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THE UNIVERSITY OF ALBERTA

AN INVESTIGATION OF QUESTION LEVEL, RESPONSE LEVEL, AND LAPSE TIME INTERVAL IN READING INSTRUCTION

BY

© ALAN DON SHAPIRO

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "AN INVESTIGATION OF QUESTION LEVEL, RESPONSE LEVEL, AND LAPSE TIME INTERVAL IN READING INSTRUCTION" submitted by Alan Don Shapiro in partial fulfillment of the requirements for the degree of Master of Education.

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Supervisor

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.....

Date 15 December, 1978

DEDICATION

To Sharon, Linnea and Marc

and to my

Loving Parents

ABSTRACT

Questioning has long been recognized as an essential teaching tool useful for stimulating and guiding thought. Questioning is so much a part of teaching that Aschner (1961) called the teacher a "professional question maker" and claimed that the asking of questions is "one of the basic ways by which the teacher stimulates student thinking and learning." However, research indicates that teachers tend to dominate questioning activity, and that questions tend to be structured at the lowest cognitive levels, with emphasis on literal recall of factual information. This study sought to investigate the cognitive nature of students' verbal responses as a function of teachers' verbal questioning and lapse time interval during reading instruction.

The sample consisted of 10 grade-six students identified as being high in reading comprehension on the basis of performance on the vocabulary and reading comprehension subtests found in The Canadian Tests of Basic Skills, Form 3 (1974), Level 11. The ages of the 7 girls and 3 boys were in the 11-12 year range.

Individually, each student in the research sample read two stories which had been previously selected as having the potential for formulation of higher order questions. The students read the two stories, and each reading was followed by a question-answer period, i.e. fifteen reading comprehen-

sion questions were asked based on the three levels of cognition identified by Smith (1963); 5 questions formulated at the interpretation level, 5 questions formulated at the interpretation level, and 5 questions formulated at the critical level. Therefore, 30 questions were asked each student on the basis of their reading. All 300 question-response dyads were tape-recorded and then transcribed into typed protocols for further analysis.

On the basis of Smith's (1963) reading levels responses were categorized as being in one of the three levels of reading comprehension. Lapse time intervals were determined by recording the amount of time that elapsed between the completion of the investigator's question and the beginning of the student's response. The lapse time interval means were calculated for each of the three levels of reading comprehension. A one-way analysis of variance with repeated measures was utilized for testing differences in lapse time between the three reading levels. In addition, the relationship between question level and response level was determined using the chi-square statistic.

Findings of the analysis revealed that:

(1) respectively greater amounts of time were required to respond to questions of reading comprehension formulated at the literal level, interpretation level, and critical level.

(2) a definite hierarchical lapse time interval pattern

was established with respect to question level and response, but was not significant between interpretation and critical level questions.

(3) a definite relationship exists between questions and responses at the three levels of reading comprehension; literal, interpretation, and critical.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

OVERVIEW OF THE STUDY

Introduction and Statement of the Problem

> "There is a distinction between inquiry and inquisition. Inquisition is something teachers do to students, inquiry is something that students and teachers may do together." (Mary Budd Rowe, 1973).
>
> "What's in a question, you ask? Everything. It is the way of evoking stimulating response or stultifying inquiry. It is in essence, the very core of teaching." (John Dewey, 1933).

Certainly a primary objective of education in general, and of reading and reading instruction specifically, should be one of guiding and maximizing the learner's cognitive potential. The popular phrase, "teach the children how to think, not what to think", summarizes an emphasis that many skilled and sensitive teachers place upon providing reading situations in which student comprehension of printed material reflects not only an understanding of literal factual content, but further, an acquisition of meaning which reflects an activation of interpretive and critical reading abilities. This "teaching for thinking" has resulted in an increased awareness concerning a "higher-level cognition" that may be stimulated by instruction which is alert to varying levels of reading comprehension, as well as to teaching strategies and methodologies which consciously fosters higher level thinking and understanding.

Harris and Smith (1972) define critical reading as the "... level of comprehension at which the reader must analyze, synthesize, and evaluate the quality, value, accuracy, and truthfulness of what he reads." To operate at this level the reader must be able to make critical judgments about the information his lower order thought processes gather for him. In effect, at this level he is reading 'beyond the lines'. But, regardless of the level of understanding, definite thinking processes are involved.

If indeed "reading is a thinking process" (Stauffer, 1969), and if "comprehension is the very heart of the reading act" (Smith, 1969), then a principle concern during the teaching-learning interaction is a cultivation towards maximum cognitive potential. Comprehension, then, becomes more than an ability to regurgitate partially digested factual information, but rather a capacity to efficiently use printed information by engaging in cognition which necessitates understanding of relationships among facts, an ability to apply acquired knowledge to new situations, (which may require original and creative thinking), and to analyze, synthesize, and evaluate the reading material.

Muise (1976) states that "teachers must first establish definite assumptions about the thinking process" in order that students may develop thinking abilities beyond the literal content comprehension level. These assumptions can then provide a structure from which specific strategies and

methodologies may be formulated. Sanders (1966) and Bloom (1956) view the thinking process as both sequential and cumulative, i.e., each level of thinking, from the lowest level of memory and translation to the higher levels of application, analysis, synthesis and evaluation, have unique elements but "also includes some form of all lower categories" (Sanders, 1966). Therefore, as a student engages in evaluative thinking, attention is also given to all lower levels of thought. It is the lower level thought processes which provide a knowledge base from which the student may extend his understanding of printed material.

In addition to being sequential and cumulative in nature, the thinking process can be taught and learned (Taba, 1966), but specific strategies or methodologies must be employed such that the cognitive potential of the learner is achieved. Because "reading is a thinking process" (Stauffer, 1969), formal reading instruction, which constitutes a major portion of academic instruction in the elementary school, may be a prime setting for uniting effective teaching methodology with learning opportunity. This opportunity for learning may imply that the thinking stimulated, be of a critical as well as of a literal nature. However, several investigators, (Guszak, 1967; Bartolome, 1969; Stevens, 1912) have reported that teachers, in general, do not require critical, analytical, and evaluative thinking of their students.

Irrespective of the quite fundamentally different objec-

tives and actual instructional strategies, the most frequently used teaching tool is the question (Sanders, 1966; Bellack, 1966; Stevens, 1912). Aschner (1961) called the teacher "a professional question maker" and stated that the asking of questions is "one of the basic ways by which the teacher stimulates student thinking and learning."

It is generally agreed that teachers should emphasize the development of critical thinking rather than merely learning and recalling facts (Aschner, 1961; Hunkins, 1966), yet more than a half-century of research indicates that teacher's questions, both written and verbal, have been structured to elicit memorized facts (Stevens 1912; Davis, 1967; Guszak, 1967; Godbold; 1970). Questions have been little more than testing devices causing the student to function as a "data bank computer" who, like such a machine, is unable to critically appraise the data received. Further, the teacher who consistently asks exclusively fact-finding memory level questions, transforms the teaching-learning interaction into something not unlike the mindless television quiz show. DeGarno (1902) points out that:

> "To question well is to teach well. In the skillfull use of the question more than anything else lies the fine art of teaching; for in it we have the guide to clear and vivid ideas, and the quick spur to the imagination, the stimulus to thought, the incentive to action."

Moreover, Stevens (1912) states that it is "... the mechanical teacher who seeks in his questioning merely to drive home a certain assortment of facts gleaned from the perusal

of the text-book lesson." This conclusion is particularly depressing when considering the widely held objective for reading instruction is one of fostering critical thinking which involves higher-level cognitive operations.

It is this acquisition of facts which appears to be the major cognitive objective when teachers question students. Stevens (1912) found that for a sample of high-school classes varying in grade level and subject area, two-thirds of the teachers' questions demanded explicit recall of factual text-book information. Cory (1940) observed all questions asked by teachers in a one-week period in a laboratory high-school. He classified 71% of the questions as necessitating memory for facts, and only 29% as those requiring higher-level thinking skills. In studies conducted at an elementary school level, Guszak (1967) investigated twelve classes (grades two, four and six) and found that, during reading instruction, 70% of the questions required recall of facts. This type of questioning, he suggests, "actually leads the students away from a basic understanding of story plots, events and sequences" (Guszak, 1967). Bartolome (1969) studied questioning practices in twelve Canadian primary reading classes. It was established that although teachers thought they were teaching for comprehension and critical thinking, their questions were essentially structured at the lowest cognitive level as defined by Sanders (1966): that of recalling or recognizing facts. It would appear, then, that questions requiring only

factual recall are emphasized in many elementary and secondary schools. This led Gall (1970) to conclude that:

> "... in a half-century there has been no essential change in the types of questions which teachers emphasize in the classroom. About 60% of teacher's questions require students to recall facts; about 20% require students to think; and the remaining are procedural."

Contrasting the evidence concerning actual questioning practices, some researchers have found that the kinds of questions teachers ask define the level and nature of cognitive operation. Guszak (1967) states that a teacher who limits questions to the factual level is limiting the students' development to that level. Sanders (1966), in a discussion of his Taxonomy of Questions, suggests that not only the nature of the question must be considered in terms of its classification in the Taxonomy, but that "a certain kind of question leads to a certain kind of thinking." Taba (1964) posits that teacher questioning is critical in the process of thought development, and suggests that the "teacher's way of asking questions is by far the most influential teaching act."

Heuristic questioning, then, becomes an important element in the teaching-learning interaction, as it may well be a catalyst which stimulates and determines the level of cognition. However, it may be as equally crucial that teachers learn how and when to remain silent during the question-answer recitation. Because students vary in the speed with which they respond to questions, and in the degree to which

they formulate clear responses, teachers are advised to pause after posing a question (Carin and Sund, 1971; Rowe, 1969; Lancelot, 1929). As Lancelot (1929) states, "... there must be a pause while the pupils think. How long this pause should be depends upon the difficulty of the thinking that is required."

Rowe (1973) reports her work with teachers in inservice training courses in science education, and suggests the beneficial effects of pausing after asking a question. She states that if approximately five seconds are allowed to elapse before a student is asked to respond to a question, several significant results appear: (1) the length of student response increases, (2) the number of unsolicited but appropriate responses by students increases, (3) "I don't know" and failure to respond decreases, (4) the evidence of speculative thinking increases, (5) more evidence followed by or preceeded by inferential statements occurs, (6) the number of questions asked by students increases, and (7) contributions by "slow children" increased.

It appears, then, that not only should questions be formulated to stimulate higher-order thinking, but that a 'think time' following the question may facilitate maximum cognitive operation.

PURPOSE OF THE STUDY

The major purpose of the present study was to investigate the cognitive nature of students' verbal responses as a

function of teachers' verbal questioning and lapse time interval during reading instruction.

DEFINITIONS OF TERMS

Certain terms having meaning specific to the purposes of this study are defined as follows:

Lapse Time Interval

Refers to the interim period from the completion of a teachers' utterance in posing a question, to the beginning of an oral response by a student.

Question

Refers to any interrogative verbal action which has as its purpose the solicitation of a response.

Higher Level Questions

Refers to any query which necessitates cognition above, and is classified above, the literal level of reading comprehension as indicated by Smith (1963), i.e. the interpretation level and the critical level.

Lower Level Questions

Refers to any query which necessitates cognition at, and is classified exclusively at the literal level of reading comprehension as indicated by Smith (1963).

Higher Level Responses

Refers to answers which may be classified above the literal level of reading comprehension as indicated by Smith

(1963), i.e. the interpretation level and the critical level.

Lower Level Responses

Refers to answers which may be classified exclusively at the literal level of reading comprehension as indicated by Smith (1963).

Response Category

Refers to any of the three levels of reading comprehension: the literal level, the interpretation level, or the critical level, as indicated by Smith (1963).

High Reading Comprehenders

Refers to those students whose grade-equivalent score is no lower than 8.0 on the vocabulary and reading comprehension subtests found in the 1974 edition of the Canadian Tests of Basic Skills, Form 3, Level 11.

Readability

The relative difficulty of a reading passage as determined by the Dale-Chall Formula for Predicting Readability.

HYPOTHESES

On the basis of prior studies (reviewed in Chapter Two), the following research hypotheses guided the study. To facilitate statistical analysis, null hypotheses were formulated and tested.

Hypothesis 1.0

There is no significant difference in the mean lapse

time required to respond to questions of reading comprehension at the:

1.1 literal level

1.2 interpretation level

1.3 the ctitical level

Hypothesis 2.0

There is no significant relationship between questions and responses of reading comprehension at the:

2.1 literal level

2.2 interpretation level

2.3 critical level

ASSUMPTIONS

The following assumptions are noted as being pertinent to the investigation:

(1) That all ten pupils who participated in the investigation were correctly classified as high reading comprehenders on the basis of the testing instrument.

(2) That thinking is a sequential and cumulative process that can be developed by means of specific questioning methodology.

(3) That the responses of students were correctly classified as being one of the three levels of cognition as identified by Smith (1963).

(4) That the categorization of student responses exactly

reflected student thinking.

(5) That lapse time intervals were accurately recorded.

LIMITATIONS OF THE STUDY

The following limitations should be considered when reviewing the study.

(1) Variation in the Canadian Tests of Basic Skills scores may be due to test administration differences by the classroom teachers involved.

(2) Although all students in the sample were classified as high reading comprehenders, some were more verbal than others as well as demonstrating greater facility in language use. Therefore, the investigation must be considered in terms of the degree to which verbalization is a correlate of thinking processes. Further, student comprehension of reading passages may have transcended individual capabilities in verbal expression.

(3) Although the researcher attempted to provide a non-threatening and comfortable atmosphere, the one-to-one situation may have caused some student tension, thus affecting the question-response interaction.

SIGNIFICANCE OF THE STUDY

Although there has been a half-century of research emphasizing the use and disuse of the question as a tool for developing thinking processes (Stevens, 1912; Lancelot, 1929;

McCullough, 1957; Aschner, 1961; Gall, 1970; Rowe, 1973), there is little quantifiable data which establishes relationships among (1) the cognitive levels of teachers' questions, (2) the cognitive levels of students' responses, and (3) the lapse time interval. It is felt that these research findings may disclose important information as to the nature of the question answer episode, as well as question use for stimulation of higher-level thought during more formal reading instruction.

The study may have implications for future teachers, teacher educators, and those involved with the creation of contemporary reading curricula, such that readers at all academic levels be required to comprehend information beyond the level of recall and memory.

ORGANIZATION OF THE RESEARCH REPORT

The investigation is reported in accordance with the following plan.

Chapter I has provided an overview of the study, stated its purpose, defined the terms used, presented the research hypotheses, assumptions, limitations, and stated the significance of the study.

Chapter II reviews the literature and empirical research pertinent to the present investigation.

Chapter III explains the experimental design of the study.

Chapter IV contains the analysis of the data and the results.

The final chapter, Chapter V, presents the major findings, summary, conclusions, implications, and suggestions for further research.

CHAPTER II

REVIEW OF THE LITERATURE

Research for more than a half a century indicates that as much as one-third of all classroom discourse consists of questions (Hyman 1970). Additionally, end-of-the-chapter questions, questions included in workbooks, test and examination questions are included in "the teacher's interrogative arsenal' (Wease, 1976). Questioning is so much a part of the teaching act that Gall (1970) viewed the teacher as a 'professional question maker'.

Since this present study is concerned with the question-answer episode as a determiner of cognitive operation, this chapter will provide a review of research and literature focusing on (1) question usage in teaching, (2) question classification systems relevant for this study, (3) types of questions asked, (4) the relationship of question level and response level, (5) the effects of rapid questioning practices and, (6) increasing the lapse time intervals.

QUESTION USAGE IN TEACHING

Questioning has long been recognized as an essential teaching tool useful for stimulating and guiding thought. As Wease (1976) points out, "It is perhaps the most familiar

feature of such venerable methods as the Socratic and catechetical patterns of teaching." It is also an inherent part of the problem-solving method of teaching because, according to problem-solving methodology, an unanswered question is always necessary to initiate inquiry and investigation. Results of interaction analysis indicate that teacher's talk dominates the verbal out-put in the classroom and that teacher's questions constitute a large portion of this verbal out-put (Flanders, 1970). As pointed out by Hyman (1970), "Anyone who has been in a classroom for at least five minutes is fully aware that the asking of questions constitutes a lion's share of the verbal behavior there." Teacher questioning, therefore, is an important determinant not only of the content to be learned, but also of the nature and quality of learning that exists in the classroom. Questioning is so much a part of teaching that Aschner (1961) called the teacher "a professional question maker" and claimed that the asking of questions is "one of the basic ways by which the teacher stimulates student thinking and learning." Although questioning may well be "the genesis of teaching and learning" (Wease, 1976), studies indicate that teachers tend to dominate questioning activity, and that questions tend to be structured at the lowest cognitive levels, with emphasis on literal recall of factual information.

A half-century ago Stevens (1912) found that an estimated four-fifths of classroom time was occupied with ques-

tion-and-answer recitations. By observing a sample of high-school teachers she found that a mean number of 395 questions were asked per day. High frequencies of question use by teachers were also reported by Floyd (1960). In an analysis of the oral questioning activity in selected Colorado primary classrooms, he found that nine teachers asked more than 240 questions during the hour-long visitations. During the ten all-day visitations it was found that an average of 348 questions were asked daily. This high frequency of questioning activity was verified by Gall (1970) in an attempt to define the state of research knowledge in the area of teacher questioning behavior. He reports that Moyer (1965) found that twelve elementary school teachers asked an average of 180 questions each in a science lesson. Further, Schrieber (1970) found that 14 fifth-grade teachers asked an average of 64 questions each in a 30 minute social studies lesson.

Judging from the high frequency of questioning activity, it would appear that question-answer interaction provides a basic teaching-learning activity in elementary and secondary classrooms. Although educators may agree that teachers should emphasize the development of critical thinking in their students, research indicates that teacher questioning practices require little more than recalling facts (Stevens, 1912; Davis, 1967; Guszak, 1967; Godbold, 1970). As Stevens, (1912) states, it is "... the mechanical teacher who seeks

in his questioning merely to drive home a certain assortment of facts gleaned from the perusal of the text-book lesson." This conclusion is particularly depressing when considering the widely held objective for reading instruction as one of fostering critical thinking which involves higher-level cognitive operation. Nevertheless, it is this aquisition of facts which appears to be the major cognitive objective when teachers question students.

QUESTION CLASSIFICATION SYSTEMS

Bloom's Taxonomy of Educational Objectives (Bloom, et al., 1956) was developed "to be a classification of student behaviors which represent the intended outcomes of the educational process," (Bloom, 1956, p. 12). Because the Taxonomy categorizes thinking behaviors into six distinct levels: knowledge, comprehension, application, analysis, synthesis and evaluation, teachers are provided with a system with which to perceive, and be sensitive to, the various cognitive behaviors which underly particular teaching objectives. It has become an invaluable device by which cognitive process might be measured and has become the basis for the production of systems used by educators for the classification of teacher questions and subsequent student responses.

Sanders' Taxonomy of Questions

The basic concepts which underly Sanders' (1966) study

of questions, and his resulting Taxonomy of Questions, reflect the use of Bloom's Taxonomy of Educational Objectives (Bloom, et al., 1956). Sanders (1966) speaks of Bloom's Taxonomy:

> "Their purpose was to develop a system that could be used to classify any educational objective and thereby provide a useful pattern in a hopelessly confused area in educational thinking.... Within (the) cognitive domain, they defined a number of categories of thinking that encompassed all intellectual objectives in education and named them... One of the ways they defined each category was by using examples of questions that required students to engage in the specific kind of thinking" (Sanders, 1966, pp. 2-3).

This becomes the point at which the Taxonomy of Educational Objectives (Bloom, et al., 1956) is extended by Sanders (1966) beyond a system for categorizing intellectual objectives, to a system for the formulation and classification of questions leading to specific intellectual objectives. In his excellent book, Classroom Questions, What Kinds? (Sanders, 1966), guidelines are provided for educators interested in writing questions which are specific to each level of thinking in the Taxonomy of Questions. The Knowledge category of Bloom's Taxonomy is replaced with the term Memory, and further condenses Bloom's Comprehension category into two distinct categories, that of Translation and Interpretation. Having modified Bloom's Taxonomy, Sanders establishes seven categories: Memory, Translation, Interpretation, Application, Analysis, Synthesis, and Evaluation. More complete definitions of the categories in Sanders' Tax-

onomy of Questions are presented in the following section.

Sanders' Question Categories

1. Memory: requires the ability to recognize or recall information. Sanders (1966) states, "A question is framed in such a way that if the student remembers information presented to him he will know it applies to the question. The student is not asked to compare or relate or make any deductive or inductive leap on his own" (Sanders, 1966, p. 19).

2. Translation: requires the ability to change ideas in a communication into parallel forms. To explicate, Sanders provides an example. "When a student answers a question by parroting the words of the text, the teacher asks for translation: 'Now answer the question in your own words.' In effect, this means: Translate the ideas from one communication (the textbook) to another (the student's own language)" (Sanders, 1966, p. 34). Translation thinking, then, is quite literal, and such a question does not demand the discovery of relationships or deeper meaning.

3. Interpretation: In answering a question formulated at the interpretation level, the student must relate facts, generalizations, definitions, values, and skills. Sanders defines the term relate as meaning "to discover or use a relationship between two or more ideas." He states further that "interpretation questions are difficult to define, because there are many kinds of thinking in the category and

because all higher levels of thinking are refinements or special emphases of intellectual processes found in embryonic form in interpretation." This led Sanders to identify six forms of relationships within the interpretation category.

(a) Comparative relationship (determining if ideas are identical, similar, different, unrelated, or contradictory).

(b) Relationship of Implication.

(c) Relationship of an inductive generalization to support evidence.

(d) Relationship of a value, skill, or definition to an example of its use.

(e) Numerical relationship.

(f) Cause and effect relationship.

4. Application: Questions which stimulates application to present problems approximating the form and context in which they would be encountered in life ... [The application question] is "designed to give students practice in the transfer of training" (Sanders, 1966, p. 75). These questions deal with (1) "knowledge which has explanatory or problem-solving power ... that is transferable to many new situations, (2) the whole of ideas and skills rather than soley with the parts, and (3) a minimum of directions or instructions, because the questions are based on previous learning... and give practice in independent use of knowledge and skills" (Sanders, 1966, p. 76).

5. Analysis: "The distinctive feature of the analysis category is that it requires solutions of problems in the light of conscious knowledge of the parts and processes of reasoning. In interpretation and application, the emphasis is on using subject matter to arrive at conclusions but without special attention by the student as to how it is done" (Sanders, 1966, p. 98).

6. Synthesis: encourages students to engage in original and creative thinking. Questions formulated at this level in the Taxonomy allow students more liberty in seeking solutions and, allow him to draw from his own life-world experiences. As Sanders (1966, p. 127) states, "He must understand that the teacher does not have in mind a definite answer which he is expected to duplicate."

7. Evaluation: requires students to make a judgment of good or bad, right or wrong, according to personally designated standards and to determine how closely the idea or object meets these standards or values.

Smith's Reading Levels

Smith's Levels of Reading Comprehension are, in essence, a modification of Sanders' (1966) Taxonomy of Questions, and was used as the basis for formulating questions and classifying responses in this investigation. Table 1 presents Smith's (1963) translation of Sanders (1966) taxonomy into three levels of reading comprehension: (1) the literal level,

Table 1

Comparison of Sanders' Taxonomy and Smith's Levels of Reading Comprehension

Sanders' Cognitive Levels	Smith's Levels of Reading Comprehension
1. Memory: recalling or recognizing information.	1. Literal
2. Translation: changing information into a different form or language.	
3. Intrepretation: discovering relationships among facts, generalizations, definitions, values, and skills.	2. Interpretation
4. Application: solving a lifelike problem that requires the identification of the issue and the selection and use of appropriate generalizations and skills.	
5. Analysis: solving a problem in the light of conscious knowledge of the parts and forms of thinking.	3. Critical
6. Synthesis: solving a problem that requires original, creative thinking.	
7. Evaluation: making a judgment of good or bad, right or worng, according to personally designated standards.	

(2) the interpretation level, and (3) the critical level. The categories are described as follows:

Literal Level: Teacher questions are formulated to solicit responses which require specific recall of factual information. Comprehension at this level demands answers which identify understanding of who, when, what or where. This level of thought is considered important because higher-level thinking must build upon a foundation of factual information.

Interpretation Level: Corresponding to Sanders' (1966) interpretation and application levels, this comprehension level "probes for greater depth of understanding than the literal level" (Smith, 1963). Several different types of cognition are required: (1) making generalizations, (2) reasoning cause and effect, (3) anticipating endings, (4) making comparisons, (5) sensing motives, and (6) discovering relationships among facts. Further, all of the fundamental skills required for comprehension at the literal level are subsequently required at the interpretation level. The reader must comprehend implied meanings and extend understanding to new situations. Therefore, teacher questions must be formulated so that interpretive comprehension is stimulated.

Critical Level: Corresponding to Sanders' (1966) analysis, synthesis, and evaluation levels. Comprehension at the critical level requires that teacher questions be formulated which stimulate the reader to analyze, synthesize, and evalu-

ate the quality, value, accuracy, and truthfulness of what he reads.

In this present investigation both questions and student responses were formulated and classified in terms of the above levels of reading comprehension.

TYPES OF QUESTIONS ASKED

Davis and Tinsley (1967) investigated the range of cognitive objectives evident in the questions asked by forty-four student teachers in secondary-school social studies classes. An observation instrument, the Teacher Pupil Question Inventory, was used to evaluate teacher questions and place them into categories based directly on Sanders' taxonomy of questions. It was found that more than 50% of the questions asked required only memory of factual information, and that at least half of the student teachers asked no questions which could be categorized as application, analysis, or synthesis.

Guszak (1967) conducted a study to determine the development of reading-thinking skills in elementary classrooms. Four classes at each of grades two, four, and six were randomly selected for the study. To determine the kinds of questions asked by the teacher, the Reading Comprehension Question-Response Inventory was developed for subsequent question-type categorization. The categories include questions of (1) Recognition, (2) Recall, (3) Translation, (4) Conjecture, (5) Explanation, and (6) Evaluation. Guszak

(1967) reports that (1) almost 70% of teacher questions were those requiring recognition or recall of literal information; (2) evaluation questions (15.3%) were the next most frequently asked; (3) conjecture and explanation accounted for 13.7% of questions asked; (4) there was a pattern of a decrease in literal questioning as children reached the higher grades, (89% in grade two, 65.3% in grade four, and 60.2% in grade six). Thus Guszak's (1967) findings verify the findings of Davis and Tinsley (1967) and Stevens (1912).

RELATIONSHIP OF LEVEL OF QUESTION TO LEVEL OF STUDENT RESPONSE

Hilda Taba (1964) suggests that the way people think may be largely dependent on the kinds of thinking experience they have had, and such experiences should be so structured as to develop specific kinds of thought processes and skills. She conducted an exploratory investigation to determine the relationship between teaching strategies and subsequent development of cognitive processes. Influenced by the work of Jean Piaget, Taba hypothesized that the development of thought would be maximized under three conditions: (1) use of a curriculum designed specifically for thought development; (2) use of teaching strategies which provided for thought development; (3) an allowance for a time factor in the development of thought, i.e. an allowance for the process of equilibration in the Piagetian sense.

Of particular importance to her study was Piaget's idea of a construction of a conceptual scheme, the concept of assimilation and accommodation, and his concept that thinking is a sequential and a hierarchical developmental process. A social studies curriculum was then developed into which Piaget's ideas and concepts were incorporated. Teachers were given ten days of training; five consecutive days prior to the beginning of school and ten half-days throughout the school year. Teachers analyzed the structure and rationale of the curriculum, and were sensitized to the purposes of the study as well as translating Piaget's concepts into actual teaching strategies. The training for specific strategies emphasized appropriateness of questioning techniques for conducting discussions and included the following areas: (1) types of questions and their sequencing in a hierarchical manner; (2) timing of questions; and (3) the ways questions might be focused, lifted, and extended to reach higher levels of cognition. Students were presented with cognitive tasks which were designed to be representative of specific levels of thought; grouping and classifying, interpreting data and making inferences, and an application of previous knowledge to explain new phenomena and predict outcomes.

Growth in students' thinking was measured using The Social Studies Inference Test and through analysis of tape transcriptions of classroom discussions. It should be noted,

however, that The Social Studies Inference Test is a paper-pencil test requiring students to answer inference statements as either 'true', 'false', or 'can't be determined'. It seems a less accurate measure of thinking processes than would be provided by an open ended question which requires consideration and reflection. Concerning this present study, two findings are particularly relevant: (1) The single most important factor in the development of thinking processes was teaching strategy and (2) the nature of the question asked was the most influential variable in students' cognitive development.

An investigation by Wolf, King, and Huck (1968) was conducted to determine what kinds of teacher questions elicit critical responses from students. Twenty-four classes of students in grades one to six comprised two control groups and two experimental groups at each grade level. Over a one year period the control groups received instruction in literature while the experimental groups received instruction in critical reading. Critical reading was defined as the students' ability to appropriately answer questions requiring interpretation, analysis and evaluation. Questions were formulated utilizing Sanders' Taxonomy of Questions. An observation scale was developed to determine the effect of teachers' questions on students, as well as a pre and post-test given to evaluate student responses.

Results indicated that: (1) Questions formulated at

levels of interpretation, analysis, and synthesis stimulated more critical responses than did other types of questions, and (2) the experimental group scored significantly higher on the post-test of critical reading than did the control groups at all grade levels.

A study by Ryan (1973) investigated the potential relationship between the types of questions asked by teachers and ensuing student performance. One-hundred grade-five and six students were placed into one of three groups; a high questioning group, a low questioning group, and a control group. Both the high and low questioning groups received nine consecutive days of instruction in an 'inquiry-oriented' social studies unit. Ninety-five percent of the questions asked of the low questioning group were formulated to require recall of facts only. Seventy-five percent of the questions asked of the high questioning group were formulated above this level. The control group studied a descriptive unit on South America and no specific questioning techniques were utilized. Student performance was evaluated using two multiple choice tests; one measuring retention of factual information (low level achievement test) and consisted of low-level questions, and the other test consisted of high-level questions (high level achievement test). A classroom observation instrument was developed to determine the level of student responses to questions.

Upon analysis it was revealed that: (1) Performance

of both the high questioning group and the low questioning group exceeded that of the control group on the low achievement test. (2) The level of student responses reflected the level of questions asked.

RAPID QUESTIONING PRACTICES

For over sixty years research has indicated the existence of a fast questioning pace in the classroom (Floyd, 1960; Stevens, 1912; Rowe, 1969; Lancelot, 1929). Teachers at all levels allow very little 'thinking time' as they ask questions, present materials and respond to students. Descriptive studies have shown that the average lapse time interval (the elapsed time between the end of a teacher's question and the beginning of a student response) is between one and two seconds. Stevens (1912), felt that only the most rudimentary thought processes would be existent in students under this rapid rate of teacher question asking. Studies by Floyd (1960), Rowe (1969), and others support the existence and consistent use of rapid pacing of questions in classrooms studied.

Commenting on Stevens' (1912) investigations, Miller (1922) notes that "... he can observe this fault by putting a thought question to some member of his class and then measuring with a stop watch the interval that elapses between the question and the expected answer. It is rare, indeed that the teacher does not show considerable uneasiness before ten seconds have elapsed." Further, Ivany and Neujar (1970),

found that:

> "... one could begin timing the pauses between questions and the next piece of discourse. How long does the average teacher allow for a response before shifting to another student or making some verbal interruption?
>
> The kinds of analysis possible in this category can be complex. The teacher or the experimenter can deliberately vary salient quantities to discover their effect.
>
> Then, having discovered the length of time between question and subsequent teacher discourse, one wonders whether a teacher can deliberately shorten or lengthen such a pause. If so, what effect does this have on student participation?"

This present study is concerned with a variable (lapse time interval) which has received little treatment by researchers studying classroom interaction and, specifically, the question-response episode. There is, indeed, little quantifiable research available. However, throughout the literature dealing with teacher questioning practices, one persistent pattern does emerge--the existence of a rapid rate of teacher questioning.

When Stevens (1912) analyzed stenographic records of discourse in secondary school classrooms, she stated:

> "The fact that one teacher has the ability to quiz his pupils at the rate of two or three questions in a minute is a matter of comparatively slight importance; the fact that one hundred different classrooms reveal the same methods in vogue is quite another matter. The fact that one history teacher attempts to realize his educational aims through the process of 'hearing' the textbook, day after day, is unfortunate, but pardonable; that history, science, mathematics, foreign language, and English teachers, collectively are following in the same groove, is a matter for theorists and practitioners to reckon with" (Stevens, 1912).

Miller (1922) would agree with Stevens (1912) when he reports the results of his own observations:

> "The writer is convinced that in classes as organized at present, thought questions are put at a rate too rapid for a large majority of the class. If an answer is not given almost immediately, the teacher interrupts by meaningless remarks, by a needless repetition of the question, by passing the question to some other pupil, or by answering the question herself. She cannot endure the silence that must prevail while the pupil is thinking and organizing his material and commonly feels she must break the silence by making a remark of some kind, however useless and distracting it may be."

Garagliano reports Pepoon's (1926) study in his historical review of works which provide evidence of rapid teacher questioning procedures. Pepoon's (1926) investigation was an attempt to determine changes since Stevens' study of 1912. She reports that in-service teachers asked a question every 1.22 minutes. The average for student teachers was one question every 1.02 minutes.

Barr (1929), in a study investigating differences in the teaching performances of social studies teachers, noted that in a forty-minute period teachers asked an average of 92.7 questions; 2.3 questions per minute.

Corey (1966) studied six classes (grades seven through eleven) in laboratory high school science, history and English classes. Analysis of stenographic records indicated that one question was asked every 72 seconds. He states that "the frequency with which the teachers asked questions ... is probably proof sufficient that no great number of

'thoughtful' answers was expected. Apparently few were obtained." More recently, Tisher (1971) investigated verbal interaction in junior-high school science classes in Brisbane, Australia, and provides even more evidence of a fast questioning rate. The average duration of a lesson was 30 minutes, and the average rate of questioning ranged from two per minute to four per minute. Tisher (1971) concluded that "if these rates are maintained in other lessons during a day, the pupils are subjected to about 700 questions per school day or 3,000 to 4,000 questions per week."

Having established the existence of fast-pace questioning which also indicates extremely small lapse time intervals, what effect does slowing the questionin rate and increasing the 'think-time' have on thinking processes?

INCREASING THE LAPSE TIME INTERVAL

Because students vary in the speed with which they respond to questions and in the degree to which they formulate clear responses, teachers are advised to pause after posing a question (Carin and Sund, 1971; Rowe, 1969; Lancelot 1919). Lancelot (1929) states:

> "Those teachers who make regular use of <u>fact</u> questions may reasonably expect 'quick answers', since little time is required to recall facts that have been memorized. On the other hand, those who use problems and <u>thought</u> questions must not expect answers to be given quickly for the reasons that the pupils must not only recall facts that are needed but must make use of them in arriving at decisions and conclusions. This clearly requires considerably more time than is needed merely to repeat memorized material. It is therefore regarded as a

> serious mistake to call for the answer of any given thought question immediately after it has been asked. As the technique says, there must be a pause while the pupils think. How long this pause should be depends upon the difficulty of the thinking that is required" (Lancelot, 1929).

Mary Budd Rowe has studied the effect of increased lapse time intervals on teachers' verbal behavior. Reporting at the Conference on Science and Man in the Americas in June 1973, she indicated that a change in the distribution of question types occurs "once average wait-times of three seconds or more have been achieved." She found that in a sampling of science teachers, 82% of all questions asked by the teachers fell into a category she termed 'informational', 13% she categorized as 'leading questions' and 2% she found to be 'probing questions'. Informational type questions are defined as those which "seek factual information." These questions are similar in nature to those that may be formulated at the literal level of reading comprehension as indicated by Smith (1963). Leading type questions are defined as those which 'seek to expand or extend ideas, redirect ideas, justify ideas and help students to form conclusions by interpreting data.' These questions are similar in nature to those that may be formulated at the interpretation level of reading comprehension as indicated by Smith (1963). Probing type questions are defined as those which 'help students form conclusions, solutions, and plans for investigating problems.' These questions are similar in nature to those

that may be formulated at the critical level of reading comprehension as indicated by Smith (1963).

When teachers had received training in pausing for three or more seconds after asking a question, informational type questions dropped to 34%, leading type questions increased to 36% and probing type questions increased to 28%. This appears to indicate that teachers' verbal behavior was, indeed, affected by a pause after questioning. The effect of this 'pausing' on student response was the focus of another study by Rowe (1973).

Working with a group of 50 teachers, Rowe (1973) explored the effects of increasing 'wait-times' to 3 seconds or longer, i.e. increasing the period of time that a teacher waits for students to construct a response to a question.

Question by teacher	Wait time (3 seconds or longer)	Student's Response

It was found that increasing 'wait-time' affected the teacher's own questioning behavior as well as behavior of the students. As 'wait-time' increased, teachers began to: (1) exhibit greater flexibility and variability in the kinds of questions they ask, i.e. "the number of questions that call for reflection and that ask for clarification of meaning increases" (Rowe, 1973); (2) ask fewer questions and were less "barrage-like", i.e. rapid-fire questioning was replaced with fewer and more thought-stimulating questions; and (3) ask questions which began to reflect a more genuine interest

in the ideas of the students. Further, Rowe (1973) noted that "slowing down the whole interchange rate among the players in the classroom seems to produce satisfying gains for all concerned."

The effects of an increased lapse time interval upon students are as equally noteworthy. Rowe (1973) found that:

(1) "The length of students' responses increased. Under a fast schedule, responses tend to consist of short phrases and rarely exhibit explanation of any complexity. Data suggests... that prolonged wait-time contributes measurably to the appearance of longer statements."

(2) "The number of unsolicited but appropriate responses by students increases."

(3) "Failures to respond decreased. 'I don't know' or no responses were often as high as 30% in normal classrooms, i.e., in classrooms where the mean wait time fell at 1 second or less."

(4) "The incidence of speculative thinking increased."

(5) "Teacher-centered show-and-tell decreased and child-child comparing increased. Under a fast schedule and a high reward or sanctioning schedule, children 'stack-up' waiting to tell the teacher. There is very little indication that they listen to each other."

(6) "More evidence followed by or preceded by inference statements occurred. Under a fast schedule, the incidence of qualified inferences is extremely low."

(7) "The number of questions asked by children increased... Students do not ask questions very often. When they do, the questions are usually for clarification of procedures and are rarely ever directed at students."

(8) "Contributions by 'slow' students increased. Under the fast schedule, most responses came from a particular faction of the class. When wait-times

were increased, the sources of response increased. Interestingly, this outcome gradually influenced teachers' expectations."

(9) "Disciplinary moves decreased. In some classrooms which shift from a fast schedule to a slow schedule, the number of disciplinary moves which a teacher makes, e.g., calling people to attention, stopping unsocial behaviors, etc., tends to decrease."

SUMMARY

This chapter has reviewed the literature and research relevant to the question-answer episode as a determiner of cognitive operation.

The first section of this chapter presented research dealing with question usage in teaching. These studies indicate that not only to teacher's questions constitute a large portion of verbal out-put in the classroom, but that these questions tend to be structured at the lowest cognitive levels, with emphasis on literal recall of factual information.

Both Sanders' Taxonomy of Questions and Smith's Levels of Reading Comprehension are discussed in the second section of this chapter. Sanders' taxonomy is described as a guideline for the formulation and classification of questions leading to specific intellectual objectives. Smith's 'levels' are, in essence, a modification of Sanders' taxonomy of questions, and was used as the basis for formulating questions and classifying responses in this investigation.

A survey of the types of questions asked by teachers in the classroom is presented in the third section of this chapter. Research suggests that a heavy emphasis is given to questions requiring only factual recall. This led Gall (1970) to conclude that "... in a half-century there has been no essential change in the types of questions which teachers emphasize in the classroom. About 60% of teachers' questions require students to recall facts; about 20% require students to think; and the remaining are procedural."

The fourth section of this chapter presented studies which investigated the relationship of the question level to the level of student response. Research tends to confirm Taba's (1969) statement that 'a certain kind of question leads to a certain kind of thinking, and, further, that '... a focus set by teachers' questions circumscribe the mental operations which students can perform, determines which points they can explore, and which modes of thought they learn."

The fifth section of this chapter presented studies which indicate the existence of a fast questioning pace in the classroom with subsequent lapse time intervals of between one and two seconds.

The final section of this chapter presented research literature related to the effects of an increased lapse time interval during the question-answer episode. It was posited that because students vary in the speed with which they re-

spond to questions and in the degree to which they formulate clear responses, that teachers should learn to 'pause' after posing a question. This 'think-space', when increased to 5 seconds or longer, provided time for the student during which he could reflect or speculate.

CHAPTER III

THE EXPERIMENTAL DESIGN

This chapter will describe the design of the study, and will include a description of the testing instrument, a description of the student population and sample, the selection and evaluation of reading materials, data collection procedures, and describe the coding and analysis of gathered information.

THE DESIGN OF THE STUDY

The purpose of the present study was to investigate the cognitive nature of verbal responses and lapse time intervals following questions which were formulated at the three levels of reading comprehension, i.e., the literal level, the interpretation level and the critical level as suggested by Smith (1963). The study was conducted in three phases. The first phase involved the analyzing of reading materials suitable in content for the formulation and asking of higher-level questions as well as for appropriate readability levels. Also, as the recording of lapse time intervals required precision, various types of electronic timing devices and simple stopwatches were evaluated as to accuracy and ease of manipulation. The second phase required that the suitability of

selected reading passages, lapse time interval recording devices, and formulated questions be validated with assistance from independent sources. The final and third phase involved the collection and subsequent analysis of data. Audio taped transcriptions of question-response interaction provided the format from which information was extracted for the investigation.

THE SAMPLE

The test population was drawn from one elementary-junior high school assigned to the researcher by officials of the County of Strathcona School System. It was indicated that this school served a population of predominantly middle-class families.

The initial test population consisted of 50 sixth-grade students in two classes. Ten suitable subjects, 7 girls and 3 boys, were identified. All students within the sample were in the 11-12 year age range. The selection of these students is described in the following section.

Selection of the Sample

The sample of 10 grade-six students selected was identified through testing procedures as being high in reading comprehension on the basis of performance on the vocabulary and reading comprehension subtests found in The Canadian Tests of Basic Skills, (described on p. 41). This test was administered to the entire population of 50 grade-six pupils, and the results analyzed. Any students receiving a grade score

of 8.0 or greater when the vocabulary and reading comprehension scores were averaged, were classified as high-reading comprehenders for the purposes of this investigation.

The composition of the research sample is presented in Table 2.

TESTING INSTRUMENTS

The following section provides a description of the test instrument used for screening and identifying high-reading comprehenders.

The Canadian Tests of Basic Skills

The Canadian Tests of Basic Skills, Form 3 (1974), Level 11, was administered on a school-wide basis to grades 4,5, and 6 during the first week of May, 1978. This test, referred to hereafter as the CTBS, is designed to measure student performance in vocabulary, reading comprehension, language skills, and mathematics. For the purpose of selecting the sample, scores obtained in the vocabulary, and reading comprehension subtests were averaged.

The 40 items in the Vocabulary Subtest consist of a word in context followed by four possible definitions. Stimulus words were chosen from the Thorndike (1944) and Rinsland (1947) word lists, as were words constituting definitions. Nouns, verbs, and adjectives were given approximately equal representation, with some adverbs at each grade level.

The Reading Comprehension Subtest consists of sele tions

Table 2

Composition of the Research Sample

Pupil	Sex	Present Grade	Age	The Canadian Tests of Basic Skills		
				Vocabulary Subtest Grade Score	Reading Comprehension Subtest Grade Score	Average of Reading Comprehension and Vocabulary Grade Scores
1	F	6.8	11.9	8.8	8.5	8.7
2	M	6.8	11.8	8.8	8.0	8.4
3	F	6.8	11.9	8.0	8.0	8.0
4	F	6.8	11.9	8.4	8.0	8.2
5	M	6.8	12.0	8.8	9.5	9.2
6	F	6.8	12.3	8.4	9.1	8.3
7	F	6.8	11.8	8.8	8.8	8.8
8	M	6.8	11.7	9.2	9.3	9.3
9	F	6.8	12.4	8.4	8.0	8.2
10	F	6.8	12.5	9.2	9.3	9.3
MEAN		6.8	12.2	8.7	8.6	8.6

varying in length. The passage content was chosen by the authors to "represent many of the types of material encountered by students in everyday reading situations" (p. 43, Administration Manual). See Table 3. Reading passages were adapted from newspapers, magazines, encyclopedias, government publications, textbooks, and original literary works.

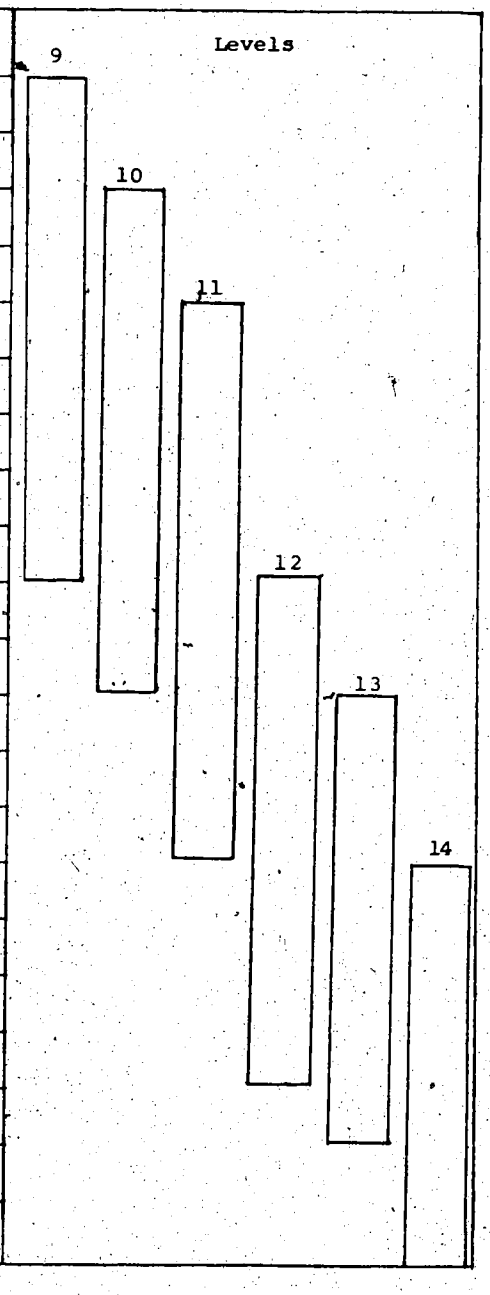
The authors of the CTBS state that "the reading process as defined by the items in this test is a complex one. Whether or not the pupils are good readers depends not only on the extent to which they apprehend the author's meaning but also on the degree to which they grasp the significance of the ideas presented, evaluate them, and draw useful conclusions from them" (p. 43). For these reasons, and because of the authors' view the reading act as a meaning-getting process, the items in all levels of the test place "a premium on understanding and drawing inferences from the reading selections" (p. 43). Some of the specific skills measured by the Reading Comprehension Subtest of the CTBS are presented in Table 4.

The Vocabulary and Reading Comprehension subtests of the CTBS were utilized by the researcher for the purpose of identifying high-reading comprehenders because it appeared to emphasize many pertinent aspects of the reading act as well as requiring comprehension beyond memory of factual details.

Table 3

Test R: Reading Comprehension (Form 3)*

Types of Reading Materials	Items
Science (Nature Study)	1-5
Social Studies	6-11
Literature (Biography)	12-17
Social Studies (Occupations)	18-24
Literature (Fable)	25-36
Health (Food)	37-42
Science (Plants)	43-50
Social Studies (Geography)	51-55
Literature (Poetry)	56-60
Social Studies (Geography)	61-70
Social Studies (Soil Conservation)	71-79
Science (Experiment)	80-87
Literature (Poetry)	88-92
Language (Word Origin)	93-98
Social Studies (Ecology)	99-109
Science (Animal Conservation)	110-120
Social Studies (Geography)	121-129
Literature (Poetry)	130-136
Social Studies (Food Process)	137-157
Science (Biology)	158-169
Language (Evolution of Alphabet)	170-178



* Taken from Canadian Tests of Basic Skills, Form 3, (1974), Level 11, p. 44.

Table 4

Test R: Reading Comprehension*

Skills Tested
D (Details) - To Recognize and Understand Stated or Implied Factual Details and Relationships
D-1 To recognize and understand important facts and details
D-2 To recognize and understand implied facts and relationships
D-3 To deduce the meaning of words or phrases from context
P (Purpose) - To Develop Skill in Discerning the Purpose or Main Idea of a Paragraph or Selection
P-1 To detect the main purpose of a paragraph or selection
P-2 To recognize the main idea or topic of a paragraph or selection
O (Organization) - To Develop Ability to Organize Ideas
O-1 To recognize common elements or parallel topics in incidents or paragraphs
O-2 To recognize proper time sequence
E (Evaluation) - To Develop Skill in Evaluating What is Read
E-1 To develop generalizations from a selection
E-2 To recognize the writer's viewpoint, attitude or intention
E-3 To recognize the mood or tone of a selection
E-4 To recognize outstanding qualities of style or structure

* Taken from Canadian Tests of Basic Skills, Form 3, (1974), Level 11, p. 45.

Selection of Reading Passages

Muise (1978) notes that "most of the existing literature on the application of questioning strategies to reading materials is related to social studies content." This material, in this researcher's experience, is generally of a descriptive nature. In contrast, more formal reading instruction utilizes material written in a more narrative mode. Owing to this difference as well as to the large amount of time allotted for the actual "teaching" of reading in most classrooms, stories were selected that were of a narrative nature and suitable in content for the formulation of questions at all three levels of reading comprehension: (1) the literal level, (2) the interpretation level, and (3) the critical level.

Criteria for story selection was based on work by Muise (1976). After researching relevant literature concerning selection of classroom reading material, she formulated a criteria which is useful in evaluating reading material. These guidelines with some modifications, were considered insightful and valuable for use in this present study.

(1) Each selection must fall within the readability level of grades 5-7.

(2) The content must be such as to support higher-level thinking in terms of having the potential for formulation of higher-order questions.

(3) The content should have a high interest potential

for grade-six students.

(4) The vocabulary must be at a level appropriate for grade-six students.

(5) Ideas and concepts presented in the story should not be of a nature too complex for a grade-six student, i.e. beyond his realm of experience, either direct or indirect, but novel enough to stimulate thinking.

(6) The syntactic structures of sentences within the story should be of a complexity believed to be that which students can handle.

(7) Attitudes and ideas fostered by the story should not be of a controversial nature, i.e. they should not support particular ethical, racist, or religious views (Muise, 1976).

The readability level of each story selection was identified using the Dale-Chall Readability Formula (1948). The formula was applied to three 100 word samples from each of the stories used, to identify an approximate grade level. Table 5 indicates readability levels of story selections.

PROCEDURES AND DATA COLLECTION

During the week of May 17-21, 1978, the researcher conducted ten data gathering sessions; one session for each individual. A quiet, well-lighted room in the school was provided for research activities. Each student in the research sample read two stories, and each reading was followed by a question-

Table 5

Readability Levels of Story Selections Using the Dale-Chall Readability Formula

Story Selection	Readability of Sample 1	Readability of Sample 2	Readability of Sample 3	Average of 3 Samples	Grade Score
The Lion in the Sewer	6.54	6.52	6.48	6.51	7-8
Adventure on Ice	5.97	5.13	5.53	5.54	5-6

answer period. Each session required approximately 45 minutes. The instructions used before actual student reading began may be found in Appendix A.

Formulation of Questions used in the Investigation

All questions utilized in the study were formulated to comply with the reading comprehension levels identified by Smith (1963), i.e. the literal level, the interpretation level, and the critical level. Both the investigator and a reading specialist read the two stories identified as suitable for the purposes of the study. After reading the first story selection, the investigator and reading specialist separately constructed 15 questions; i.e. 5 questions at the literal level, 5 questions at the interpretation level, and 5 questions at the critical level. Of the resulting 30 questions formulated, 5 at each level were selected as representing a stimulus to thinking at each of the above levels; a total of 15 questions. The same procedure was utilized using the second story selection. A total of 30 questions (15 for each story) were selected as suitable for the purposes of the investigation (see Table 6). The specific data gathering procedure is described in the following section.

Data Gathering Procedure

Because the investigator was personally unfamiliar to the students prior to the investigation, and because of the possible tension a one-to-one encounter might have generated, the researcher felt it necessary to provide an atmosphere

Table 6

Number of Questions Asked at Each of Smith's (1963) Reading Levels

Story Selection	Number of Literal Comprehension Questions	Number of Interpretation Questions	Number of Critical Reading Questions	Total
The Lion in the Sewer	5	5	5	15
Adventure on Ice	5	5	5	15
Total	10	10	10	30

which was comfortable both physically and psychologically. For the purpose of helping establish a more personal relationship the researcher, after introducing himself, explained the purpose of the investigation. Time was also spent discussing the student's personal interests and plans for the upcoming summer holidays. The student was then asked to read the first story, taking as much time as was necessary for its completion. When finished, the student was asked the 15 questions related to the story content. This procedure was repeated after the reading of the second story. (The story selections, questions, and transcribed student responses are presented in Appendices B - K). The question-response interaction was tape recorded for further analysis of cognitive response level as well as for determination of lapse time intervals. Since 10 students were each asked a total of 30 questions, 300 question-response dyads were obtained during audio-taped data gathering sessions.

Determination of Lapse Time Intervals

Lapse time intervals were determined in the following manner. The investigator and a research assistant, working independently, listened to each of the 300 question-response dyads to determine the amount of time (in seconds), that elapsed between the completion of the investigator's question and the beginning of the student's response; i.e. the lapse time interval. Each 'timer' recorded lapse time intervals using an electronic digital stopwatch, accurate to .01 sec-

onds. (Specifications for both the CRONUS digital stopwatch and the SONY-O-MATIC, TC-105 four-track monophonic recorder are presented in Appendices L-M). Listening carefully to each of the 300 question-response dyads, both the investigator and research assistant began 'timing' immediately upon completion of the investigator's question, and ended the 'timing' immediately upon the beginning of the student's response. The two lapse time intervals were recorded, and the mean of each pair was used in the analysis.

Classification of Student Response Data into Reading Levels

After determining lapse time intervals, the investigator and the reading specialist again listened to the 300 question-response dyads in order to classify responses with respect to reading levels. On the basis of Smith's (1963) Reading levels, responses were categorized as being in one of the three levels of reading comprehension, i.e. (1) the literal level, (2) the interpretation level, or (3) the critical level. Generally, agreement as to response classification was unanimous between the investigator and reading specialist, (97%). However, there was failure to agree concerning level classification of 10 student responses, i.e. whether the response was to be classified as at the interpretation level or critical level. Therefore, a third independent judge was consulted, (a reading specialist at the University of Alberta) and the resulting appraisal was con-

sidered to finalize the response classification The resulting response classifications were used in subsequent statistical analysis.

ANALYSIS OF DATA

The computing facilities in the division of Educational Research Services at the University of Alberta were used to analyze the data.

(1) The question-response dyads were classified and lapse time intervals determined.

(2) The number of cases, lapse time means, and standard deviations were calculated for each of the three levels of reading comprehension, i.e. (1) literal, (2) interpretation, and (3) critical.

(3) A one-way analysis of variance with repeated measures was utilized for testing differences in mean lapse time between the three reading levels.

(4) The relationship between question level and response level was determined using the chi-square statistic.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

The present study investigated the cognitive nature of students' verbal responses as a function of teachers' verbal questioning and lapse time interval during reading instruction. This chapter will present the results of the statistical analysis with respect to the hypotheses generated in Chapter I.

THE RESEARCH HYPOTHESES

Null Hypothesis 1:

There are no significant differences among the mean lapse time required to respond to questions of reading comprehension at the:

1.1 literal level

1.2 interpretation level

1.3 critical level

Analysis and Interpretation

Table 7 presents the lapse time intervals (in seconds) required by each student to answer questions formulated at the literal level of reading comprehension. The range was found to be .89 - 1.81 seconds. The group lapse time mean (see Table 10) for answering questions at this level was calculated as being 1.46 seconds.

Table 7

Lapse Time Intervals (in seconds) for Questions Formulated at the Literal Level of Reading Comprehension

Student	Questions (Literal Level) 1	2	3	4	5	6	7	8	9	10	Row $\bar{x}$
1	1.55	2.15	2.54	1.47	.84	1.15	.83	1.22	1.24	2.39	1.54
2	.87	.80	1.44	.95	.77	1.49	1.73	2.30	.80	3.22	1.44
3	2.36	1.97	2.20	2.32	.61	2.26	1.05	1.09	.87	1.28	1.60
4	2.21	1.77	3.47	.90	.60	1.13	1.36	1.19	.72	1.48	1.48
5	2.51	1.63	3.18	1.20	1.37	1.19	1.59	1.24	1.30	1.13	1.63
6	.63	1.52	3.68	1.25	.78	1.80	2.25	1.90	2.25	2.08	1.81
7	1.35	1.06	1.57	1.27	.67	1.00	.57	.73	.48	1.25	1.0
8	2.58	1.52	2.59	.84	.65	.93	2.38	2.39	.75	1.35	1.60
9	.72	1.06	1.28	1.33	.60	.89	.53	1.00	.56	.96	.89
10	1.76	1.33	4.80	1.21	.90	1.10	1.06	1.15	.71	1.24	1.53

Total Group $\bar{x}$ = 1.46

Table 8 presents lapse time intervals (in seconds) required by each student to answer questions formulated at the interpretation level of reading comprehension. The range was found to be 1.31 - 2.57 seconds. The group lapse time mean (see Table 10) for answering questions at this level was calculated as being 2.21 seconds.

Table 9 presents lapse time intervals (in seconds) required by each student to answer questions formulated at the critical level of reading comprehension. The range was found to be 1.53 - 4.13 seconds. The group lapse time mean (see Table 10) for answering questions at this level was calculated as being 2.92 seconds.

Figure 1 summarizes the data found in Table 10 and reveals a definite increase in lapse time through the reading levels; i.e. group means of 1.46, 2.21, and 2.92 respectively. This was the case with all students in the sample with the exception of student #10, (who required an average of 1.53 seconds to answer literal level questions, 1.31 seconds for interpretation questions, and 1.53 seconds for critical level questions) (refer to Table 10).

The data analyzed thus far appear to confirm previously cited literature, i.e., that students vary in the speed with which they respond to questions. Although Lancelot (1929) presented no quantifiable data on which to base his suggestions, he posits that teachers who ask questions which probe for facts may reasonable expect 'quick answers'. Further,

Table 8

Lapse Time Interval (in seconds) for Questions Formulated at the Interpretation Level of Reading Comprehension

Student	Questions (Interpretation Level) 1	2	3	4	5	6	7	8	9	10	Row $\bar{x}$
1	.83	.71	2.22	5.63	9.69	1.43	2.11	.82	1.29	1.01	2.57
2	1.81	.79	.99	2.40	1.94	1.43	2.25	1.28	1.35	2.39	1.66
3	1.27	4.67	1.22	6.59	1.67	.91	2.84	1.35	.89	1.04	2.55
4	1.27	9.48	4.83	3.71	3.17	1.09	2.70	1.96	1.69	1.63	3.16
5	2.07	9.17	3.67	3.55	3.77	2.67	2.04	1.36	1.75	1.69	3.17
6	1.37	1.20	2.23	3.35	2.46	1.59	2.33	2.25	2.16	1.49	2.04
7	.55	3.55	1.40	2.24	3.64	2.54	2.70	1.62	1.71	1.65	2.16
8	1.11	2.93	2.58	2.52	2.71	1.54	1.90	1.10	1.87	1.88	2.01
9	1.51	2.69	1.37	2.06	1.24	1.57	2.23	2.20	1.80	1.68	1.84
10	.93	1.48	1.12	1.48	1.36	.93	1.16	1.48	1.17	1.96	1.31

Total Group $\bar{x}$ = 2.21

Table 9

Lapse Time Intervals (in seconds) for Questions Formulated at the Critical Level of Reading Comprehension

Student	Questions (Critical Level) 1	2	3	4	5	6	7	8	9	10	Row $\bar{x}$
1	1.64	1.55	3.88	1.86	5.71	1.92	3.03	1.85	2.33	2.31	2.61
2	1.70	1.04	1.94	1.28	3.33	2.51	1.16	2.89	1.05	2.75	1.97
3	2.09	2.49	2.19	4.26	9.81	4.66	1.13	3.20	2.82	2.70	3.54
4	1.30	6.31	9.05	3.19	7.57	2.69	1.67	4.65	4.05	.92	4.14
5	.94	3.34	2.69	3.36	10.25	5.42	1.15	1.60	3.45	3.78	3.60
6	2.45	1.56	1.72	2.23	2.71	2.37	.73	1.30	2.16	4.69	2.19
7	.85	3.57	4.96	7.22	5.88	2.81	2.06	3.97	1.22	3.93	3.67
8	2.48	2.04	1.80	3.11	4.53	2.02	4.78	1.62	1.96	9.97	3.43
9	.72	1.30	3.66	3.85	4.43	1.48	2.97	2.27	2.63	1.77	2.51
10	1.52	1.72	.95	1.52	1.59	1.87	1.21	1.31	1.67	1.95	1.53

Total Group $\bar{x}$ = 2.92

Table 10

Total Group Lapse Times (in seconds) Required to Answer Questions Formulated at Three Levels of Reading Comprehension

Student	Literal Level	Interpretation Level	Critical Level
1	1.54	2.57	2.61
2	1.44	1.66	1.97
3	1.60	2.25	3.54
4	1.48	3.16	4.14
5	1.63	3.17	3.60
6	1.81	2.04	2.19
7	1.0	2.16	3.67
8	1.60	2.01	3.43
9	.89	1.84	2.51
10	1.53	1.31	1.53
Total Group $\bar{x}$	1.46	2.21	2.91

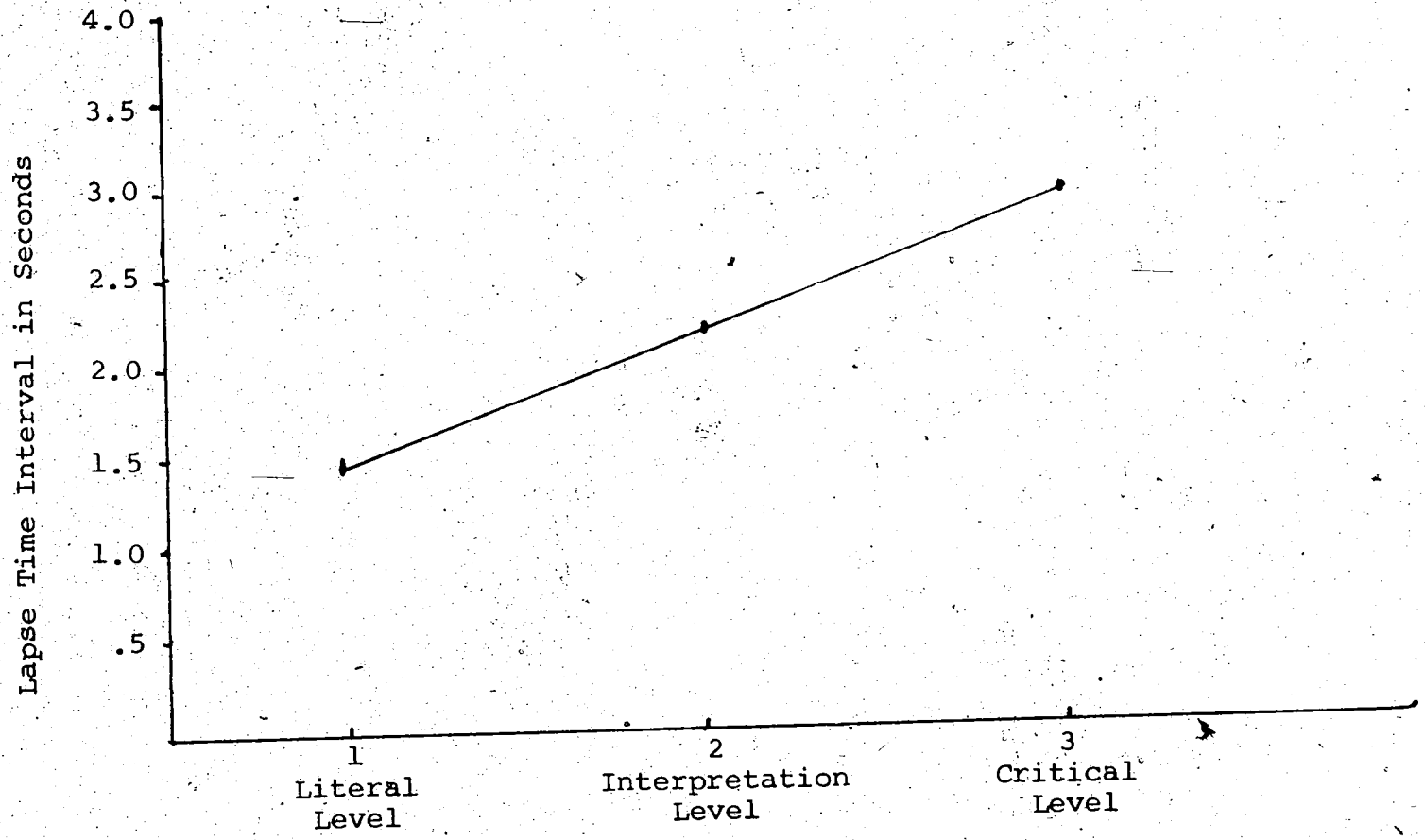


Figure 1: Graphic Representation of Total Group Lapse Times required to Answer Questions Formulated at the Three Levels of Reading Comprehension; literal, interpretation and critical.

teachers who ask questions which necessitate a 'thoughtful' response must not expect answers to be given quickly, but such questions require considerably more time to respond appropriately.

The total lapse time interval means required to answer questions of reading comprehension at the literal level, interpretation level, and critical level was analyzed by a one-way analysis of variance with repeated measures for each of the three levels. A summary of this analysis is presented in Table 11. The null hypothesis of equal population means was rejected. Post hoc Newman-Keuls Comparison betwen Ordered Means at the .05 level (Table 12) revealed a significant difference in lapse time intervals between questions formulated at the literal level, and questions formulated at the critical level. The difference between lapse time intervals between the literal level and the interpretation level approached significance. These findings are in keeping with suggestions offered by Rowe (1969), Lancelot (1929), and Stevens (1912), i.e., that responses to questions requiring an interpretation or critical evaluation may require more 'time' to answer. There was, however, no significant difference in lapse time intervals between questions formulated at the interpretation level and the critical level. This may suggest that, indeed, questions formulated at the interpretation and critical levels may differ only

Table 11

Summary of One Way Analysis of Variance with Repeated Measures for Lapse Time Interval Means of the Reading Levels

Source of Variation	SS	DF	MS	F	P
Between	0.808	9	0.898		
Within	0.227	20	0.114		
Treatments	0.107	2	0.534	7.981	.0033
Residual	0.121	18	0.669		

F.95 = 3.55

F.99 = 6.01

Table 12

Newman-Keuls Comparison Between Ordered Means

Reading Levels		Critical	Interpretation	Literal
	Means	2.919	2.207	1.457
Literal	1.457	1.462	0.750	-
Interpretation	2.207	0.712	-	
Critical	2.919	-		

r = 3 (.934) r = 2 (.768)

minimally in their lapse time interval requirements. This appears to be particularly true for students # 1, 2, 5, 6 and 10 of the research sample (50%) in this present investigation. Differences in lapse time of less than .5 seconds are noted between questions formulated at the interpretation and critical levels (refer to Figure 2).

Null Hypothesis 2:

There is no significant relationship between questions and responses of reading comprehension at the:

2.1 literal level

2.2 interpretation level

2.3 critical level

Analysis and Interpretation

Of the 300 questions formulated at the three levels of reading comprehension, 290 stimulated responses were classified as being at the literal level, interpretation level, or critical level. The remaining 10 responses were not categorized; i.e. answers were "I don't know' or no attempt was made to reply. Of these 10 unclassified responses, one was in response to a literal level question, six were in response to an interpretation question, and three were in response to a critical level question. The remaining 290 question-answer dyads are presented in a contingency table (Table 13). The value of chi-square was found to be 522.50. The number of degrees of freedom associated with this value of χ is 4, with 18.46 being the chi square value

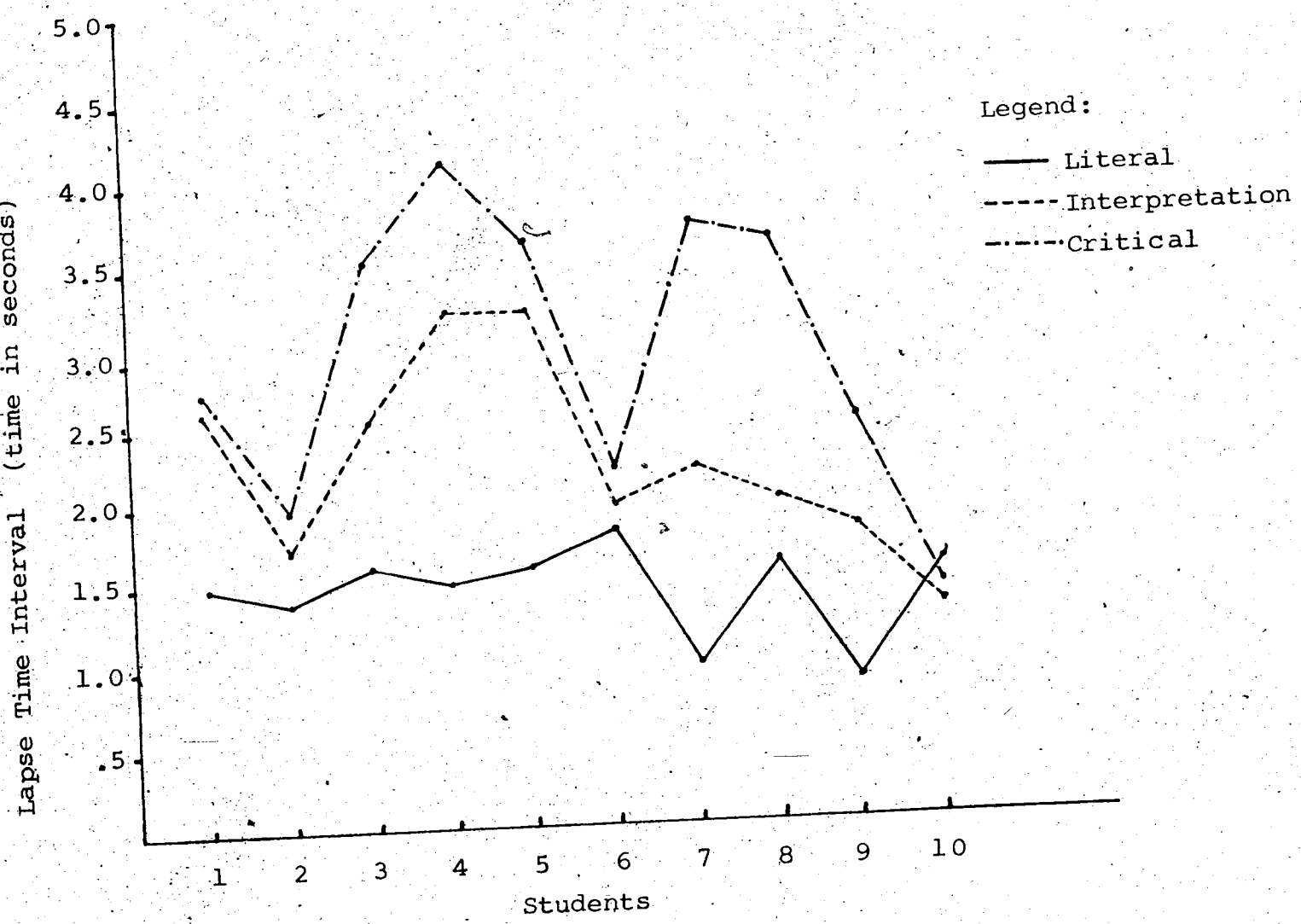


Figure 2: Graphic Representation of Required Lapse Time Intervals as a Function of Questions Formulated at the Literal Level, Interpretation Level, and Critical Level of Reading Comprehension.

Table 13

Contingency Table showing Relationship between Question and Response at the Three Levels of Reading Comprehension and Calculation of Expected Values

	Literal Level Response	Interpretation Level Response	Critical Level Response	Total
Literal Level Question	94 (31.78)	2 (32.11)	0 (32.11)	96
Interpretation Level Question	1 (33.10)	94 (33.45)	5 (33.45)	100
Critical Level Question	1 (31.12)	1 (31.44)	92 (31.44)	94
Total	96	97	97	290

Table 14

Calculation of Chi Square for data of Table 13

O	E	(O-E)	$(O-E)^2$	$\frac{(O-E)^2}{E}$
94	31.78	62.22	3871.33	121.9
2	32.11	-30.11	906.61	28.2
0	32.11	-32.11	1031.05	32.1
1	33.10	-32.10	1030.41	31.13
94	33.45	60.55	3666.30	109.6
5	33.45	28.45	809.40	24.2
1	31.12	-30.12	907.21	29.2
1	31.44	-30.44	926.59	29.5
92	31.44	60.56	3667.51	116.7
290	290.0	-	-	$\chi^2 = 522.50$

required at the .001 level. Therefore, there is substantial evidence for rejecting null hypothesis 2. Data suggest a definite relationship between questions and responses at the literal, interpretation, and critical levels of reading comprehension.

This conclusion is confirmed by Ryan (1973) who found that levels of student responses reflected the level of questions asked.

SUMMARY

This chapter has presented the results of the statistical analysis of the data and discussed these data with respect to the null hypotheses generated in Chapter I. The analysis of data indicated that null hypothesis 1 could be rejected. It was also found that there was a significant difference in the mean lapse time intervals between questions formulated at the literal level and the critical level of reading comprehension, with the lapse time intervals between the literal level and the interpretation level approaching significance. Further, no significant difference existed in the mean lapse time interval between questions formulated at the interpretation level and critical level of reading comprehension.

Substantial evidence was available to reject null hypothesis 2. Data suggests a relationship between questions and responses at the literal, interpretation, and critical levels of reading comprehension.

CHAPTER V

OVERVIEW, CONCLUSIONS, AND IMPLICATIONS

This chapter presents a general overview of the investigation and outlines the main findings. Additionally, conclusions drawn from the findings and implications for teaching are discussed. Recommendations for further research are also made.

OVERVIEW OF THE STUDY

The purpose of this study was to investigate the cognitive nature of verbal responses and lapse time intervals following questions which were formulated at three levels of reading comprehension as suggested by Smith (1963), i.e. the literal level, the interpretation level, and the critical level.

The sample consisted of 10 grade-six students, 7 girls and three boys all in the 11-12 year age range, drawn from one elementary-junior high school in the County of Strathcona School System. Subjects were identified as being high in reading comprehension on the basis of performance on the vocabulary and reading comprehension subtests found in The Canadian Tests of Basic Skills, Form 3, Level 11 (1974). The mean average grade equivalent scores for the sample were 8.7 (Vocabulary) and 8.6 (Reading Comprehension).

Individually, each student in the research sample read two stories which had been previously selected as having the potential for the formulation of higher order questions. The students read the two stories, and each reading was followed by a question-answer period, i.e. fifteen reading comprehension questions were asked (5 questions formulated at the literal level, 5 questions formulated at the interpretation level, 5 questions formulated at the critical level). Therefore, 30 questions were asked each student on the basis of their reading. All 300 question-response dyads were tape-recorded and then transcribed into typed protocols for further analysis.

On the basis of Smith's (1963) reading levels, responses were categorized as being in one of the three levels of reading comprehension, i.e. literal, interpretation, or critical. Lapse time intervals were determined by recording the amount of time that elapsed between the completion of the investigator's question and the beginning of the student's response and the lapse time interval means were calculated for each of the three levels of reading comprehension. A one-way analysis of variance with repeated measures was utilized for testing differences in lapse time between the three reading levels. In addition, the relationship between question level and response level was determined using the chi-square statistic.

FINDINGS OF THE STUDY

An analysis of the data yield several main findings with respect to null hypotheses 1 and 2.

Null hypothesis 1:

There are no significant differences among the mean lapse times required to respond to questions of reading comprehension at the:

1.1 literal level

1.2 interpretation level

1.3 critical level

(1) Analysis reveals a sequential increase in lapse time intervals through the levels of reading comprehension, i.e. respective group means were calculated as being 1.46 (literal level), 2.21 (interpretation level), and 2.92 (critical level). This hierarchical pattern was established for 9 of the 10 students in the sample.

(2) Significant difference at the .05 level was indicated in lapse time intervals between questions formulated at the literal level and questions formulated at the critical level.

(3) The difference in lapse time intervals required to answer questions formulated at the literal level and the interpretation level approached significance at the .05 level.

(4) No significant difference in lapse time intervals between questions formulated at the interpretation level and

the critical level were indicated at the .05 level.

Conclusions and Discussion

The following conclusions were drawn on the basis of the findings in this study.

(1) Ninety-percent of the students in this study required, respectively, greater amounts of time to respond to questions of reading comprehension formulated at the literal level, interpretation level, and critical level.

(2) A definite hierarchical lapse time interval pattern was established with respect to question level and response, but was not significant between interpretation and critical level questions.

(3) Lapse time intervals may be determined to .01 second using an appropriate timing device.

Rowe (1973) and others have suggested and noted the positive results when teachers consciously endeavor to pause after posing a question. However, in reviewing the literature, this author has found no quantifiable data with which to support these ideas. This present study suggests that students do require and, indeed, "take more time to think" when responding to questions which necessitate thinking beyond mere recall of factual information. The implications of this disclosure will be discussed in a following section of this chapter.

Null hypothesis 2:

There is no significant relationship between questions and responses of reading comprehension at the:

2.1 literal level

2.2 interpretation level

2.3 critical level

(1) Analysis revealed a definite relationship between questions and responses at the three levels of reading comprehension; literal, interpretation, and critical.

(2) Questions may be formulated and responses classified using Smith's (1963) Reading Levels.

(3) Length of student response (i.e. the number of words in an answer) tended to increase when replying to questions formulated above the level of literal reading comprehension. This confirmed Rowe's (1973) study of the effect of increasing lapse time intervals. She states that "under a fast (questioning) schedule, responses tend to consist of short phrases and rarely exhibit explanation of any complexity. Data suggests... that prolonged wait-time contributes measurably to the appearance of longer statements."

This present study indicates an explicit relationship exists between the levels of the questions asked and the resulting level of student responses. It appears, then, that the level of the question asked, may have stimulated

and determined the type of thinking in which students engaged. This suggests a confirmation of Taba's (1967) hypothesis, that one of the single most important factors in the development of thinking processes is the nature of the questions that are asked. Ryan (1973) would agree on the basis of his study investigating potential relationships between question types and ensuing student performance. Analysis of data revealed that the level of student responses did, indeed, reflect the level of questions asked.

IMPLICATIONS OF THIS INVESTIGATION

This investigation has established that a respective sequential increase in lapse time interval is necessary for students in this study to respond to questions formulated at three levels of reading comprehension, i.e. the literal level, the interpretation level, and the critical level. Further, it was established that student responses reflected the questions asked at all three levels of reading comprehension. Because "teachers' questions are a basic unit underlying most methods of classroom teaching (Gall, 1970)," the findings of this study may be relevant to all those who teach, regardless of the academic setting.

Rowe (1969) states, "If you are like many experienced teachers, you allow an average of one second for a child to start an answer (to a question)." The findings of this study suggest that teachers should pause after a question is posed

and allow students "time" to construct a response. Further, because teachers' questions decidedly influence the kind of thinking in which a student will engage, it is suggested that teachers view the question as not only a tool which evaluates the extent of factual knowledge, but also as a device with which to stimulate and develop thinking of an interpretive and critical nature. The improvement of teachers' questioning techniques has, then, the primary objective of improving students' thinking. Because this study noted an existing relationship between question level and response level, it appears to confirm Taba's (1964) hypothesis that, "teachers get the kind of thinking they seek." Also students answering questions above a literal factual level require more 'time' to construct responses. Increased lapse time intervals may allow the opportunity for increased speculation and consideration regarding the question posed. This may necessitate decreasing the number of questions asked during a specific lesson. However, the question-answer interaction may become less barrage-like and more amenable for the sharing of ideas and opinions.

Finally, it is suggested that teacher training institutions might consider adoption of curriculum components specifically constructed for the purpose of sensitizing pre-service teachers to the 'art' of productive questioning strategies. Gall (1970) points out that pre-service teachers should "not only study questioning strategies, but also attempt

guided practice in their use." Micro-teaching may be an effective technique for such practice. Gall (1970) also feels that "teachers cannot be expected to learn the inquiry method or any new method of pedagogy if it is presented to them in vague, general, undefined terms; they can be expected to learn new methods if the methods are presented, at least in part, as sets of specific types of questions asked in specific classroom settings." This author, would agree, and further, the teacher who wishes to stimulate productive thinking during reading instruction must consider the nature of the reading material. The teacher may encourage students to think, during reading, by selecting the more provocative materials. The teacher may ask, Does the material 'leave something' for the reader to do? Does it open up avenues that invite more divergent thinking abilities?

In the last analysis, Wease (1976) states it well, "Questioning is the genesis of teaching and learning." If it is indeed the basic 'tool' with which teachers stock their pedagogical arsenal, then more research which focuses on question-answer interaction must be forthcoming.

SUGGESTIONS FOR FUTURE RESEARCH

As a result of this investigation a number of suggestions can be made for future research. These are as follows:

(1) The present study involved high reading comprehenders in grade six. It may be worthwhile to replicate this

investigation and vary both grade level and reading abilities. In this way possible developmental aspects of lapse time requirements and cognition might be explored.

(2) The present study required 10 data-gathering sessions over a 10 day period. Studies of a longitudinal nature need to be conducted to determine if any change occurs over time with respect to lapse time requirements and response levels as students become familiar with the questioning process.

(3) The present study utilized reading passages of a narrative nature. Other studies might be conducted which specifically determine whether the nature of the reading material (narrative, expository, or descriptive) affect lapse time intervals required to answer questions at the literal level, interpretation level, and critical level of reading comprehension.

(4) In the present study, data was gathered individually with each student, and then combined for analysis. Would similar results be obtained when research was conducted in an actual classroom setting?

(5) The existing literature is replete with considerable information regarding teachers' use of questions in classroom practice. Researchers may consider conducting studies which provide data which would aid teachers' questioning abilities.

(6) It was suggested that this investigation be considered in terms of the degree to which verbalization is a correlate of thinking processes, since student comprehension of reading passages may well have transcended abilities in verbal expression. As the study progressed it became apparent that certain students were more verbal than their peers. An investigation might be conducted which inspects possible relationships between verbal expressive abilities of students and linguistic complexity of their responses to questions asked at the various levels of a questioning taxonomy.

CONCLUDING STATEMENT

This investigation studied the cognitive nature of students' verbal responses as a function of teachers' verbal questioning and lapse time interval during reading instruction. It is concluded that a respective sequential increase in lapse time interval is necessary to respond to questions formulated at three levels of reading, i.e., literal level, interpretation level, and critical level. There also exists a relationship between questions and responses at these three levels.

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LIST OF STORIES AND MATERIALS

Braithwaite, M. "Adventure on Ice", from Strategies for Effective Reading, Gage Educational Publishing Ltd., 1975.

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APPENDICES

APPENDIX A

ORAL INSTRUCTIONS PRIOR TO READING STORY SELECTION

Instructions - Oral

I'm interested in studying the way grade-six students think about questions. I'd like you to read two stories. When you have finished reading the first story I'll ask you some questions about what you've read. We'll do the same thing with the second story. You may take as much time as you need to finish each story.

APPENDIX B

"THE LION IN THE SEWER"

THE LION IN THE SEWER

Ruth Manning-Sanders

Many years ago, young Frank Bostock brought his menagerie to a three-day fair in Birmingham. In the menagerie was a lion called Nero. Nero was a beautiful creature, big, sleek and tawny. He had a great, chubby head, and strong shoulders covered with a handsome dark mane. A king of beasts - Frank Bostock was very proud of him.

The menagerie was set up on the fiarground with the animal cages arranged on three sides of an open square. On the fourth side of the square was a platform where eight bandsmen sat, playing their instruments to attract the crowds.

Frank Bostock walked round his show, checking everything, to make sure that all was in order.

'I think we'll shift Nero into a larger cage. He's grown too big for the one he's in,' he said.

So his men brought another cage, and put a big chunk of meat in it. They opened the doors of both cages, and tried to persudade Nero to go into the new one.

But something frightened Nero; perhaps it was the noise of the thousands of people at the fair; or perhaps it was some little thing, like a piece of broken glass, glittering in the sun. At any rate, <u>something</u> frightened him, and instead of going into the new cage, he made a sudden dash for freedom. Before anyone could stop him, he had rushed right out of the menagerie, and into the fairground.

'There's a lion loose! A lion ..... There is. I tell you! Here he comes .... Run for your lives... Run! Run! Run!'

Those thousands of people on the fairground were shouting and screaming and running in all directions!

Poor Nero, more frightened than ever by all the hubbub, tore straight across the fairground, out of the gates, and away through the streets of the city. Men, women, and children fled before him. Shoppers dropped their shopping baskets; men lost their hats in their panic; shopkeepers slammed and bolted their doors; the police were running and blowing their whistles; drivers of carts urged their horses at a gallop down side streets - the whole city was in confusion.

The streets behind Nero were crowded with shouting people, but the streets in front of him were emptied as if by magic. On and on he ran, right through the city, till he came to a small brook. Into that brook he jumped - and disappeared!

What had happened? Just this. Under the banks of that small brook was a hole that led down into the city sewers, and Nero had dived right through this hole. And there he was, wandering about underground through the sewer tunnels that ran for miles and miles beneath the city.

At intervals along these tunnels were the manholes, or openings, used by workers to go down and inspect the drains. Whenever Nero came to one of these manholes, he greeted it with loud roars. Soon an enormous crowd of people gathered to listen to Nero's progress down below. The roars echoed

and echoed along the enclosed space of the sewer tunnels. They very earth itself seemed to be roaring, and the listeners were half wild with terror.

Nero was not really a savage animal. Frank Bostock, who was known to be one of the greatest animal trainers then living, could usually do anything with the animal. Frank would pat and fondle the great chubby head, tickle the big sleek body, and get the lion to take food out of his hand. But now that Nero was excited and terrified, Frank knew that it would be difficult to get the lion to listen. It seemed impossible to coax Nero out of those sewers.

What on earth was to be done? Every now and then a man would come running to say that at this manhole or that, Nero's great head had been seen poking up, eyes glaring, ears flat, and lips lifted in a snarl. People were imagining that they could see him everywhere! And every now and then, the police would come up and tell Frank that there were thousands of people on the fairground, all very much afraid; and that he must, he simply must, do something!

So Frank decided that he would do something. If he couldn't catch Nero, he could at least quieten the people by pretending to catch him. So he chose two of his most trusted animal keepers, and told them what he intended to do.

The keepers went back to the menagerie and put a very old and quiet lion, called Punch, into a shifting den. The den had a partition in it, worked by a spring. Punch was put

behind the partition, and then the keepers covered the den with thick canvas, so that no one could see the lion. They hoisted lion and den on to a wagon that was drawn by two horses.

Away went the wagon, rumbling through the city, followed by a huge crowd of excited people. When the wagon reached the brook, the den was removed and placed in front of the manhole down which Nero had disappeared.

Meanwhile, one of the lion trainers, Orenzo, entered the sewer by using a distant manhole. Orenzo was carrying a strange assortment of weapons with him; a revolver, a bundle of firecrackers, a frying pan, and a thick stick. And he also took Marco, Frank Bostock's dog.

Slowly, slowly, Orenzo and Marco crawled along the sewer in the direction of the brook where Nero was. Orenzo was making as much noise as he possible could, setting off firecrackers, banging the frying pan, beating the sides of the tunnel with his thick stick, and urging Marco to bark and growl his loudest.

'Well,' the waiting crowds told each other, '<u>something's</u> happening down there!' For all this noise was echoing like thunder along the sewer tunnel, and getting nearer and nearer to the brook.

Suddenly the noise stopped. There was a moment's complete silence; and then two quick revolver shots. That was the signal Frank was waiting for. The men in charge of the shifting

den touched the spring, there was a sharp click, the partition fell in, the men snatched the canvas off the den - and there stood a lion, plain for all to see!

It was not Nero, of course. It was Punch, but the watching crowd couldn't know that. And sleepy old Punch was playing his part well. He had been peacefully snoozing under his canvas covering, but the revolver shots had roused him, and he had leaped up with a roar. Now he was running to and fro in the shifting den, and lashing his tail - the very image of a ferocious, newly captured beast!

A great shout went up, 'They've got him! They've got him! They've got the lion!'

The shifting den was taken back to the menagerie. Orenzo and Marco came up out of the sewer, and Orenzo was carried shoulder-high behind the wagon, while the people cheered. That afternoon, over forty thousand people swarmed into the menagerie, to see the fierce lion that had escaped and been captured again. Never had the menagerie done such business!

But - Nero was still in the sewer!

All that night, and all the night after that, Frank couldn't sleep. He place armed sentries by the manhole near the brook and then spent the hours of darkness touring all the other manholes in the city: watching, listening, but hearing nothing.

On Saturday afternoon, which was the last afternoon of the three days' fair, he went to the Chief Constable and told

him the whole story. At first, the Chief Constable was very angry. But when he calmed down, the Chief said he supposed Frank had acted for the best. Then together they thought out a plan for the recapture of Nero.

Very early Sunday morning, when all the town was sleeping, two hundred volunteers, police, and menagerie hands, all sworn to secrecy, assembled in the big tent.

Silently the rescuers stole off to their appointed places along the sewers. Every exit was guarded, and a shifting den was place in position at the manhole down which Nero had disappeared. Then, with three companions, and the dog Marco, Frank entered the dark and slimy sewer. He began crawling forward on hands and knees, for there was no room to stand upright.

By and by, Marco gave a sharp bark, followed by a throaty growl. Away in the darkness ahead gleamed two greenish-red eyes. Nero! Frank sent one of the men back with the news. Other trainers immediately lowered themselves into the manholes, to which ropes with slip knots were fastened.

Firing blank cartridges and firecrackers, Frank and his two companions crawled nearer and nearer to those gleaming eyes. Frank reasoned that Nero would turn and go back the way he had come in, to where the shifting den was waiting for him.

But the gleaming eyes did not move: more blank cartridges, a real cascade of firecrackers, furious growls and

barks from Marco. Not a sound, not a movement ahead. The eyes, still in the same location, gleamed out of the darkness.

Frank was puzzled and was considering what to do next, when Marco lost patience. Bristling and growling furiously, the dog dashed forward. There, in that evil-smelling darkness, a battle raged between dog and lion. Roaring, barkings, growlings, snarlings, and howlings echoed back through the narrow tunnels. Nero lashed out with all his strength. Marco returned again and again to the attack. Only when he was slashed, bitten, and bleeding from a dozen wounds, did Marco come crawling back to Frank for protection. Frank at once told one of his helpers to take Marco up to the surface and have his wounds attended to.

Now Frank and one other keeper remained in the sewer - and ahead of them the infuriated Nero lurked in the darkness. Frank crouched on hands and knees, in darkness except for those two greenish-red eyes, glaring and gleaming but never moving.

Why did Nero not move? He must be made to move somehow! The first thing that Frank did was to take off his big jackboots and put them on his hands and arms, as a protection against Nero's teeth and claws. Then inch by inch, Frank crawled forward.

Still Nero did not move. He just gave a deep, angry growl. Frank was not so close that he could feel Nero's hot

breath. If a person could have stood upright, he would have had a chance. But Frank was crouched and his head was at Nero's mercy. If Nero should lash out with one of his heavy paws, he could split Frank's head open like an eggshell.

'Quick, the pail! Put the pail over my head,' Frank whispered to his assistant.

Frank referred to a large iron pail in which the were carrying their blank cartridges. The keeper clapped it over Frank's head like a helmet. Frank gave a sudden lurch forward, and brought one of the heavy jackboots, smack, across Nero's nose.

And still Nero refused to move. He just growled savagely.

Then, as Frank drew himself together for another smack at Nero, the pail tipped, rolled off, and went clattering down the sewer, making a noice that echoed through the narrow tunnel like clap after clap of thunder. It was too much for Nero who turned - and vanished.

Then Frank found out why the poor beast had refused to move before. Immediately behind Nero's resting spot was a two-metre drop in the sewer tunnel. Somewhere beyond this drop, the rescuers could hear the lion roaring and roaring! Scrambling down the two-metre drop, they followed the sound, and very soon they found the animal. While leaping, Nero had caught his hind legs in one of the slip nooses that had been lowered down a manhole. And there he was, hanging upside down, and quite helpless.

Poor Nero! The rescuers obtained other ropes and speedily turned the lion right-side up. The shifting den was fetched and placed above him. And so, wet, cold, covered with filth, and as unlike a king of beasts as anything could be, Nero was hauled up and rushed back to the menagerie. And there, on a huge bed of straw, with plenty of food and water close beside him, they left him to rest and recover, and clean himself up.

APPENDIX C

"ADVENTURE ON ICE"

ADVENTURE ON ICE

Max Braithwaite

"Chris Summerville, you've got rocks in your head," Dumong LePage point his finger at his friend and fixed him with a glowering stare.

They were sitting at the kitchen table in the Summerville home in Harrisburg. Through the window Chris could see the sun gleaming on white snowbanks. It looked great for ice fishing.

"I tell you Little Birch Lake is the best place to catch whitefish," Dumont finished.

Chris ignored finger and stare. "You're nuts," he said, "Look at all the fishermen's huts on Green Rock Lake."

"That's just the point!" Dumont waved his long arms. "I tell you ..."

But he didn't finish. A black-and-white bundle of shagginess, about the size of a wolf, bounded through the door, plunked its big paws on Dumont's lap, and licked his face.

"Get down, you flea-bitten mutt!" Dumont gasped.

"Arthur like you," Chris grinned. "If you call him a mutt you'll hurt his feelings."

"Where there's no sense there's no feelings," Dumont scoffed. "We're not taking him with us, are we?"

"Where I go Arthur goes," Chris stated flatly. "I wouldn't feel safe without him around."

"How do you feel safe with him around? He'll get in the way, get tangled in the lines, eat the fish ..."

"Just the same he's coming. Now, as I was saying ... Green Rock Lake is ..."

The door opened again and Chris's mother came in. "You will be careful, Chris, won't you?"

"Yes, Mom, we'll be careful. We'll wear warm clothing, we'll take a compass ..."

"And plenty of matches in a waterproof case," Dumont added. "And Willie Longknife is coming with us. Willie knows this country like the back of his hand." Willie was a Cree whose father was the best hunter and guide in the area.

"I'm glad Willie's going with you," Laura Summerville said. "I'll feel better. But is the ice safe?"

"Safe! Mom .. there are dozens of huts on that ice. It's half a metre thick. Besides, Arthur will be with us."

Dumont put his hand over his face. "Please ... do you want to ruin our chances?"

Laura Summerville smiled. "Well, do be careful." She left the room, and the boys went on assembling their gear.

Ten minutes later they were trudging along the snow-covered road that wound through rock and bush west of town. The wind was stonger than it had been and the boys kept their noses buried in the fur of their parkas.

Willie Longknife was waiting for them at a small bridge

about a kilometre from town. Immediately both boys renewed their argument about the best lake for fishing.

Willie listened and then said, "Little Birch is better. Not many people go there yet."

"But how do we get there?" Chris protested. "The road turns here for Green Rock."

Willie pointed to the small river below them. "Follow the river. We've all got snowshoes. It's only about two and a half kilometres."

"But my folks think we're going to Green Rock," Chris said.

"What's the difference?" Dumont asked.

"I don't know. None, I guess. Come one, let's get our snowshoes on." But a little shiver of worry had pierced his mind. He remembered his father's warning - never take chances.

Half an hour's tramping brought them to the rocky tree-covered shore of Little Birch Lake. Not a soul was in sight. Far out on the lake they could see one lone fisherman's hut, but there was no smoke coming from the stovepipe.

"Come on," Willie said, leading the way across the expanse of pure white snow. Out of the shelter of the bush the wind cut like a knife.

Quickly they shoved the loose snow from the ice with their snowshoes and Chris began chopping a hole. It was hard work. When he was down half a metre he handed the axe to

Dumont. Soon the bottom of the hole was showing wet. "Get those minnows ready," Dumont panted. "We'll soon be fishing."

Then it happened! Arthur, who'd been looking for rabbits in the bush, lumbered down across the ice, crept up to the hole, and bumped Dumont just as the axe came down. Instead of the clean ring of steel against ice there was a sickening thud as the keen edge sliced through leather boot.

"Ouch!" Dumont sat down and stared with disbelief at the cut in his boot, from which a trickle of blood was spreading out over the snow.

Willie and Chris dropped on their knees beside him.

"Gosh ... gosh...," Chris breathed. "That crazy dog, I'm sorry, Dumont."

"It's bad," Willie said. "He's bleeding a lot."

Chris held back the panic. First aid. What do you do for bleeding? Of course ... a tourniquet. Shaking off his mitts he reached into his picket for a handkerchief, tied it loosely around Dumont's leg, and slipped the end of the axe handle under the handkerchief. Then he twisted it.

"Bleeding seems to be stopping," Willie said.

"Yeah... yeah ... but we can't leave it one," Chris panted. "Got to wrap the foot up in something. But what?"

For answer, Willie undid his jacket and yanked a long scarf from around his neck. "This'll do." He wound it tightly around Dumont's foot.

"Dumont, how do you feel?" Chris asked.

"All right. Kind of cold." He shuddered slightly.

"What are we going to do?" Chris asked, staring at Willie. "We've got to get him home. But how? It's three kilometres. Can you walk?" he asked.

For answer Dumont struggled to his feet, gingerly put his foot down, and gasped with pain. A stain of blood showed through the scarf.

The three boys were silent. With brutal suddenness their situation had become critical.

Willie Longknife looked out over the lake. "If we got him to that hut we could at least keep him warm."

"Yeah.... But how can we get him there?"

"Pull him." Without further explanation Willie sprinted across the flat surface of the lake and up onto the bank. The axe rang out sharply and in no time he was back with a spruce tree three metres long. "Dumont can lie on this and we can pull it over the hard snow," Willie said.

"We can try," Chris said. "Come on, Dumont." He helped his friend onto the tree.

"Now we'll each grab one of these bottom branches and pull," Willie said. "Take it easy at first. That's it."

Slowly, the spruce, with Dumont clinging to it and shivering with cold, began to move over the ice.

It was the longest, hardest pull the boys had every tried, but each time they looked down at Dumont shivering with cold and pain, they had renewed energy to struggle on.

The wind was rising now, and the fine snow was beginning to slide across the surface of the lake. When they reached the cabin, they could scarcely see it through the increasing ground drift.

"We made it," Chris gasped. The he almost cried. "There's a padlock on the door!"

"Soon fix that." Willie put the edge of the axe blade under the hasp and pried the screws out of the wood. Together the boys heaved Dumont through the door and banged it shut. In the sudden shelter Chris took a deep breath as he looked around. The hut was about three metres long and two metres wide, had benches along each side, and a hole in the centre of the floor.

"Gosh, it's colder in here than it was outside," Dumont groaned as they propped him up on the bench.

"Soon fix that, too." Willie took the lid from the small iron stove and began breaking up some of the sticks that were piled near it. In no time he had a fire going.

Chris sat down beside Dumont. "How do you feel?"

"Like a regular cutup." Dumont tried to grin, but managed only a grimace of pain.

"Your folks know where you are, Chris?" Willie asked.

"No. They think we're at Green Rock." Then his heart fell. "And Dumont's dad's away at a bonspiel in Pineland. What about your dad?"

"Out on his trapline for a week."

"One of us will have to go for help," Chris gasped.

Willie opened the door a crack. The wind whistled in. "Worse than ever out there. Couldn't make thirty metres. We'll just have to wait until the blizzard dies down."

Neither boy said a thing more. They were in a desperate spot and they knew it.

Back in town, a worried Laura Summerville phoned the mine office were Chris's father worked.

"Charles," she said anxiously, "Chris and Dumont and Willie went ice fishing... and they're not home yet."

"It's only two in the afternoon, Laura."

"But there's such a wind. I'm worried."

"Those boys can look after themselves."

"But you know what it's like out on the lake when there's a wind. I think I'll drive out to Green Rock and get them."

"You know how Chris hates the idea of parents dashing out and giving kids lifts whenever ..."

"I don't care about that now, Charles, I'm worried."

"All right. But I'm closer, and I have the jeep. Just as soon as I finish a couple of things here, I'll drive out."

In the semi-darkness of the hut, Dumont LePage groaded with pain. He was lying full length on the bench now, his left side almost frozen from the wind that whistled through the cracks in the wall, but his forehead hot with fever. Willie and Chris had taken off his shoe and dressed the wound

as well as possible. Arthur leaned his heavy head and chest over Dumont's feet as though trying to atone for what he'd done.

"How are you feeling, Dumont?" Chris got up from the other bench where he and Willie were sitting.

"Not bad," Dumont tried to grin. Chris looked to the stove. There were only four more pieces of wood left. He shook his head. "Willie, we've got to have more fuel."

Willie picked up the axe and went to the door.

"Where are you going?" Chris asked.

"To cut up that spruce we pulled Dumont here on. It's green but it'll burn just the same."

"What about your dog?" Willie continued. "Any chance he could find his way home and bring help?"

Dumont opened his eyes and grimaced.

"His name is Arthur, not Rin Tin Tin. He couldn't find his way out of Chris's front room."

For once Chris didn't argue. He knew it was utterly useless to try to send Arthur on such an errand. Arthur just wouldn't understand.

Willie opened the door. The wind ripped it from his grasp and banged it against the hut. He wrestled it back into position and Chris pulled it tight, but the air in the little hut was filled with swirling snow. Only then did Chris notice that Arthur had gone out, too. Oh well..., it didn't matter. Couldn't lose that dog.

"You didn't find them!" Laura Summerville stood at the door of her husband's car, which had just pulled into the garage.

"There's nobody on the lake at all. Everygody left when the blow started. But I talked to half a dozen guys. None of them saw the boys out there at all."

"Then they may be somewhere in the woods. Lost!"

"You've checked every spot they could be in town?"

"Yes... yes ... I've phoned everybody."

"Now we mustn't panic. I'm scared too, but the boys are in one of the huts on Green Rock. I'll phone Constable Blake first thing in the morning."

"I don't think we should wait until..." She was interrupted by a loud bark and Arthur bounded into the garage.

"They must be home!" Both parents dashed out of the garage. "Chris! Willie! Dumont! Are you there?"

For five minutes they called, but the only answer was the howling wind.

"Arthur must have left them." Laura reached down and patted the big dog. Then she drew back her hand. "Blood! Charles, there's blood on his fur!"

"It's blood all right." Charles Summerville felt gingerly in the fur. "But not his. He got it off something else... or somebody."

They stared at each other. Then Charles Summerville bent over the dog. "Take us to Chris!" he yelled fiercely.

"Do you hear me? Take us to Chris?"

Arthur just scratched at the kitchen door. He wanted his supper.

"There's only one thing to do," Charles Summerville said, "And that's phone Pineland for the helicopter. As soon as it's light tomorrow I'm going to be over Green Rock Lake.

Nobody slept in the Summerville house that night. When the first light showed and Charles Summerville was ready to leave, there was no sign of Arthur. "That crazy pooch must have gone back to the boys," he cried.

He had. Chris was awakened from a fitful sleep by a loud barking at the door. "Hey, Arthur's back!" he muttered.

He opened the door and the big dog bounded in. "Arthur, you stupid mutt, have you been home?" he whispered. "Why was I such a fool as not to put a note on your collar?"

Dumont was stretched out on the floor now. Both the benches had been broken up and burned. The fire was just about out, the hut terribly cold.

Willie stood up, went to the door, and opened it. Through the drifing snow he could see that the sun had risen. The wind was stronger then ever.

"It's light. We'd better start across the ice," he said.

"What?" Chris said. "We'll never make it."

"Perhaps not. But if we stay here we'll freeze."

"Okay," Chris said. "I'll put my outer jacket around

Dumont too. Not moving he'll need the extra."

Outside the wind was blowing harder than ever. "It isn't going to work, it isn't," Chris muttered to himself, feeling his own blood chill.

Then Arthur began to bark.

"What is it, boy?" Chris asked, and even as he did he heard the steady staccato sounds of a helicopter. "Quick! Outside!" he yelled, pushing the door open and leaping through. Willie and Arthur followed. The boys waved their arms and shouted. Arthur barked and leaped high in the air. Through the driving snow Chris saw the big, ungainly from of the helicopter settling down on the ice.

"How did you find us?" Chris asked. They were all crowded into the small hospital room where Dumont lay in bed, the infection in his foot checked.

"Arthur led us to you," Charles Summerville said.

"Arthur? A hero?"

"Well... he didn't exactly intend to be. He beat it before we got going this morning. But we spotted him from the air, ambling along the road. Then he cut off down the creek and we lost him in the bush, but we figured he was heading for Little Birch. The top of your shack was just barely visible through the ground drift."

"You silly old prune." Dumont reached his hand towards the big, shaggy head resting against the white sheet of his bed. "You are some good after all."

Arthur licked the hand, lifted his big tail and let it flop down on the floor.

APPENDIX D

QUESTIONS ASKED REFERING TO

"THE LION IN THE SEWER"

THE LION IN THE SEWER

Literal Level

1. What was the animal trainer's name?
2. Where did Nero go to escape the crowds?
3. What happened to Marco when he was in the sewer?
4. What did Frank do to make the people feel less afraid?
5. What did Frank ~~put~~ over his head to protect himself when he was in the sewer?

Interpretation Level

1. At first the chief constable was very angry with Frank for tricking the people but then decided that he had acted for the best. What do you think made him feel Frank really acted for the best?
2. Suppose Nero was loose in Fort Saskatchewan. Do you think it would be easier or more difficult to capture him? Please explain.
3. In what ways do you think Frank shows courage during the capture of Nero?
4. If you were the animal trainer in the same situation, what would you have done to capture Nero?
5. What would you consider to be the most crucial moment during the capture of Nero?

Critical Level

1. Do you think Frank was right to trick the people into thinking he had captured Nero? Please explain.
2. Nero was captured on a Sunday morning. What might have happened if Nero hadn't been captured for another several days?
3. What do you think of the way the people behaved after Nero escaped?
4. What would have been a better way to move Nero to a larger cage?

5. What else could have been done to ensure the safety of the people of Birmingham?

APPENDIX E

QUESTIONS ASKED REFERING TO

"ADVENTURE ON ICE"

ADVENTURE ON ICE

Literal Level

1. Who was Arthur?
2. Why did Dumont want to go to Little Birch Lake instead of Green Rock Lake?
3. Who did the dog belong to?
4. Why couldn't one of the boys go for help after they had taken Dumont to the fishing hut?
5. How did the accident happen?

Interpretation Level

1. What evidence indicated that Willie Longknife was more capable in the outdoors than either Chris or Dumont?
2. Suppose you had been fishing with some friends, and the same kind of accident happened. What would you have done?
3. Why do you suppose that Chris' mother felt better when she found out that Willie was going with the boys?
4. Why do you think Dumont didn't like Arthur at the beginning of the story?
5. How did Dumont's feelings change towards Arthur after the rescue?

Critical Level

1. What might Dumont have been thinking about as he was lying in the fishing hut?
2. Do you think the author of this story wanted us to learn anything from the experience he described? Please explain.
3. Once the accident had occurred, do you agree with what the boys did? Please explain.
4. What qualities did Dumont have which made it possible for him to survive the ordeal?
5. In what ways might they have been safer if the same accident had occurred at Green Rock Lake?

APPENDIX F

STUDENT RESPONSES TO QUESTIONS FORMULATED AT THE LITERAL LEVEL OF READING COMPREHENSION FOR THE STORY "THE LION IN THE SEWER"

LITERAL LEVEL

The Lion in the Sewer

Student #1.

1. Something like Bullock?
2. The brook.
3. He was beaten by the lion?
4. Make them think that he had captured Nero.
5. He put a pail over it.

Student #2.

1. Frank Bostock.
2. In the sewers underneath the city.
3. He was fighting with the lion and he got hurt.
4. To trick them into believing that he had captured Nero.
5. He put a pail that had cartridges in it over his head.

Student #3.

1. Frank.
2. He went in a sewer.
3. He got slashed and cut up.
4. Use another lion to trick them.
5. Put a pail over it.

Student #4.

1. Uh Frank.
2. Down the streets and into the ponds and then into the sewer.
3. Oh, he got all bitten up by the lion because he tried to fight him.

The Lion in the Sewer ...

4. He put another lion in the cage to make people think it was the other lion.

5. He put a pail over it.

Student #5.

1. The animal trainers came in the story was Frank Bostock.

2. He ran out of the city and, well not quite out of the city, but he jumped into a brook which led into the sewer systems, and he went in there to escape from all the mobs.

3. What happened to Marco was he went in because the lion would not move, so he went in and Nero and lion started slashing and biting at him and then after a few more slashes and scratches Marco came back out, because it was too much for him.

4. He decided to make them think that he had caught Nero by getting another lion called Punch, which was an old and lazy lion and when the people though he had caught Nero they all were happy and went home and weren't so excited and afraid.

5. The way Frank protected his head when he went into the sewer to get Nero was that he put a pail on top of his head so that Nero could not him him with his claw and break his head open.

Student #6.

1. Frank Bostock.

2. He went through the town and to the pond and jumped in ... in the sewer.

3. He fired firecrackers, oh um... Marco barked loudly, Marco was the dog, right? ... yeah, he was told to bark and make lots of noise.

4. He decided to get a different lion to take him to the town to show the people that the lion had been caught, but it wasn't Nero.

5. I can't remember that one.

The Lion in the Sewer ...

Student #7.

1. Henry.

2. A sewer.

3. Um he was trying, uh they were trying to capture the, lion and he got frustrated and so he went and started to attack the lion and he got wounded so many times that he had to go up on top for assistance.

4. He put men down in the sewer to pretend they were capturing him and then he put a blanket over the cage and when they moved the blanket he put an old lion called Punch in there and the crowd thought it was Nero.

5. He put a tin pail, like an Army helmet over his head.

Student #8.

1. I think it was Frank, but I can't remember his last name.

2. In a stream, he jumped into a stream and fell down into a sewer.

3. Um he was growling at Nero, and he went to attack him and Nero attached him and he had to go back up.

4. He put another lion in the cage and so they'd think he'd captured Nero.

5. He put a pail over it.

Student #9.

1. Frankie

2. To the brook that led to the sewers.

3. He uh, he um lost patience and lunged forward at the lion and they started fighting.

4. Uh he worked up a plan to make, and um, and put one of the um other lions into a cage and made them think it was Nero.

5. Put a pail over it.

The Lion in the Sewer ...

Student #10.

1. Frank Bostock.

2. He ran out of the fair grounds and he went to a nearby book and he jumped in and went to a sewer.

3. Marco started to growl and he went forward and got all slashed up.

4. They put another lion named Punch and they, they did a whole bunch of act like they pretended to be scared of Nero and they they put black canvas all over the cage so that they couldn't see the lion and then they made two revolver shots so that the lion would get up and walk around and growl and everything and act like Nero and so the people thought that they had captured him.

5. He put a pail over it.

APPENDIX G

STUDENT RESPONSES TO QUESTIONS FORMULATED AT THE LITERAL LEVEL OF READING COMPREHENSION FOR THE STORY "ADVENTURE ON ICE"

LITERAL LEVEL

Adventure on Ice

Student #1.

1. He was a dog.
2. He thought it was better fishing.
3. Chris'.
4. It was too cold and there was a blizzard.
5. Chris was coming out of the woods and, no ... Arthur came and he bumped into Dumont and Dumont hit himself with the axe.

Student #2.

1. Arthur was the dog.
2. Dumont thought Little Birch Lake would have more fish.
3. He belonged to Chris.
4. After they had gotten in a blizzard started.
5. One of the boys pushed Chris when he had the axe.

Student #3.

1. The dog.
2. He said the fishing was better there.
3. Chris'.
4. Because of the storm and they couldn't see or anything.
5. Uh, ... Arthur, someone put the, no, Arthur put the axe on Dumont's foot.

Student #4.

1. Arthur was the dog.

Adventure on Ice ...

2. Because it was better fishing there.

3. Chris'.

4. Because there was a blizzard coming up and it was windy.

5. Arthur was chasing rabbits and he came down and he knocked Dumont and the axe fell on Dumont's foot.

Student #5.

1. Arthur was the dog who rescued all the boys by going back to Chris' house and then led the helicopter back to the hut.

2. Dumont wanted to go to Little Birch Lake because he knew that less fishermen were there at this time of the year and with less fishermen there they might have better luck.

3. Arthur was Chris' dog.

4. The reason that neither one of the boys could go for help was because they would not be able to find their way back home, because of the wind and the drifts coming up.

5. The accident happened when Dumont was chipping out the ice to get down to the water and Arthur came up behind him and bumped him and the axe slipped and cut him in the foot.

Student #6.

1. Arthur was the dog.

2. Because um, Green Rock Lake had many cabins on it and they wanted to go to Little Birch Lake cause it didn't have as many.

3. Willie?

4. Because there was a blizzard outside and they couldn't see to, to, very well where they were going and they could get lost.

5. There was a hole ... Arthur the dog was chasing rabbits I think and he accidently bumped Chris and he was swinging the axe down to the ice and he bumped and his leg got in front of the axe, and just hit his leg.

Adventure on Ice ...

Student #7.

1. A dog.
2. He said there were more fish there.
3. Chris.
4. It was stormy outside and the wind was blowing too hard.
5. They were digging a hole in the ice with the axe, and Arthur the dog came and bumped Willie who had the axe and it chopped off the guy's foot ... sort of.

Student #8.

1. He was Chris' dog.
2. Because he thought that it was better fishing there and it was a little bit better than Green Rock?
3. Chris.
4. Because it was too snowy outside and they couldn't, they wouldn't have been able to see where they were going.
5. Arthur bumped into um Dumont cause he was going to chop the ice and that axe landed down on his boot.

Student #9.

1. Arthur was the big dog.
2. Because he thought the fishing was better there.
3. He belong to Chris.
4. Well, because the wind and the blizzard was too strong.
5. Arthur came along and Dumont was chopping wood and Arthur bumped him and instead of chopping the ice he chopped his foot.

Student #10.

1. Arthur was a dog.

Adventure on Ice ...

2. Dumont wanted to go to Little Birch Lake because there was, there wasn't as many people and so there would be more fish and he thought it would be better fishing there.

3. Chris.

4. Well, it was such a blizzard and they didn't really have the right clothes and stuff for a blizzard and so they would get about thirty meters and probably stop and have to go back.

5. Well, Dumont he was chopping wood and then Arthur came along and bumped him and he slit his foot with the axe.

APPENDIX H

STUDENT RESPONSES TO QUESTIONS FORMULATED AT THE INTERPRETATION LEVEL OF READING COMPREHENSION FOR THE STORY "THE LION IN THE SEWER"

INTERPRETATION LEVEL

The Lion in the Sewer

Student #1.

1. Then the people wouldn't panic any more, because they knew the lion would be captured.
2. More difficult, because he could go down by the river and hide in the trees.
3. He walked right up to Nero and booted him with his boot.
4. Set a whole bunch of traps and put nets at the ends of the sewers, and put nets on tops of the manholes so if he ever decided to come out, he would just jump right into the net.
5. When Nero fell in the two meter drop behind him and got caught in the ropes.

Student #2.

1. That he had tricked the people into believing that the lion had been captured so the lion wouldn't be hurt and nobody else would be hurt.
2. More difficult, because it would be hard for him to get into the sewers and he would be probably walking along the streets scaring everybody.
3. To be able to go up to the lion when the dog was hurt.
4. I would have probably tied the animal or persuaded him with meat because he was probably hungry by that time.
5. When there was the hole behind the lion and Frank could've gotten hurt.

Student #3.

1. No attempt.
2. Easier, because there was more space.
3. Because he was the one who sent up to catch Nero.

4. Put food somewhere so he could smell it and he would come up ... I don't know.

5. When they had to get him out of the manhole.

Student #4.

1. I don't know.

2. It would be harder because there's a whole bunch of open fields around here where all the houses are being built and he'd be running all over and there's the river, and he could run down by the river and people wouldn't know where he was.

3. Most people wouldn't go down to see the lion because they'd be afraid he'd attack them or something.

4. Probably the same thing. I can't think of anything else that would make him come out.

5. I'm not really sure ...

Student #5.

1. Well I think that maybe the reason that after a while that he had acted for the best was that if he hadn't done that the people would have been still afraid and there might have been great riots and mobs and if Frank hadn't done that there would have been lots of trouble.

2. I think that it would be probably be more difficult because nobody has seen a lion in Fort Saskatchewan apart from a circus that once came here and a loose lion in Fort Saskatchewan would probably cause more panic than in lots of ther places, cause in larger cities there has been more accidents happening than in small towns and villages where something like that could cause great riots.

3. Where he goes in all by himself with just his boots on his hands and a pail with no firearms or weapons or anything and he goes in to where the beast is.

4. I think that I would've just somehow, if you could've, surrounded him with ropes and or if you had to just use a tranquilizer gun so he wouldn't get hurt and then with a tranquilizer gun you could just put him to sleep and then haul him back up to the surface and into his cage when he work up he'd be inside his cage.

The Lion in the Sewer...

5. I think the most crucial moment would probably be when the pail fell off Frank's head Nero just turned around all of a sudden vanished from sight and they could not have known whether he fell down, how far he'd fallen, or what had happened or what.

Student #6.

1. Uh, the way he had caught the other lion, like he, when he went down to the pond he had the other lion come up with him and like he thought that he was doing a good act and that he would calm the people and that there wouldn't be too much trouble once there wasn't any commotion, and he would just be able to get the lion.

2. I think it would be, well, easier, because well we don't have an access like that to the sewers and its mostly a wide open area um, the people would scramble um, yeah I think it would be easier, it seems to be a wide open area not too many buildings sorta wide open.

3. Um when the, he had to show courage the way he um had to get another lion to do this ya know wanted to go along with making the lion roar and taking the chance of it in case that Punch the other lion he could get all scared and he could go after somebody. So he had to take a chance.

4. Well, if I was the animal trainer I would've gotten men and I would've been in the fronts of other men and I would've been very quiet and would've approached the lion and tried to calm him, and tried to get him out and tried to get him out of the sewer calmly and quietly and put him into a cage.

5. I don't know.

Student #7.

1. He calmed all the people down, they weren't so nervous and they weren't yelling and screaming.

2. It would probably be easier if her went in the sewerage system because it isn't that big and he wouldn't have such a time trying to locate him.

3. He went right beside a wild lion that wasn't really that tame.

4. Probably the same thing.

The Lion in the Sewer ...

5. Just the time when he would go right up to him and just sit there and try to get him to move.

Student #8.

1. Well if he hadn't put another lion in there the people would be running around the town real scared and wouldn't come out of their homes and they go to the um they'd go to the police and the mayor or something to demand that he capture the lion.

2. Well, Fort Saskatchewan is not very big so if he got away there aren't many places that he could go and he'd probably be better if he escaped in Fort Saskatchewan.

3. Well, he went down into the hole and he told some of the people to go back up and there was only him and one more man down there and so the lion could have attacked those, and he wouldn't have had much chance.

4. I think I would have probably done the same thing, gone down in the sewer and tried to get him back up into a cage.

5. Probably when he had to sort of scare him out because if you scare him too much he coulda tried to get back, not the way they were supposed to but the other way, and he coulda gone up and there wasn't a cage there and he would have been loose again.

Student #9.

1. Well the people had calmed down a lot and they weren't so frightened any longer, didn't make so much noise any more and scared Nero down the manholes.

2. I think it would be more difficult, um I don't know I think lots of people around here are so frightened of things from most of my friends are so frightened of lions and everything I like lions though I think they're nice.

3. Well um he stayed in there uh he didn't get scared when the lions started growling and uh fighting with Marco. I would be scared to death.

4. I would have probably sent someone else in, as much as I like lions I wouldn't have gone in there myself.

5. When they were, when the lion and the dog were fighting and he finally caught the lion and got him out.

The Lion in the Sewer ...

Student #10.

1. Well maybe people would start to feel afraid and wouldn't go out of the house and stuff like that just cause there was a lion so he was really trying to protect the people cause they'd, they would go about normally and really Nero wouldn't hurt anybody.

2. Well, I think that maybe it would be a little easier because well... like I can't really explain...the people I think would be less afraid around here I don't know why but I have a feeling that they would be and maybe they would try to help out more...I don't know.

3. Well he went down there and he was trying to tell everybody that Nero wasn't going to hurt anybody so he went down there brave with only rubber boots on his hands and a pail over his head.

4. I think I would've done the same thing that he did cause he showed great trust in the animal and it was a smart way to do it.

5. Well, I think it was when uh Nero was hanging upside down and they didn't know when the dog went in there and he got slashed.

APPENDIX I

STUDENT RESPONSES TO QUESTIONS FORMULATED AT THE INTERPRETATION LEVEL OF READING COMPREHENSION FOR THE STORY "ADVENTURE ON ICE"

INTERPRETATION LEVEL

Adventure on Ice

Student #1.

1. He always knew what to do. He cut down the long tree and he cut the hole in the ice.
2. Gone to the nearest shelter and fixed up the guy's foot and made a fire of the nearest trees.
3. Because he was the sone of a hunter and a guide.
4. He thought he was a mutt, because he jumped up on him and licked him.
5. He really liked him after.

Student #2.

1. He thought of bringing him to the hut, of using the sticks as a stretcher and his father was a Cree Indian.
2. I probably would have screamed at the sight of blood, but I think if there was a hut or woods around I'd have brought him there.
3. Because he was more experienced in fishing and living alone in the wilderness.
4. Because he was a ~~big~~ dog and too playful.
5. Because the dog had maybe saved him from bleeding to death and he thought the dog was a hero.

Student #3.

1. He went out to get a spruce tree to carry Dumont.
2. Done what they did.
3. Cause he knew more about the wilderness.
4. He thought he was a dumb dog.
5. Cause Arthur had brought the people to where they were.

Adventure on Ice ...

Student #4.

1. His father was a kind of a tour guide around there and would go out with people and show them different sights in that area.

2. Well... I probably would have gone for help but it was quite a ways so I maybe wouldn't have gotten back there till it was dark, and I maybe didn't know where I was situated, so I would have probably have done the same thing they did.

3. She felt better because Willie knew the area really good.

4. Because Arthur would always come up and lick him and Dumont didn't really like this so he called him names.

5. He thought Arthur was a good dog because he actually saved his life.

Student #5.

1. I think the evidence that showed that was the boys were thinking when they'd first got into the hut, they thought that even right in there there was hardly any protection and Willie he just went and there was some wood there and he said we've got wood just make a fire and he also thought that... little fish or whatever lake it was, was a better lake and he said why not just go down the river it's covered with snow and we've all got snowshoes no reason just to not just use our snowshoes when we've got better fishing in another place.

2. If I had a good dog and we had wood and that I would have made a fire like they did then sent the dog back home if he knew the way and put a note on its collar of some kind then got the dog to go home and bring back some help.

3. I think that the reason that she felt better was because Willie's father was an experienced guide and hunter and trapper in that area and he probably inherited some of his father's tracking abilities.

4. The reason, I think, that Dumont didn't like Arthur at the beginning of the story to at the end of the story where he like him because if it wasn't for Arthur he could have died out, froze out in the wilderness.

Adventure on Ice ...

Student #6.

1. First of all, he said uh um when it was cold in the lake and they couldn't get in the hut they said, he said we'll soon fix that, he got the axe and wedged out the bolts to get in and then when it was cold in the cabin he said we'll fix that and he put the fire, he got a fire started in the stove.

2. You mean if his leg had been cut? Well, yuh, I would have put a tourniquet on to stop the bleeding and if the wind had started up I would've probably wouldn't have too much choice I would have had to run to the cabin cause I wouldn't have been able to see my way home, so I would have gone to the cabin and tried to start a fire like they did and just sorta wait for the blizzard to see if it would go down, so we could go.

3. Well, he knew the trails like the back of his hand it said, like he knew where he was going really and he knew where like if they ever got lost he would know his way back.

4. Well because he didn't seem to able to do too much, he was just and old mutt, and he didn't like him.

5. After he had found out that Arthur had gone home uh sorta went to his mom and dad he thought well he knew what he was doing, he wasn't just and old dumb mutt after all.

Student #7.

1. Well, he knew just what to do after the accident, like cutting the tree to make a stretcher and making the fire and getting into the fishing hut.

2. Well, I would have tried to find shelter like they did, and if I could I'd go for help. I would, like if I had any scarves or anything I'd um wrap up the foot like they did and try and stop the bleeding.

3. Willie was a Cree Indian and he knew his way around the place.

4. He thought he would just get in the way and stuff, and didn't think a big dog would be much help.

5. Well it turned out that the dog Arthur had brought help to them and he started to like Arthur.

Adventure on Ice ...

Student #8.

1. Well, when they told Chirs' mom that Willie was going with them, then she said well I'm glad because she felt safe when he was going too.

2. I would have taken them to the hut and um I would have tried to stop the bleeding and then um and I probably would have sent Arthur if I knew that he knew where he was going.

3. Because Willie knew the wilderness out there better than anyone else.

4. Because he jumped on top of him and he was licking him and Chris wanted to take him with him on the fishing trip and Dumont didn't want him to go cause he'd eat the fish.

5. He thought he was a good dog after that cause he had saved them.

Student #9.

1. I don't know, I can't remember who Willie was.

2. You mean if the same kind of accident happened to me... I don't know.

3. Because... I can't remember who Willie was.. I don't know I can't remember who he was.

4. Because he was such a dumb dog, well he thought he was anyways.

5. He like him better after he'd gone cause he saved his life almost... well he did save his life.

Student #10.

1. Well, he knew that they wouldn't be able to make it in the blizzard and he knew how to start a fire and uh the ice fishing and he knew that there'd be a lot more fish at the birch.

2. Well, I would've, I would've wrapped a, a thing around his leg to cut off the circulation so he wouldn't bleed as much then I would have wrapped his cut up warmly and probably taken him to the nearest shelter like they did.

Adventure on Ice ...

3. Well, Willie was an Indian and usually Indians know the country that they've been brought up in so he probably, if they got lost he'd probably know where to go.

4. Well, I guess maybe he didn't like dogs or maybe he just didn't feel he was useful.

5. Well, He'd be very grateful to the dog since he sort of saved his life so...

APPENDIX J

STUDENT RESPONSES TO QUESTIONS FORMULATED AT THE CRITICAL LEVEL OF READING COMPREHENSION FOR THE STORY "THE LION IN THE SEWER"

CRITICAL LEVEL

The Lion in the Sewer

Student #1.

1. Yes, because it would cause less panic.
2. He'd get hungry and start getting mad.
3. Kind of foolish. They panicked, and Nero saw them running and he might chase after them.
4. Push the two cages closer together, like the doors right up next to each other so he couldn't burst out.
5. Well, I think I probably would have maybe called the T.V. or radio stations and asked them to broadcast to the people that a lion had escaped and that they should stay at home till it was captured.

Student #2.

1. Yes, if he hadn't tricked the people, and hadn't caught him by a certain time, the people would have shot him or persuaded him to come out, and maybe hurt him in other ways.
2. The people would be going to work in the city and if he did come out in a sewer he might have gotten hit by a car or bus or he would have scared all the people who were going to work.
3. I think they were silly because if a lion could be shown in a circus and if he got out he couldn't be all that dangerous.
4. To put the two cages together and open them and let him walk through.
5. The police could have patrolled the city streets to warn the people of the lion.

Student #3.

1. Yup, because then they would have gotten too excited and stuff and.

The Lion in the Sewer ...

2. I don't know.

3. Scared I'd be scared too.

4. Put the cages together?

5. Make sure the people were kept off the streets.

Student #4.

1. Yes, because if he didn't all the people would be going nuts and maybe running round waiting for the lion to come out, and if the lion finally came out they'd be scared.

2. Well, the circus was leaving on Sunday and um they were maybe due in another town so they might have to leave him there and get the police to take him out.

3. I thought that they kind of overdid it because really the lion was really quite tame and it wouldn't really hurt anybody but they thought it would kill them and um so they kind of got really scared.

4. No attempt.

5. Probably closing all the stores and shops, all businesses ... so the people would stay home until Nero was captured.

Student #5.

1. Yes I think he was right because if he hadn't done that the people would still be afraid and they might have to kill the lion or something if they didn't know that some angry farmer or some person from the city might get a shotgun and see him and shoot down one of the manholes and kill the lion, if Frank hadn't done that.

2. People might be wondering how come the carnival wasn't leaving in three days and then when they were still there they might be getting suspicious that somehow that this wasn't Nero that they'd really caught.

3. Well I thought it was probably just like any crowd would have, as if you were just standing there watching the lion move from cage to cage then all of a sudden it jumps out straight towards the people I think that probably any crowd would do that.

4. They could have used the tranquilizer gun again or else

The Lion in the Sewer ...

they could have had instead of just putting the cages right together with about maybe about that much space between they could have gotten a kind of tunnel for him to go through, a pipe, or so from going from one cage to another ... a metal pipe.

5. Maybe there could be some way, it depends on how big the town was, that somebody could ride through the town in a car with a loudspeaker and tell the people who didn't know Nero was out running around, to keep out of the city and stay in their homes for safety.

Student #6.

1. Well, in one way yes, it was a good thing to do in case Nero, well he probably went through a lot more than Punch so he might have gone sort of wild but also if he would have tried to catch the lion he might have been able to do it and he wouldn't have had to go through it.

2. Well, he would have probably gotten really hungry and roar and try to get out of there.

3. They were very scared, they wanted to get to their homes um try to get their children, trying to go to their homes and just lock up, they just wanted to just get away from it in case he just tried to attack them.

4. A better way to move him to a larger cage? Um he would've, like he was getting nervous of all the other people so if he would've had a better cage he coulda went to, well a better cage, bigger, well I guess he woulda had more room to walk around in, a little more, he wouldn't have felt so congested maybe.

5. Well, maybe if they sorta cage the, around the pond,... maybe if they sort of got the people away and got them to stay in their homes, then maybe a few men could've been able to get the lion, ya know surely without hurting any people, if they would have evacuated the area but there were people around sort of around the sewer so if they would've taken the people and told them to go to their homes and just lock up maybe some policemen and some, the trainer could try to get the lion out safely.

Student #7.

1. No not really, because somebody could have been playing

The Lion in the Sewer ...

and landed down in the sewer and the lion could have eaten him or something.

2. He could have died down there without any food, or like I said before he could have eaten some people who might have been playing.

3. I think it was quite normal because if a wild lion had escaped everybody would go into a panic.

4. Have both of the small cages in one large cage so that if he did get out of the small one he'd just be running around in a bigger one and he couldn't get out.

Student #8.

1. Well my explanation would have been the same as theirs, because yeah, I think it was a good idea because then they'd, like they'd lock themselves in the house and wouldn't want to come out.

2. Well, he could have come up out of the sewer, and he would have been running around loose again and the people would of thought it was another lion cause they thought it was Nero in the cage.

3. Well, it was kind of silly because they knew he was a trained animal, he had a trainer, and he wouldn't have attacked anybody because they said he was scared when he ran out of the cage, and he probably would have just continued running and he wouldn't have stopped to hurt anybody.

4. Probably put the other cage right by it and locked the two together and then he would only have one way to walk in.

5. He could have told him that he wasn't ferocious or they could have just told them if they just went about their normal activity and weren't yelling too much then the lion would probably just stay away, like he wouldn't go to them if they were just doing what they would they would just normally do, cause they wouldn't be scaring him.

Student #9.

1. Yes because if he hadn't they would have been running

The Lion in the Sewer ...

around all scared like a bunch of weirdos.

2. He probably would have starved to death down there.

3. Pretty dumb I would've just stood back and not just sat there screaming my head off..., I would've just stood back and let him go... either that or go home, just peacefully, not screaming because the more you scream the more frightened the stupid things going to be.

4. Well, open the door to his old cage and open the door to the other cage and just let him walk in, or put him on a lead and lead him in there.

5. Well, maybe they could have put in the newspaper, you know a headline like Lion Escapes, then the people could be warned to stay home.

Student #10.

1. Yeah, I do because then, now the people wouldn't be so afraid anymore they'll do things more ya know and they won't get afraid because, really he wouldn't hurt anybody.

2. The animal, he coulda maybe got up during the week days it's more active and he might have hurt somebody or something if he was more hurt or something.

3. Well, I think that's the way most people would've acted because people don't know animals very well and they get scared maybe if a mad dog was loose or something like that, so I think that they acted right.

4. I think they should have put a leash around him or something cause they, knew the animal and the owner could have put a leash around him and took him out and put him in another cage.

5. Not attempted.

APPENDIX K

STUDENT RESPONSES TO QUESTIONS FORMULATED AT THE CRITICAL LEVEL OF READING COMPREHENSION FOR THE STORY "ADVENTURE ON ICE"

CRITICAL LEVEL

Adventure on Ice

Student #1.

1. If they'd get rescued or not and if his foot would get all healed and better.

2. They should have gone to Green Rock Lake where he'd told his mother and they wouldn't have gotten into that situation. Like their father had gone up to Green Rock and they weren't there.

3. Yes, because they went to a shelter and they made a fire for him and they fixed up his foot and stopped the bleeding.

4. No attempt.

5. Their father would have been able to drive out to get them, and there were more huts around and there were more huts around and there were more fishermen.

Student #2.

1. How he should have told his parents where he went and be more careful with the axe.

2. Yes he wanted us to learn to be careful, and always tell everyone where you're going.

3. Yes, because if they hadn't they would have frozen to death.

4. He tried not to think of his toe and tried to grin.

5. Well there were more people at Green Rock Lake and people could have helped them.

Student #3.

1. Mmm, he might have been thinking someone hurry up and get here.

2. Uh, tell your parents where you're going and stuff and be careful.

3. I agree with them because um um like I agree they shoulda

Adventure on Ice ...

found shelter.

4. He tried to smile and try not to get the other guys worried too much.

5. The parents woulda known where they were.

Student #4.

1. How nice it would be to have no sore on his foot.

2. Yes because um, he wanted us to learn that you should go where you told people where you were going and not go someplace else because you could get into trouble and if it's farther away and you have no way to get hom then you get in trouble.

3. I'm not sure...I agree with what they did because um if they had just left him laying out there he could have froze and his foot would have um started bleeding more cause it was cold.

4. He had a sense of humor and he would say funny things and you know about his foot and he would try to laugh about them.

5. They would have been safer because they would have been closer and they could have dragged Dumont home.

Student #5.

1. I think that he was probably thinking that it was probably partly his fault that he cut his own foot and not just Arthur's and that if he had been more careful it might not have happened and maybe they should have gone where Chris had said, instead of coming to a different place.

2. Yes because it will show us that if we tell and adult or something that we're going one place we should not go to another just in case an accident like that happens and then they go and pick you up where you're supposed to be and you're not in that place...and they'll get worried.

3. Yes I agree, because the hut that they went in probably offered more protection than out right on the ice cause there the wind and the snow could have buried them while in the hut if offered some protection, while out on the ice there was none.

Adventure on Ice ...

4. Some of the qualities that he had was that probably he was a tough boy and was used to having accidents or something, and that he could withstand the cold pretty well, and he had good friends that knew how to help him and do the right thing.

5. At Green Rock Lake there were more fishermen that could've helped them, there was lots of fishermen that could've helped them and take good care of them gone to get Chris' mother and father and also if they had been there they could have been picked up by their mom and dad because they knew they were going there.

Student #6.

1. Um, he would have been probably been thinking um um um wish the blizzard would stop so he could get Chris to some hospital with his leg, he probably would be really worried about Chris and want him to get a, to fix his leg somewhere, he would just hope for the morning and hope for the best um weather so they could get home.

2. Yes, I think he was pointing out something, um like you should always never, you should always inform like elders, if you make any last minute decisions, you should always inform them where you're going, you should always have the right things with you like, well, utilities and um you should um well right they had warm clothes and that was good but you should always inform where you are going like when you're out in a cold day or something um you shouldn't make any last minute changes like they did just go off.

3. Uh yes they um they done it mainly what they could do they put a tourniquet on it and it helped stop the bleeding and they went to the hut, um that was good because they stopped the bleeding and ya know if it was constant bleeding it wouldn't have helped at all, and they went to the hut that was really good um, although it didn't seem too warm at the first once they got the fire I think it helped them a bit and it was some refuge for them when they were in the cold to wait for that night.

4. Um, um well he, he helped Chris with his leg, he um put the tourniquet on it and um and he um.. what was the question again? Well he knew what he was going, he um he could use all with them goin' back he um was smart enough with Willie to say that he was that it was best to just stay that night.

Adventure on Ice ...

5. Well, there was more cabins and more people, like more cabins probably a little better cabins um they could, the people who were just about to leave when the wind came up they could have helped them maybe some parents who had been there they could have gone in a car, or they would have more people to help them.

Student #7.

1. When am I going to get out of here!

2. Maybe, he could be trying to tell us that just because he's a dog and can't speak like us he can still be of use.

3. Yes they did what was right, um they um tried to comfort um Dumont and um they just tried to make do with what they had.

4. He took the pain, he tried to make it um better for the other guys and he didn't expect too much of them and he tried to joke.

5. There are more people there and they would have been able to be of some assistance.

Student #8.

1. Probably how stupid Arthur was and that they both should have held him back or something.

2. Yes, I think he did cause um it's good to know what things can happen you go out ice fishing then you know how to avoid them.

3. Yes, because it was a smart thing to do because he um Chris knew that Arthur probably wouldn't have been able to gone home he probably would have got lost and he knew that he couldn't go out in the blizzard so they just stayed there and waited.

4. Well, he was brave and he didn't start crying and complaining.

5. Oh, um Chris' mother knew where they were going and if she was worried she could have gone there straighaway but she didn't know that they were down at Little Birch.

Adventure on Ice ...

Student #9.

1. He might have been thinking he was going to die if help didn't come soon or about his leg or about freezing to death.

2. Yes he wanted us to learn not to go anywhere without telling anybody.

3. Yes because if they hadn't of done that then the blook would've just come and would have frozen up his leg.

4. Bravery and courage and the ability to bear pain.

5. Well if the people had gone to Green Rock Lake first they would've got there sooner and the people would've known where they were.

Student #10.

1. Maybe he was thinking of maybe his life or as he treated other people or maybe he was thinking of his family or something.

2. Well, I think the author sort of did because he, they, I guess he wanted us to know that dogs, like any animal is useful for something an uh that you shouldn't turn away from an animal because he'll come in useful sometime.

3. Yes I do because I think theat they did all the right things and I couldn't think of anything else that they did or anything that they did wrong.

4. Well, he was, he sort of looked on the humorous side when he tried to smile after he um was in the thing he was, usually boys are stronger than girls and he was, he was doin'... he should, he wasn't looking on the bad side of everything.

5. Well there were more people at Green Rock Lake and uh he coulda asked somebody to take them back maybe in the car or maybe it would be warmer in a shack or something like that.

APPENDIX L

TECHNICAL SPECIFICATIONS FOR THE CRONUS DIGITAL ELECTRONIC STOPWATCH

Cronus Digital Electronic Stopwatch
Cronus Precision Products, Inc.,
2895 Northwestern Parkway,
Santa Clara,
CALIFORNIA 95051

Specifications:

Weight	5 ounces
Size	$3\frac{5}{8}$" x $2\frac{1}{2}$" x $1\frac{1}{2}$"
Accuracy (at 25°C, 77°F)	0.002%
Temperature Drift (32°F to 140°F)	± .005%
Measuring Range	59 min 59.99 sec.
Digits	6
Timing Resolution	1/100 sec.
Battery Life	Practical Operation - 21 hrs, "alkaline" batteries (Frequent on-off) Continuous - 17 hours.
Power Supply	3 Disposable Primary AA Batteries
Circuitry	Solid State CMOS
Crystal	Quartz - 3.2768 MHz

APPENDIX M

TECHNICAL SPECIFICATIONS FOR THE SONY-O-MATIC TC-105 AUDIO TAPE RECORDER

Technical Specifications

The model TC-105 is a portable solid state 4-track monophonic recorder with an automatic gain control system which adjust recording level for any program material and maintains a uniform recording level.

Power requirements	Canada: fixed to operate on AC 120V, 60 Hz. Other Countries: adjustable for either AC 100, 110, 117, 125, 220 or 240V, 50 or 60 Hz
Power consumption	45 watts (45VA)
Tape speed	instantaneous selection 7½ips., 3¾ips, or 1 7/8 ips. (19, 9.5 or 4.8 centimeters per second)
Recording system	4-track monophonic
Recording time: (with 1800 ft. tape)	45 minutes per track 3 hours total at 7½ips (19cm/sec) 1.5 hours per track, 6 hours total at 3¾ips, (9.5cm/sec) 3 hours per track 12 hours total at 1 7/8 ips, (4.8 cm/sec)
Tape reels	7 inches or smaller
Frequency response	40-18,000 Hz at 7½ips (19cm/sec) 40-13,000 Hz at 3¾ips (9.5cm/sec) 50-6,000 Hz at 1 7/8 ips (4.8 cm/sec)
Record/playback head	In-line quarter track (2 channel)
Erase head	In-line quarter track (2 channel)
Inputs	Microphone Input Jack Sensivity: 0.11 mV Impedance: 600 ohms

Inputs (cont.)	Auxiliary Input Jack Sensivity: 34 mV Impedance: 100 K ohms
Outputs	Monitor Jack Output level: 3.46 V Load impedance: more than 10 K ohms (8 ohm magnetic earphone can be connected)
	External Speaker Jack Output Level: 2.83 V Load impedance: 8 ohms
Speaker	4 x 6" (10 x 15 cm) dynamic speaker
Power Output	4 watts
Transistors	8
Dioder	3
Dimensions:	14¾ (w) x 7¼ (h) x 13 3/8 (d)" 375 x 185 x 340 mm)
Weight	21 lb (9.5 kg)
Hz (hertz)	Cycle per second