firmly set up, it was worth the struggle.
4. The new grains grew very quickly.
5. Dirt roads and wooden sidewalks remained in the small towns and villages.
6. They built large homes.
7. They rode in fine carriages.

8. They brought in the best goods from New York.
(Deletion of 7 - 8 unnecessary details scores 3.
Deletion of 4 - 6 unnecessary details scores 2.
Deletion of 0 - 3 unnecessary details scores 1.).

Winnipeg in 1895

Superordination

Lists for Reduction

1. Curling bonspiels and canoeing, wheat and railway.
2. Swimming, cricket, canoeing, yachting, and curling were loved.
(Use of 2 superordinates scores 3.
Use of 1 superordinate scores 2.
Use of 0 superordinate scores 1.).

Selection

Topic Sentences to be Selected

1. Curling bonspiels and canoeing, wheat and railway: this is Winnipeg in 1895.
2. It was quiet in Winnipeg in the 1870s.
3. Quiet or not, Winnipeg was still the main city of the Prairies.
4. At the same time, women were given the right to vote in city elections.
5. The city had begun a tree planting program a few years before.
(Inclusion of 4 - 5 topic sentences scores 3.
Inclusion of 2 - 3 topic sentences scores 2.
Inclusion of 0 - 1 topic sentence scores 1.).

Inventions

Topic Sentences must be invented for:

1. Paragraph 3 ("Of the population. . .").
2. Paragraph 5 ("The unions were. . .").
(Invention of 2 topic sentences scores 3.
Invention of 1 topic sentence scores 2.
Invention of 0 topic sentence scores 1.).

Deletions

Sentences to be Deleted

1. And women still did not hold public office.
2. In summer, people could go to the Lake of the Woods.
3. It was a growing summer resort.
(Deletion of 3 topic sentences scores 3.
Deletion of 1 - 2 topic sentences scores 2.
Deletion of 0 topic sentence scores 1.).

A Place to Settle

Superordination

List for Reduction

1. Navigator, geographer, and mapmaker.
(Use of 1 superordinate scores 3.
Use of 0 superordinate scores 1.).

Selection

Topic Sentences to be Selected

1. Samuel de Champlain was on the trip.
2. They explored the coast of Nova Scotia around Cape Sable and into the St. Mary Bay but they did not find a good place to set up a village.
3. The captain of the second ship was Francois Gravé Du Pont.
4. Finally, the explorers decided to stay for the winter on an island, Ile-St. Croix, now Dochet Island, in the St. Croix River.

(Inclusion of 4 topic sentences scores 3.

Inclusion of 2 - 3 topic sentences scores 2.

Inclusion of 0 - 1 topic sentence scores 1.).

Invention

Topic Sentences must be invented for:

1. Paragraph 1 ("On March 7. . . .")
2. Paragraph 2 ("The trip across. . . .")
3. Paragraph 3 ("The next day. . . .")

(Invention of 3 topic sentences scores 3.

Invention of 1 - 2 topic sentences scores 2.

Invention of 0 topic sentence scores 1.).

Deletion

Unnecessary Detail to be Deleted

1. Then the ship headed for the open sea.

2. He was a very shrewd and bright man.

3. He had already been in the West Indies.

(Deletion of 3 topic sentences scores 3.

Deletion of 1 - 2 topic sentences scores 2.

Deletion of 0 topic sentence scores 1.).

Sociology Passages

Child Labour and the Growth of Unions

Reduction

Lists for Reduction

1. Workshops, factories, and mines.

2. Ill-lit and hot sweaty.

3. Beatings and other forms of punishment.

(Use of 3 superordinates scores 3.

Use of 1 - 2 superordinates scores 2.

Use of 0 superordinate scores 1.).

Selection

Topic Sentences to be Selected

1. Children worked with adults in the workshops, factories, and mines of nineteenth century Canada.

2. Young boys worked in the coal mines of Nova Scotia.

3. The early trade unions fought for an end to child labour.

- (Inclusion of 3 topic sentences scores 3.
Inclusion of 1 - 2 topic sentences scores 2.
Inclusion of 0 topic sentence scores 1.).

Invention

Topic sentences must be invented for

1. Paragraph 2 ("Children in cigar factories. . . .")
2. Paragraph 4 ("In 1889, children of eight working. . . .")
3. Paragraph 6 ("By the turn of the century. . . .").

(Invention of 3 topic sentences scores 3.
Invention of 1 - 2 topic sentences scores 2.
Invention of 0 topic sentence scores 1.).

Deletion

Unnecessary Details to be Selected

1. Some employers hired children as young as eight.
2. The less money an employer paid for workers the more the profit.
3. A child was even beaten for talking to another child while working.
4. Many workers and machines were examined into a small room.
5. Change was slow.
6. They fought for the good of Canadians.

(Deletion of 5 - 6 unnecessary details scores 3.
Deletion of 3 - 4 unnecessary details scores 2.
Deletion of 0 - 2 unnecessary details scores 1.).

The Family

Superordination

Lists for Reduction

1. A mother, a father and children.
(Use of 1 superordinate scores 3.
Use of 0 superordinate scores 1.)

Selection

Topic Sentences to be Selected

1. An Ojibwa family was like a modern one.
2. In the winter months single family groups lived in hunting areas.
3. Family groups united to form communities as soon as the snow began to melt in early spring.
(Inclusion of 3 topic sentences scores 3.
Inclusion of 1 - 2 topic sentences scores 2.
Inclusion of 0 topic sentence scores 1.)

Inventions

Topic Sentences must be Invented for:

1. Paragraph 2 ("The Ojibwa family moved. . . .")
2. Paragraph 5 ("Each Ojibwa belonged. . . .")
3. Paragraph 6 ("It has been said. . . .")

(Invention of 3 topic sentences scores 3.

Invention of 1 - 2 topic sentences scores 2.

Invention of 0 topic sentence scores 1.)

Deletion

Unnecessary Details to be Deleted

1. Nearby, the father's brothers and their families lived in wigwams.
2. They went hunting every year.
3. They used every skill they could muster.
4. They included a few related families.
5. In some cases the bands were made up of many hundreds of people.
6. Clans were common to many Indian groups of North America.

(Deletion of 5 - 6 unnecessary details scores 3.

Deletion of 3 - 4 unnecessary details scores 2.

Deletion of 0 - 2 unnecessary details scores 1.)

A July Day

Superordination

List for Reduction

1. Clear the table, wash the dishes and sweep the kitchen.

(Use of 1 superordinate scores 3.

Use of 0 superordinate scores 1.)

Selection

Topic Sentences to be Selected

1. In the vegetable garden Smith and Stephen are weeding.
2. Nehemiah, now fifteen has been in the blacksmith's shop since dawn.
3. Caleb junior and Samuel are away for the summer.

(Inclusion of 3 topic sentences scores 3.

Inclusion of 1 - 2 topic sentences scores 2.

Inclusion of 0 topic sentence scores 1.)

Invention

Topic sentences must be invented for:

1. Paragraph 1 ("It is a warm 1795. . . .")
2. Paragraph 3 ("Elizabeth is in the. . . .")
3. Paragraph 4 ("Sarah, aged ten. . . .")
4. Paragraph ("The busy day ends. . . .")

(Invention of 4 topic sentences scores 3.

Invention of 2 - 3 topic sentences scores 2.

Invention of 0 topic sentence scores 1.)

Deletion

Unnecessary Details to be Deleted

1. Three more have been born since the move to Elizabethtown.
2. A square addition has been made to the longside.

3. The drown of the bees flying over the small field of the flax adds rhythm to the movement.
4. The flax is growing well.
5. It will give plenty of thread for Martha's spinning and weaving.
6. The boys' arms move slowly in the heat.
7. He likes working inside by the heat of the forge.
8. He does not like to work in the garden, meadow or with horses.
9. The meadow is some distance from the farm.

(Deletion of 7 - 9 unnecessary details scores 3.

Deletion of 4 - 6 unnecessary details scores 2.

Deletion of 0 - 3 unnecessary details scores 1.)

APPENDIX K

Examples of Responses to Interview Questions

Self-Control Training Group

Less Competent Reader

Investigator: What were you doing during this session?

Student: I was summarizing.

Investigator: How do you go about summarizing?

Student: First you read the passage and understand it and then... you star and take out all the important stuff and the lists and the topic sentences. Then you write it on a piece of paper and then you proofread it and if there is any mistake you fix it up and polish it and then you're finished!

Investigator: Why is it important to be able to summarize?

Student: Like if you...you are writing about a book or a passage, instead of writing all the stuff and boring the other person who is reading it you summarize it getting all the important information and main detail and not just have extra stuff. You cannot remember everything anyway!

Instruction: Is that all?

Student: Yep.

Competent Reader

Investigator: What were you doing during this session?

Student: I was summarizing.

Investigator: How do you go about summarizing?

Student: First you read over the passage and understand it. Then...h-m-m...cross out the lists and substitute with one word or as few words as possible and then you write topic sentences...and before you do that you find the theme and star what's important and after you write your topic sentences, you cross out everything that was repeated and then you cross out everything that was not important and then you write the summary with what's left. Then you check it and polish it.

Investigator: Why is it important to be able to summarize?

Student: When you are taking notes you just write down the important things. You can't remember and write everything. You can use it for most things...h-m-m...you can summarize a story or any passage.

Informed Training Group

Less Competent Reader

Investigator: What were you doing during this session?

Student: No response.

Investigator: What were you doing?

Student: No response.

Investigator: What exactly were you doing?

Student: Writing summaries.

Investigator: How do you go about writing a summary?

Student: Well, you cross out...uh...the...unimportant...uh... information with a green pencil and the repeated stuff with the red and you write a summary.

Investigator: Is that all you do?

Student: Yes.

Investigator: Why is it important to know how to write a summary?

Student: It makes it easier on you when you have a long stay or a passage to uh...tell.

Competent Reader

Investigator: What were you doing during this session?

Student: We were learning how to write summaries or how to shorten passages.

Investigator: How do you go about writing summaries?

Student: First you try to get all the important information in it. Then we...then we try and shorten the lists if there are any and we uh...cross out repeated information. If there are no topic sentences in a paragraph we make up a topic sentence.

Investigator: Is that all?

Student: Yep.

Investigator: Why is it important to be able to summarize?

Student: Well, so you can...like say you won't...uh...do a lot of work. Say like you have to copy out something on pages. You just summarize it. It says the same thing so you don't have to do as much work.

Blind Training Group

Less Competent Reader

Investigator: What were you doing during this lesson?

Student: Doing a summary.

Investigator: How do you go about doing a summary?

Student: You cross out stuff that aren't important. You cross out stuff that are repeated.

Investigator: What else?

Student: If there isn't a topic sentence you have to put one or make up your own.

Investigator: Why do you think knowing how to write summaries is important?

Student: If you have a project to do, you can make it shorter and you put them in your own words.

Competent Reader

Investigator: What were you doing?

Student: I was writing a summary.

Investigator: How do you go about writing a summary?

Student: First you take out the unnecessary details and make sure that you have topic sentences and you take out all repeated stuff and you write a summary with what's left and you should also polish it after you are done.

Investigator: Why do you think it is important to know how to write a summary?

Student: ...H-m-m...it's important because...well...I guess...I don't know...because you understand what you are reading and know the specific stuff and all that...I don't know.

APPENDIX L

Rating Scales for Responses to Interview Questions

As indicated in Chapter 3, at the end of the investigation students' metcognitive knowledge was probed through three interview questions which basically asked:

Question 1. What were you doing?

Question 2. How do you do it?

Question 3. Why is it important to be able to do it?

Evaluating Responses

Question 1. What were you doing?

Responses to this question were rated on a 3 point scale - 0 to 2. A highly rated response received 2 points and had to include specific reference to the task of summarizing. Less specific responses ("I was reducing the text", for example) were rated as acceptable and given 1 point while inaccurate responses received no points as outlined below.

- 0 - No awareness. The student did not know, was inaccurate or supplied a response that did not make sense.
- 1 - The response was a non-specific reference to the task. ("I was shortening passages.")
- 2 - The response included a specific reference to the task. ("I was summarizing passages.")

Question 2. How do you do it?

This question was rated on a 4 point scale - 0 to 3. A highly rated response described an appropriate sequence of steps to follow in carrying out the summary writing task. When responses were incomplete or omitted some of the summary writing steps, points were awarded as set out in the following rating guidelines.

- 0 - No awareness.
- 1 - The response was not specific to the process or merely an example that did not illustrate conscious understanding of the process to be used. ("You push all important information together.")
- 2 - The response referred to some of the steps that needed to be followed and suggested some understanding of the processes to be used.
- 3 - The response included a sequence of steps and demonstrated an understanding of the summary writing process.

Question 3. Why is it important to be able to do it?

A 4 point rating scale was employed for this question - 0 to 3. A highly rated response specified both the context in which the task could be useful and what could be done within the context and received 3 points. Less specific responses were rated as described below.

- 0 - No awareness.
- 1 - The response was not specific to the task but was related to reading and/or writing. ("You understand and write better about what you are reading.")

- 2 - The response referred to an appropriate general category but not to the specific use taught ("You write shorter and better about passages or stories.")
- 3 - The response included specific reference to both what the student could do and supplied the context in which summary writing could be used.

APPENDIX M

1. ANOVAS of Pretest, and Immediate and Delayed Posttest Scores on Dependent Measures for Self-Control, Informed and Blind Training Groups.
2. Approximate t-tests of Pretest, and Immediate and Delayed Posttest Scores for Rule Application to Summaries of History Passages.

TABLE M1

Analysis of Variance of Scores on the Gates-MacGinitie Comprehension Subtest

Source of Variation	df	SS	F	P
Treatment Group	2	178.6993	1.85	0.1778
Error	47	2264.0307		

TABLE M2
Analysis of Variance of Pretest Measures

Dependent Measure	Source of Variation	df	SS	F	P
<u>Main Idea</u>					
History Passages	Treatment Group	2	1.1969	6.50	0.0038*
	Competence	1	0.0046	0.05	0.8244
	Treatment x Competence	2	0.0874	0.47	0.6257
	Error	37	3.4080		
	Contrast				
	Informed vs Self-control	1	0.0426	0.46	0.5002
	Informed vs Blind	1	0.9692	10.52	0.0025*
	Self-control vs Blind	1	0.8601	9.34	0.0041*
	Sociology Passages	Treatment Group	2	1.8702	4.96
Competence		1	0.1227	0.65	0.4250
Treatment Group x Competence		2	0.2023	0.54	0.5893
Error		37	6.9776		
Contrast					
Informed vs Self-control		1	1.2038	6.38	0.0159*
Informed vs Blind		1	1.7176	9.11	0.0046*
Self-control vs Blind		1	0.1335	0.71	0.4055
<u>Efficiency</u>					
History Passages	Treatment Group	2	0.0002	0.20	0.8214
	Competence	1	0.0001	0.03	0.8635
	Treatment Group x Competence	2	0.0005	0.51	0.6024
	Error	37	0.01718		
	Sociology Passages	Treatment Group	2	0.0031	2.76
Competence		1	0.0002	0.47	0.4955
Treatment Group x Competence		2	0.0009	0.85	0.4349
Error		37	0.0266		
<u>Summary Rule Application</u>					
Sociology Passages	Treatment Group	2	7.7474	1.31	0.2832
	Competence	1	8.1570	2.75	0.1058
	Treatment x Competence	2	9.9700	0.84	0.4408
	Error	37	109.7902		

*P < 0.05

TABLE M3
Approximate T-tests of Pretest Scores for Rule Application to History Passages

Treatment Group	Competence	N	\bar{x}	SD	Std. Error	Variances	T	DF	P																									
Self-control	Less competent	8	8.00	1.07	0.38	Unequal	-0.3759	15.7	0.7120																									
	Competent	11	8.27	2.05	0.62					Informed	Less competent	6	8.33	1.75	0.71	Unequal	0.6780	7.9	0.5173	Competent	4	7.75	0.95	0.48	Blind	Less competent	4	6.75	0.50	0.25	Unequal	-2.5348	11.8	0.0265*
Informed	Less competent	6	8.33	1.75	0.71	Unequal	0.6780	7.9	0.5173																									
	Competent	4	7.75	0.95	0.48					Blind	Less competent	4	6.75	0.50	0.25	Unequal	-2.5348	11.8	0.0265*	Competent	10	7.90	1.20	0.38										
Blind	Less competent	4	6.75	0.50	0.25	Unequal	-2.5348	11.8	0.0265*																									
	Competent	10	7.90	1.20	0.38																													

*p < 0.05

TABLE M4

Analysis of Variance of Immediate Posttest Measures

Dependent Measure	Source of Variation	df	SS	F	P
<u>Main Idea</u>					
History Passages	Treatment Group	2	8386.6597	18.69	0.0001*
	Competence	1	941.4880	4.20	0.0476
	Treatment Group x Competence	2	224.7936	0.50	0.6099
	Error	37	8299.3066		
	Contrast				
	Informed vs Self-control	1	5945.2788	26.51	0.0001*
	Informed vs Blind	1	7348.6024	32.76	0.0001*
Self-control vs Blind	1	333.3004	1.49	0.2306	
Sociology Passages	Treatment Group	2	3253.2452	3.04	0.0601
	Competence	1	2006.5308	3.75	0.0606
	Treatment x Competence	2	574.1873	0.54	0.5895
	Error	37	19814.8851		
<u>Efficiency</u>					
History Passages	Treatment Group	2	0.0003	0.37	0.6913
	Competence	1	0.0001	0.33	0.5668
	Treatment x Competence	2	0.0007	0.96	0.3910
	Error	37	0.0145		
Sociology Passages	Treatment Group	2	0.0021	2.27	0.1175
	Competence	1	0.0034	7.36	0.0100*
	Treatment x Competence	2	0.0016	1.67	0.2012
	Error	37	0.0176		
<u>Summary Rule Application</u>					
Sociology Passages	Treatment Group	2	9.7620	1.50	0.2361
	Competence	1	15.5459	4.78	0.0352
	Treatment x Competence	2	5.0540	0.78	0.4671
	Error	37	120.3083		

*P < 0.05

TABLE M5
Approximate T-tests of Immediate Posttest Scores for Rule Application to History Passages

Treatment Group	Competence	N	\bar{X}	SD	Std. Error	Variances	T	DF	P
Self-control	Less competent	8	10.00	1.60	0.57	Unequal	-1.2260	12.2	0.2434
	Competent	11	10.82	1.67	0.35				
Informed	Less competent	6	8.33	1.97	0.80	Unequal	-1.8348	7.2	0.1082
	Competent	4	10.50	1.73	0.87				
Blind	Less competent	4	8.50	1.00	0.50	Unequal	-3.6380	8.5	0.0060*
	Competent	10	11.00	1.49	0.47				

*p < 0.05

TABLE M6
Analysis of Variance of Delayed Posttest Measures

Dependent Measure	Source of Variation	df	SS	F	P
<u>Main Idea</u>					
History Passages	Treatment Group	2	3930.3107	9.95	0.0003*
	Competence	1	593.3046	3.00	0.0914
	Treatment x Competence	2	1470.4444	3.72	0.0037*
	Error	37	7308.9981		
	Contrast				
	Informed vs Self-control	1	3415.4784	17.29	0.0002*
	Informed vs Blind	1	2824.6340	14.30	0.0006*
Self-control vs Blind	1	0.0051	0.00	0.9960	
Sociology Passages	Treatment Group	2	9974.6392	6.63	0.0034*
	Competence	1	5686.5927	7.56	0.0092*
	Treatment x Competence	2	1991.1502	1.32	0.2783
	Error	37	27813.6021		
	Contrast				
	Informed vs Self-control	1	8045.7679	10.70	0.0023*
	Informed vs Blind	1	341.4050	0.45	0.5046
Self-control vs Blind	1	5377.0411	7.15	0.0111*	
<u>Efficiency</u>					
History Passages	Treatment Group	2	0.0002	0.39	0.6815
	Competence	1	0.0007	3.06	0.0884
	Treatment x Competence	2	0.0001	0.29	0.7497
	Error	37	0.0145		
Sociology Passages	Treatment Group	2	0.0124	3.80	0.0315*
	Competence	1	0.0032	1.98	0.1676
	Treatment x Competence	2	0.0081	2.49	0.0964
	Error	37	0.0603		
	Contrast				
	Informed vs Self-control	1	0.0084	5.14	0.0293*
	Informed vs Blind	1	0.0002	0.01	0.9217
Self-control vs Blind	1	0.0085	5.21	0.0283*	
<u>Summary Rule Application</u>					
Sociology Passages	Treatment Group	2	70.8282	6.76	0.0032*
	Competence	1	44.3222	8.45	0.0061*
	Treatment x Competence	2	15.8817	1.51	0.2332
	Error	37	193.9674		
Contrast					
Informed vs Self-control	1	44.3931	8.47	0.0061*	
Informed vs Blind	1	0.0178	0.00	0.9539	
Self-control vs Blind	1	51.8318	9.89	0.0033*	

*p < 0.05

TABLE M7
Approximate T-tests of Delayed Posttest Scores for Rule Application to History Passages

Treatment Group	Competence	N	\bar{X}	SD	Std. Error	Variances	T	DF	P																									
Self-control	Less competent	8	9.50	0.93	0.33	Unequal	-3.7623	16.8	0.0016*																									
	Competent	11	11.55	1.44	0.43					Informed	Less competent	6	8.33	2.16	0.88	Unequal	-1.5613	7.6	0.1591	Competent	4	10.25	1.71	0.85	Blind	Less competent	4	9.25	1.26	0.63	Unequal	-1.2889	7.3	0.2368
Informed	Less competent	6	8.33	2.16	0.88	Unequal	-1.5613	7.6	0.1591																									
	Competent	4	10.25	1.71	0.85					Blind	Less competent	4	9.25	1.26	0.63	Unequal	-1.2889	7.3	0.2368	Competent	10	10.30	1.64	0.52										
Blind	Less competent	4	9.25	1.26	0.63	Unequal	-1.2889	7.3	0.2368																									
	Competent	10	10.30	1.64	0.52																													

*p < 0.05

APPENDIX N

**T-tests of Mean Differences Between Test Times for Self-control,
Informed and Blind Training Groups**

TABLE N1
T-tests of Differences Between Pre and Immediate Posttest Means for Main Ideas in History Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Main Idea</u> History Passages	<u>Treatment Group</u>				
	Self-control	10.06	7.3319	1.37	0.1873
	Informed	-16.43	8.6581	-1.90	0.0902
	Blind	- 7.65	3.3642	-2.27	0.0405*
	<u>Competence</u>				
	Less Competent	-10.76	4.4486	-2.42	0.0271*
	Competent	4.53	6.3217	0.72	0.4808
	<u>Treatment Group x Competence</u>				
	Self-control: Less Competent	3.55	8.1778	-0.44	0.6766
	Competent	19.95	10.4797	1.90	0.0861
Informed: Less Competent	-22.74	3.8073	-5.97	0.0019*	
Competent	- 6.98	21.8256	-0.32	0.7700	
Blind: Less Competent	- 7.20	6.7685	-1.06	0.3653	
Competent	- 7.83	4.0946	-1.91	0.0881	

*p 0.05

TABLE N2
 T-tests of Differences Between Pre and Immediate Posttest Means for Main Ideas in Sociology Text
 Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Main Idea</u> Sociology Passages	<u>Treatment Group</u> Self-control	12.89	7.3135	1.76	0.0950
	Informed	21.23	8.8196	2.41	0.0394*
	Blind	- 9.32	7.5974	-1.23	0.2415
	<u>Competence</u> Less Competent	8.64	7.2896	1.19	0.2521
	Competent	6.84	6.5704	1.04	0.3082
	<u>Treatment Group x Competence</u> Self-control: Less Competent	12.96	8.6255	1.50	0.1768
	Competent	12.84	11.3322	1.13	0.2838
	Informed: Less Competent	15.04	13.3249	1.13	0.3102
	Competent	30.51	9.5728	3.19	0.0498*
	Blind: Less Competent	- 9.58	20.5032	-0.47	0.6722
	Competent	- 9.22	7.7891	-1.18	0.2668

*p < 0.05

TABLE N3
 T-tests of Differences Between Immediate Posttest Means for Main Ideas in History and Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Main Idea</u> History and Sociology Passages	<u>Treatment Group</u> Self-control	7.62	4.7407	1.61	0.1255
	Informed	- 2.46	4.8869	-0.50	0.6262
	Blind	23.23	8.2335	2.82	0.0144*
	<u>Competence</u> Less Competent	9.62	6.0139	1.60	0.1282
	Competent	10.89	5.0336	2.16	0.0407*
	<u>Treatment Group x Competence</u> Self-control: Less Competent	5.02	5.7522	0.87	0.4115
	Competent	9.51	7.2285	1.32	0.2177
	Informed: Less Competent	- 4.22	7.2847	-0.58	0.5872
	Competent	0.18	6.5253	0.03	0.9803
	Blind: Less Competent	39.57	15.0454	2.63	0.0783
	Competent	16.69	9.5024	1.76	0.1129

*p < 0.05

TABLE N4
 T-tests of Differences Between Pre and Immediate Posttest Means for Efficiency of History Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Efficiency</u> History Passages	<u>Treatment Group</u>				
	Self-control	0.02	0.0074	2.11	0.0487*
	Informed	0.01	0.0079	1.38	0.1999
	Blind	0.00	0.0072	0.49	0.6297
	<u>Competence</u>				
	Less Competent	0.01	0.0050	1.76	0.0958
	Competent	0.01	0.0068	1.77	0.0895
	<u>Treatment Group x Competence</u>				
	Self-control: Less Competent	0.01	0.0101	0.87	0.4140
	Competent	0.02	0.0107	1.95	0.0802
Informed:	Less Competent	0.01	0.0067	2.00	0.1019
	Competent	0.01	0.0189	0.40	0.7177
	Blind:				
Less Competent	0.00	0.0063	0.40	0.7177	
Competent	0.00	0.0100	0.40	0.6991	

*p < 0.05

TABLE N5
T-tests of Differences Between Pre and Immediate Posttest Means for Efficiency of Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Efficiency</u> Sociology Passages	<u>Treatment Group</u>				
	Self-control	0.02	0.0063	3.52	0.0025*
	Informed	0.04	0.0134	2.92	0.0171*
	Blind	0.00	0.0084	0.51	0.6171
	<u>Competence</u>				
	Less Competent	0.02	0.0086	2.19	0.0428*
Competent	0.02	0.0067	3.18	0.0040*	
<u>Treatment Group x Competence</u>	<u>Treatment Group</u>				
	Self-control: Less Competent	0.03	0.0103	2.54	0.0387*
	Competent	0.02	0.0081	2.34	0.0410*
	Informed: Less Competent	0.02	0.0189	1.15	0.3029
	Competent	0.07	0.0087	7.51	0.0049*
	Blind: Less Competent	0.00	0.01871	0.00	1.0000
Competent	0.01	0.0097	0.62	0.5509	

*p 0.05

TABLE N6
T-tests of Differences Between Immediate Posttest Means for Efficiency of History and Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Efficiency</u> History and Sociology Passages	<u>Treatment Group</u> Self-control	0.01	0.0054	1.26	0.2221
	Informed	0.01	0.0107	0.56	0.5875
	Blind	0.01	0.0077	1.77	0.1005
	<u>Competence</u> Less Competent	0.01	0.0064	2.16	0.0452*
	Competent	0.01	0.0055	0.95	0.3522
	<u>Treatment Group x Competence</u> Self-control: Less Competent	0.00	0.0098	0.38	0.7136
	Competent	0.00	0.0064	1.42	0.1852
	Informed: Less Competent	0.02	0.0131	1.78	0.1345
	Competent	-0.02	0.0071	-2.83	0.0663
	Blind: Less Competent	0.02	0.0071	2.83	0.0663
	Competent	0.01	0.0105	1.05	0.3214

*p 0.05

TABLE N7
T-tests of Differences Between Pre and Immediate Posttest Means for Rule Application to History Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Rule Application</u> History Passages	<u>Treatment Group</u>				
	Self-control	2.32	0.4717	4.91	0.0001*
	Informed	1.10	0.6046	1.82	0.1022
	Blind	2.71	0.4117	6.59	0.0001*
	<u>Competence</u>				
	Less Competent	1.28	0.4339	2.94	0.0091*
	Competent	2.80	0.3511	7.97	0.0001*
	<u>Treatment Group x Competence</u>				
	Self-control: Less Competent	2.00	0.7559	2.65	0.0331*
	Competent	2.55	0.6232	4.08	0.0022*
	Informed: Less Competent	0.00	0.5164	0.00	1.0000
	Competent	2.75	0.7500	3.67	0.0351*
	Blind: Less Competent	1.75	0.4787	3.66	0.0354*
	Competent	3.10	0.5044	6.15	0.0002*

*p < 0.05

TABLE N8
T-tests of Differences Between Pre and Immediate Posttest Means for Rule Application to Sociology Text
Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Rule Application</u>	<u>Treatment Group</u>				
Sociology Passages	Self-control	2.16	0.5422	3.98	0.0009*
	Informed	2.20	0.6799	3.24	0.0102*
	Blind	2.00	0.5645	3.54	0.0036*
	<u>Competence</u>				
	Less Competent	2.11	0.3951	5.34	0.0001*
	Competent	2.12	0.5044	4.20	0.0003*
	<u>Treatment Group x Competence</u>				
	Self-control: Less Competent	2.75	0.4909	5.60	0.0008*
	Competent	1.73	0.8644	2.00	0.0736
	Informed: Less Competent	1.50	0.8851	1.69	0.1509
	Competent	3.25	0.9465	3.43	0.0414*
	Blind: Less Competent	1.75	0.6292	2.78	0.0689
	Competent	2.10	0.7667	2.74	0.0229*

*p < 0.05

TABLE N9

T-tests of Differences Between Immediate Posttest Means for Rule Application to History and Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Rule Application</u>	<u>Treatment Group</u>				
History and	Self-control	0.63	0.3522	1.79	0.0897
Sociology Passages	Informed	0.40	0.1633	2.45	0.0368*
	Blind	1.14	0.3759	3.04	0.0095*
	<u>Competence</u>				
	Less Competent	0.39	0.2930	1.33	0.2020
	Competent	1.00	0.2708	3.69	0.0012*
	<u>Treatment Group x Competence</u>				
	Self-control: Less Competent	0.38	0.5324	0.70	0.5040
	Competent	0.82	0.4828	1.69	0.1210
	Informed: Less Competent	0.17	0.1667	1.00	0.3632
	Competent	0.75	0.2500	3.00	0.0577
	Blind: Less Competent	0.75	0.8539	0.88	0.4444
	Competent	1.30	0.4229	3.07	0.0133*

*p 0.05

TABLE N10
 T-tests of Differences Between Immediate and Delayed Posttest Means for Main Ideas in History Text
 Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Main Idea</u> History Passages	<u>Treatment Group</u>				
	Self-control	- 6.49	4.0775	-1.59	0.1285
	Informed	0.21	7.1874	0.03	0.9771
	Blind	-16.09	3.6379	-4.42	0.0007*
	<u>Competence</u>				
	Less Competent	- 5.09	3.3549	-1.17	0.2579
	Competent	-10.19	3.7197	-2.74	0.0114*
	<u>Treatment Group x Competence</u>				
	Self-control: Less Competent	- 5.93	6.3258	-0.94	0.3800
	Competent	- 6.91	5.5927	-1.24	0.2447
	Informed: Less Competent	- 2.95	10.5966	-0.28	0.7919
	Competent	4.96	9.7058	0.51	0.6449
	Blind: Less Competent	- 6.67	3.5485	-1.88	0.1570
	Competent	-19.85	4.4230	-4.49	0.0015*

*p < 0.05

TABLE N11
T-tests of Differences Between Immediate and Delayed Posttest Means for Main Ideas in Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Main Idea</u> Sociology Passages	<u>Treatment Group</u> Self-control	- 0.03	5.7372	-0.01	0.9953
	Informed	-15.26	7.8378	-1.95	0.0834
	Blind	-11.32	5.1501	-2.20	0.0467*
	<u>Competence</u> Less Competent	-14.32	6.2794	-2.28	0.0358*
	Competent	- 2.16	4.0541	-0.53	0.5997
	<u>Treatment Group x Competence</u> Self-control: Less Competent	-10.39	10.7829	-0.96	0.3675
	Competent	7.49	5.4480	1.38	0.1989
	Informed: Less Competent	-13.31	11.2080	-1.19	0.2884
	Competent	-18.18	11.9136	-1.53	0.2244
	Blind: Less Competent	-23.70	10.4251	-2.27	0.1076
	Competent	- 6.36	5.4409	-1.17	0.2722

*p < 0.05

TABLE N12
T-tests of Differences Between Delayed Posttest Means for Main Ideas in History and Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Main Idea</u> History and Sociology Passages	<u>Treatment Group</u> Self-control	1.56	4.4475	0.26	0.7976
	Informed	13.01	10.5964	1.23	0.2508
	Blind	18.46	11.3066	1.63	0.1265
	<u>Competence</u> Less Competent	18.84	7.5793	2.49	0.0236*
	Competent	2.86	6.1175	0.47	0.6449
	<u>Treatment Group x Competence</u> Self-control: Less Competent	9.48	7.3901	1.28	0.2402
	Competent	- 4.89	4.9985	-0.98	0.3502
	Informed: Less Competent	6.14	12.7194	0.48	0.6499
	Competent	23.31	19.4595	1.20	0.3170
	Blind: Less Competent	56.60	13.8279	4.09	0.0264*
	Competent	3.20	11.9376	0.27	0.7946

*p 0.05

TABLE N13
 T-tests of Differences Between Immediate and Delayed Posttest Means for Efficiency of History Text
 Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Efficiency</u> History Passages	<u>Treatment Group</u>				
	Self-control	-0.00	0.0049	-0.54	0.5969
	Informed	-0.01	0.0099	-0.71	0.4972
	Blind	-0.00	0.0055	-0.26	0.8003
	<u>Competence</u>				
	Less Competent	-0.01	0.0059	-0.93	0.3638
	Competent	-0.00	0.0044	-0.36	0.7207
<u>Treatment Group x Competence</u>	<u>Treatment Group: Less Competent</u>	0.00	0.0096	-0.26	0.8018
	Competent	-0.00	0.0052	-0.52	0.6139
	<u>Informed: Less Competent</u>	-0.02	0.0102	-0.63	0.1639
	Competent	-0.01	0.0189	-1.40	0.7177
	<u>Blind: Less Competent</u>	0.01	0.0104	0.48	0.6638
	Competent	-0.00	10.0067	-0.60	0.5652

TABLE N14
T-tests of Differences Between Immediate and Delayed Posttest Means for Efficiency of Sociology Text
Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Efficiency</u> Sociology Passages	<u>Treatment Group</u>				
	Self-control	0.01	0.0077	1.70	0.1057
	Informed	-0.02	0.0168	-1.25	0.2419
	Blind	0.00	0.0131	0.22	0.8309
	<u>Competence</u>				
	Less Competent	0.00	0.0106	-0.05	0.9589
	Competent	0.00	0.0091	0.39	0.6967
<u>Treatment Group x Competence</u>	<u>Treatment Group: Less Competent</u>				
	Self-control: Less Competent	0.02	0.0128	1.27	0.2451
	Competent	0.01	0.0100	1.09	0.3028
	<u>Informed: Less Competent</u>				
	Competent	0.01	0.0243	-0.27	0.7949
	Less Competent	-0.04	0.0193	-2.20	0.1151
<u>Blind: Less Competent</u>	Less Competent	-0.03	0.0150	-1.67	0.1942
	Competent	0.01	0.0164	0.85	0.4157

TABLE N15
T-tests of Differences Between Delayed Posttest Means for Efficiency of History and Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Efficiency</u> History and Sociology Passages	<u>Treatment Group</u> Self-control	-0.01	0.0079	-1.14	0.2705
	Informed	0.02	0.0166	1.20	0.2590
	Blind	0.01	0.0128	0.73	0.4801
	<u>Competence</u> Less Competent	0.01	0.0119	0.74	0.4675
	Competent	-0.00	0.0078	-0.00	1.0000
	<u>Treatment Group x Competence</u> Self-control: Less Competent	-0.02	0.0140	-1.07	0.3200
	Competent	-0.00	0.0094	-0.48	0.6383
	Informed: Less Competent	0.01	0.0258	0.52	0.6270
	Competent	0.03	0.0187	1.60	0.2071
	Blind: Less Competent	0.05	0.0108	4.63	0.0190*
	Competent	-0.01	0.0145	-0.48	0.6416

*p < 0.05

TABLE N16
 T-tests of Differences Between Immediate and Delayed Posttest Means for Rule Application to History
 Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Rule Application</u>	<u>Treatment Group</u>				
History Passages	Self-control	0.21	0.4497	0.47	0.6453
	Informed	-0.10	0.5259	-0.19	0.8534
	Blind	-0.29	0.3841	-0.74	0.7402
	<u>Competence</u>				
	Less Competent	-0.06	0.4677	-0.12	0.9068
	Competent	0.00	0.3055	0.00	1.0000
	<u>Treatment Group x Competence</u>				
	Self-control: Less Competent	-0.50	0.8660	-0.58	0.5818
	Competent	0.73	0.4283	1.70	0.1204
	Informed: Less Competent	0.00	0.6324	0.00	1.0000
	Competent	-0.25	1.0308	-0.24	0.8240
	Blind: Less Competent	0.75	0.8539	0.88	0.4444
	Competent	0.70	0.3667	-1.91	0.0886

TABLE N17
T-tests of Differences Between Immediate and Delayed Posttest Means for Rule Application to Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Rule Application</u> Sociology Passages	<u>Treatment Group</u> Self-control	0.74	0.4315	1.71	0.1049
	Informed	-1.10	0.7289	-1.52	0.1619
	Blind	-0.50	0.4417	-1.13	0.2780
	<u>Competence</u> Less Competent	-0.67	0.4714	-1.41	0.1754
	Competent	0.32	0.3946	0.81	0.4254
	<u>Treatment Group x Competence</u> Self-control: Less Competent	0.25	0.6478	0.39	0.7110
	Competent	1.09	0.5793	1.88	0.0890
	Informed: Less Competent	-1.00	0.8165	-1.22	0.2752
	Competent	-1.25	1.4930	-0.84	0.4639
	Blind: Less Competent	-2.00	0.9129	-2.19	0.1162
	Competent	0.10	0.3786	0.26	0.7976

TABLE N18
 T-tests of Differences Between Delayed Posttest Means for Rule Application to History and Sociology Text Summaries

Dependent Measure	Source	Mean Difference	STD Error	T	P
<u>Rule Application</u> History and Sociology Passages	<u>Treatment Group</u> Self-control	0.11	0.4769	0.22	0.8278
	Informed	1.40	0.6699	2.09	0.0662
	Blind	1.36	0.5893	2.30	0.0385*
	<u>Competence</u> Less Competent	1.00	0.5941	1.68	0.1106
	Competent	0.68	0.3861	1.76	0.0909
	<u>Treatment Group x Competence</u> Self-control: Less Competent	-0.37	0.8224	-0.46	0.6622
	Competent	0.45	0.5778	0.79	0.4497
	Informed: Less Competent	1.17	0.9804	1.19	0.2875
	Competent	1.75	0.9465	1.85	0.1616
	Blind: Less Competent	3.50	0.2887	12.12	0.0012*
	Competent	0.50	0.6368	0.79	0.4525

*p < 0.05

APPENDIX O

ANOVA of Ratings for Metacognitive Knowledge

Dependent Measure	Source of Variation	df	ss	F	P
Metacognitive Knowledge	Treatment Group	2	10.1333	12.67	0.0011*
	ERROR	12			
	Contrast				
	Informed vs Self-control	1	3.6000	9.00	0.0111*
	Informed vs Blind	1	1.6000	4.00	0.0687
Self-control vs Blind	1	10.000	25.00	0.0003*	

*p 0.05