NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

THE UNIVERSITY OF ALBERTA

WRITING, WORD PROCESSING AND GRADE IV WRITERS: A DESCRIPTIVE STUDY

BY

REGINALD PHILIP CRAWFORD

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTERS OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA

SPRING, 1989

ISBN 0-315-52877-X

THE UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: REGINALD PHILIP CRAWFORD

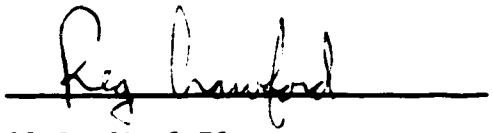
TITLE OF THESIS: WRITING, WORD PROCESSING AND GRADE IV WRITERS: A DESCRIPTIVE STORY

DEGREE: MASTERS OF EDUCATION

YEAR THIS DEGREE GRANTED: 1989

Permission is hereby granted to THE UNIVERSITY OF ALBERTA LIBRARY to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.



12 Cardinal Place
Sherwood Park, Alberta
T8A 0H6

Date: April 21, 1989

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 WRITING, WORD PROCESSING AND GRADE IV WRITERS: A DESCRIPTIVE STUDY submitted by REGINALD PHILIP CRAWFORD in partial fulfilment of the requirements for the degree of MASTERS OF EDUCATION.

.....
Supervisor

.....

.....

.....

Date: April 12, 1989

This Thesis is Dedicated to

Tetyana

Gwenn

Heather

and

Rick

ABSTRACT

The purpose of the study was to determine the writing processes and concerns of grade four students as they composed on the word processing medium. Initially, the study was designed to examine individual writers. However, during data collection the grade four children in the study began to write together at the computer in pairs. Since the study was concerned with natural classroom developments the teacher-researcher did not interfere with the collaborative writing but treated it as a logical extension of the study. The writing concerns and processes of the children working collaboratively became a subject for analysis.

The research design involved the collection of data by a teacher-researcher in a regular classroom setting using video tapes of four grade four students as they wrote, video tapes of their text as it was created, notes from student-teacher writing conferences and samples of completed work by the four students.

A detailed descriptive model was developed to analyze writing concerns and writing processes based on an elaboration of the writing processes model developed by Flowers and Hayes (1981, 1985). A variation of this model was required to accommodate the collaborative data.

The findings on individual writing on the computer suggested that students at the grade four level were capable of applying very sophisticated writing processes to their work. These included meaningful revisions to text and planning specific to the main idea of

the text. The limitations for students were not in the writing process but in the extent of their knowledge of language, subject matter and general information.

Collaborative writing was found to have many of the characteristics found in individual writing. However, the processes were much more clearly observable. A number of characteristic social concerns were noted which added an additional dimension to the writing process.

Implications of the study for teachers and researchers interested in the teaching and learning of writing with a word processor are included.

ACKNOWLEDGEMENTS

The writer is indebted to his thesis committee for its assistance in the final stages of this report. Dr. C. Norman's clear grasp of the problems in the written text made the final draft possible. Dr. M. Juliebo has been particularly supportive. Her suggestions, comments, and specific directions were especially appreciated.

A special debt of gratitude goes to Dr. M. P. Browne for her support throughout the entire project. As thesis advisor, she made it possible to undertake a new field of study and a new way of knowing one's world. Without her guidance, this process could not have come full circle nor the final report completed so succinctly.

Thanks to Gwen Simpson for her help in the preparation of the report. Her knowledge of form and protocol made the final work much less taxing that it might have been.

I wish to express special thanks to the students who were involved in this study, both those in the class and those whose work was directly used in the study. Their interest, zest for writing and learning, and their video taped images have sustained me throughout the length of the project.

Finally, it is fitting that my wife Joan and my daughter Kimorie be acknowledged for their contribution. Their sacrifice, support, and determination to put up with a man who was often beyond reason were heroic. Their continued presence in my life was a constant source of wonder.

Table of Contents

List of Tables

List of Figures

CHAPTER 1

INTRODUCTION AND STATEMENT OF THE PROBLEM

Background

Having used a word processor in my own writing for a couple of years I became interested in using one as part of a classroom writing program. I wanted to know what upper elementary children did and what concerns they addressed when they wrote on a computer so that I could maximize the advantages of word processing for my students. To that end, I searched the literature and discovered a dearth of observational investigations on writing and word processing. This was the study's point of origin. As I wanted to know what writers thought and did when they wrote on a word processor, I reasoned that I might as well find out for myself.

In the early 1980's microcomputers and word processing programs became available to schools across North America. In Alberta 63% of all schools had microcomputers by 1983 (Alberta Department of Education, 1983). However, in 1984, Becker reported that only 7% of schools with microcomputers used them in writing instruction. This statistic has not remained static. Articles on the use of word processors in the classroom listed in the Educational Review for 1983 numbered only seven. By 1987 twenty-seven articles were reviewed. This increase in articles on word processing and writing suggested a growing recognition by educators, of word processors as writing tools.

The literature dealing with word processors and writing has been both positive and speculative. Many writers have commented on the beneficial effects of the word processor on the writing process (Daiute, 1983; Fisher, 1983; Heffron, 1986; Leonardi & McDonald, 1986; Mittricker, 1983; Moorshead, 1984; O'Brien, 1984; Schwartz, 1984). Others have suggested that the word processor can help with writing instruction (Dudley-Marling, 1985; Leonardi & McDonald, 1987; Moran, 1983; Rust, 1986; Solomon, 1986; Windram, 1985). A common thread throughout was that writing with a word processor was somehow different from writing by hand. Moreover, students' writing was generally perceived as better when produced with the word processor.

So far there is very little research which actually investigates what writers do and what aspects of writing concern them when they write using a word processor. Instead, the work of writing researchers such as Emig (1971), Graves (1973), and Flower and Hayes (1981, 1986) has been used as a basis for extrapolating to the word processing medium. As a result many of the conclusions reported have not been confirmed.

In asking the question, "Do writers write better with a word processor?" we need to be mindful of the observations of such writers as McLuhan (1967) and Chandler (1986). McLuhan viewed the increasing use of electronic media as an adaptive force to the way we use language and knowledge. The medium through which language and information are accessed and manipulated evokes thoughtful behavior that takes advantage of that medium's unique manifestation of information. More recently Chandler (1986) suggested that "using computers will . . . encourage different kinds of language for different purposes . . . also different

kinds of thinking" (p. 8). From the work of these writers, one would expect that writing on the word processor may not necessarily be better but might instead be different.

Definition of Terms

The following is a list of those terms which are important to understanding this report:

1. Microcomputer: Totality of the computer environment, including both hardware and software.

   Hardware: All the physical equipment of the microcomputer environment including:

   Keyboard--Typing keys with which the user instructs the computer.

   Monitor--A screen from which the user can monitor what the computer is doing with instructions it is given.

   Disk--A storage medium on which information one wishes to use again (data) or a program (software) is kept.

   Disk drive--The equipment which allows data or software to be transferred to (memory) or from (disk) the computer.

   Software: The actual program or information that allows the user to perform specified tasks with the microcomputer. For example, the software used in this study was the word processing program, Appleworks (1983).

2. Word processor: A text-editing software package which enables a user to create, organize, edit, format and print text on a computer

monitor or as hardcopy. A few common terms used in discussions of word processors are:

Load: Transferring data (also called a file or text) from a disk to the computer's memory.

Save: transferring data (file or text) from the computers memory to a disk for long-term storage.

Delete: Erasing or negating instructions previously given to the computer or disk.

3. Keyboarding: The ability to 'type' at a keyboard.

4. Word processing medium: This is primarily the computer keyboard, the computer monitor and peripheral hardware including disks, disks drives and printer. The printer can play a major role depending upon individual writing style. Some writers prefer to revise wholly or in part by printing their selections to paper.

5. Able writers: Students judged by their current language arts teacher and at least one other teacher to be competent writer for their grade level based on written samples. In addition, students must also be considered comparatively competent in their keyboarding and word processing skills with the software used in the study.

6. Composition process: Consists of those activities that directly contribute to the final written product as they occur from the the moment an idea for the product is formulated by the writer until he or she has made a decision to no longer work on the product. The

literature differentiates several aspects of the process. They are:

Planning: (also called pre-writing) This is that part of the process where what is to be written is determined.

Translation: (also called production or articulation) This is characterized by the physical act of putting ideas down in words, sentences and paragraphs.

Reviewing: That part of the process in which the text produced is evaluated by the author and revised to achieve its communication purpose. Revision is often divided into two separate processes. One, often referred to as editing involves changes to the text which do not change its meaning. Things like spelling, punctuation, grammar and syntax concerns are included in this type of revision. All other revision involves changes to the meaning of the text.

7. Writer's concerns: Those ideas, problems, processes or goals that a writer addresses at any moment during the composition process. Concerns can be conceptualized as the substance upon which the composition process operates.

8. Natural classroom environment: The classroom environment shaped by the interactions of the individual classroom participants under the direction of the teacher responsible for that classroom.

9. Composing aloud: Verbalizing the thoughts and concerns that go through one's mind while composing a piece of writing; thinking aloud.

10. Writing conference: A discussion on a piece of writing in the process of being composed. It involves two or more readers, one of whom is the author. Its focus is on the composition's content and on helping the author to evaluate the effectiveness of his or her effort to communicate ideas.
11. Individual writing: The creation of a written product by a single writer. While interactions with others may contribute to the ideas and evaluation of the product, the text and its organization are attributable to an individual.
12. Simultaneous collaborative writing: The cooperation of two writers in the composition process where both writers have immediate, ongoing input into the evolving text. This is in contrast to consecutive collaborative composition where both authors work on the same text separately, at least in its production (Wheeler, 1985).

Statement of the Purpose

The major purpose of this study was to describe the writing concerns and processes of able grade four writers working with a word processor in a regular classroom setting.

The Research Questions

In order to achieve the purpose of the study the following research questions guided the analysis.

1. What are the concerns and processes evident in the writing behaviors of able grade four writers while they compose alone with a word processor?
   a. What common concerns and processes are found among to able grade four writers as they compose alone?
   b. What different concerns and processes are found among able grade four writers when they compose alone?
2. What are the concerns and processes evident in the composition behaviors of able grade four writers when they compose collaboratively using a word processor?
   a. What common concerns and processes are found among able grade four writers when they compose collaboratively?
   b. What different concerns and processes are found among able grade four writers when they compose collaboratively?

Significance of the Study

Since word processors are being used with increasing regularity in elementary writing classes, there is a need for a systematic description of how children write with a word processor. Just as studies of children writing with pencil and paper have provided valuable insights into children's writing, we need similar insights involving writing with a word processor. In addition, the problem of determining the nature of a writer's concerns and writing processes with the word processor is important. While studies with pencil and paper may provide guidance for the study of the word processing medium, there are new and different

questions to be addressed simply because of the electronic nature of the word processor.

There is also a need for studies which examine children's writing under normal classroom conditions since that is the condition under which most children's writing is done. When a researcher takes students out of the classroom to an unfamiliar, novel situation, that novelty has been known to enhance the behaviors of the subjects (Roethlisberger & Dickson, 1939). Moreover, there is also a need to control for the novelty that can be introduced with the computer itself when subjects with limited or no experience with computers and word processors are observed. While the novelty of the computer is often cited as one of its strengths (e.g. Dudley-Marling, 1985; Muldrow, 1986; Newman, 1984; Phenix & Hannan, 1984) classroom teachers cannot depend upon that novelty to enhance children's writing after the novelty wears off.

Overview of the Study

This report consists of eight chapters. Chapter 1 introduces the purposes of the study; provides background, definitions of terms, and research questions; discusses limitations and assumptions; and offers a synopsis of the study's significance. An overview of the report's organization is included.

Chapter 2 is a review of recent literature regarding the writing process, the effect of the word processor on composition, and research design and methods common to both areas of study. The literature presented is chosen for its contribution to theories on composition

processes, research methodologies applicable to the present study, and word processing.

Chapter 3 discusses the design of the study. Implementation and methods for embedding the methodology within the classroom environment are detailed. An outline of the effects of this procedure and problems that arose are also discussed. Since the design of the study is such that the researcher has created an environment based on personal pedagogic biases, concerns and orientation, an understanding of that environment is important in interpreting and evaluating the results of the study.

Chapter 4 outlines the development of the writing model used in the analyses of data collected. The model is based on the work of Flower and Hayes' (1981) and is developed with information gleaned from other literature, classroom observations and the data collected. A collaborative writing model is also developed from this work to aid in the analysis of the collaborative writing data.

Chapter 5 is the analysis of individual writing with a word processor.

Chapter 6 analyzes collaborative writing observations of collaborating writing pairs.

Chapter 7 summarizes the study's findings so that conclusions can be drawn and implications considered. Recommendations for further research and the future of word processing in the writing classroom are offered.

CHAPTER 2

RELATED LITERATURE AND RESEARCH

The Effects of Word Processing on Childrens' Composition Processes

The Early Literature

In the early 1980's, the schools' access to the relatively new microcomputer technology sharply increased (Alberta Department of Education, 1983). Accompanying this accessibility was a heightened awareness of the word processor and its potential as a writing tool. The contemporary literature reflected this awareness as anecdotal records of the effect of word processing on students' writing and speculative surveys of its perceived benefits to students' composition processes were reported.

The anecdotal accounts of the use of word processors may be categorized into two types: implementation and evaluation. Accounts of implementation were explanations of how word processing can be set up in the classroom and the impressions authors had of students' reactions to and interactions with the programs (Hook, 1983; Kirk, 1983; Palmer, Dowd, & James, 1984; Piper, 1983). Evaluative accounts focussed less on the set up and more on the reaction of students and teachers to the word processor. For example, Bean (1983) reported that students believed that they revised more when using a word processor. Wetzel (1985) found students to be frustrated with keyboarding problems and observed that his students wrote no better on the word processor than they did using

pencil and paper. Leonardi and McDonald (1987) claimed that learning the word processing functions interfered with students making significant, meaningful revisions in their writing. They suggested that writing instruction and word processing instruction should be separate during initial introductory sessions. These anecdotal accounts were beneficial in that they stimulated interest and led to new research and applications. However, they also lacked controlled, direct observation, specific examples or measurements. Generalizations were made with little regard for possible differences or exceptions among writers.

Speculative literature also had its limitations as exercises in deductive logic. The authors applied a knowledge of word processing functions to current knowledge of how writers write, then speculated on how writers would compose differently with the word processing medium. A review of the speculative literature revealed a number of conclusions and observations about the effects of the word processor some of which can be summarized as follows:

1. Word processing improved students' attitudes toward writing (Daiute, 1983; Moorshead, 1984; Phenix & Hannan, 1984; Rust, 1986; Schwartz, 1984).
2. Word processing changed the way students write (Daiute,1983; Heffron, 1986; Leonardi & McDonald, 1987; Phenix & Hannan, 1984; Taylor, 1986).
3. The medium held great potential for encouraging all facets of the writing process (Daiute, 1983; Heffron, 1986; Schwartz, 1983).

4. The word processor decreased the physical constraints of writing with pen and paper (Daiute, 1983; Heffron, 1986; Mittricker, 1983; Moorshead, 1984; Rust, 1986).
5. Letter formation was transformed to letter recognition with the word processor since one needed only to recognize the letter and push a key for the letter to be formed (Daiute, 1983; Moorshead, 1984; Phenix & Hannan, 1984; Rust, 1986).
6. The word processor eliminated the task of recopying text since changes to the text did not require that acceptable text be written out again (Daiute, 1983; Heffron, 1986; Mittricker, 1983; Moorshead, 1984; Rust, 1986; Schwartz, 1984).
7. The word processor encouraged students to revise more (Heffron, 1986; Mittricker, 1983; Moorshead, 1984; Rust, 1986).
8. Writers were encouraged to take risks with the text; to discover what the text had to offer; to strive for clarity of purpose in the composition (Daiute, 1983; Leonardi & McDonald, 1987).
9. Writers had to attend more to the text as the computer executed instructions precisely and meaning could get lost without due care (Daiute, 1983; Schwartz, 1984).

As a teacher interested in computers in education, I found these speculations exciting and predictive of a revolution in the nature and teaching of writing. Yet I recognized that both the anecdotal and speculative literature lacked a substantial data base for the conclusions. However, it must be acknowledged that these early conclusions and observations were a stimulus for further research.

Recent Research Trends

Recent research on writing and the word processor is characterized by an openness to scrutiny and replication. So far, however, there is still only a limited body of research which has dealt with childrens' composition processes on the word processor (Daiute, 1986; Pearson & Wilkinson, 1986; Vacc, 1985) and most of that research has focused on the revision process (Bakema, 1984; Collier, 1983; Daiute, 1986; Harris, 1985; Pearson & Wilkinson, 1986; Vacc, 1985). Other processes of writing still remain to be explored.

Collier (1983), Bakema (1984), Vacc (1985), Harris (1985), and Pearson and Wilkinson (1986) all removed their subjects from their normal writing environments to conduct their studies. A question which still needs to be explored is whether their results and conclusions would pertain when writers practice their craft in their normal writing environments.

Daiute's (1986) subjects had some experience using a word processor during a regular writing class and were studied in their normal writing class. However, Daiute only analyzed final writing products and did not address what her subjects did as they wrote.

None of the recent research reviewed examined the entire composing processes of younger writers' in the classroom learning environment. The present study was designed to address that need.

Studies of the Composition Process

Toward a Research Method

In the search for a methodology with which to study the writing concerns and processes of younger writers using a word processor, it was found that the literature on children's writing with pen and paper could provide the theoretical and methodological references for that analysis.

Braddock, Lloyd-Jones and Schoer (1963) reviewed over 500 articles, books and dissertations which dealt with composition only to report that the focus of the works reviewed was entirely on the final product of the composition process. They reported that the process by which text was produced remained largely unexplored and thus recommended that the composition process rather than the written product be the focus of future research.

Problems related to methodology hampered the achievement of this goal until the early 1970's. At that time, qualitative research methods began to gain some acceptance within the educational research community (King, 1978) and writing processes became a viable research subject. Two of the early researchers in this area were Emig (1971) and Graves (1973).

Emig (1971) used a case study approach to describe the composing processes of eight grade twelve students. These students chose their own composition topics but were required to complete each composition during specific writing sessions. The researcher was present for most sessions.

The data were collected from three sources. The primary source was a 'composing aloud' technique which required subjects to verbalize everything that they were thinking as they were composing text. In addition to the 'composing aloud' technique, Emig gathered data through personal observation and interviews with students after they completed each composition. Of these three, the 'composing aloud' technique was potentially the most valuable. Its underlying assumption was that a writer would in "externalizing his process of composition, somehow reflect, if not parallel, his actual inner process" (p. 40).

From her analysis, Emig identified ten dimensions of the students' composing process. An examination of her dimensions suggests that they can be divided into three descriptive categories. First, there are the writing processes which include prewriting (planning), writing and revision. A second category could involve environmental factors or writer's concerns that affect the writing process. The final category is a research-related factor involving her composing aloud technique.

The first category of writing processes Emig observed, includes prewriting or planning, the actual writing of text, and revision. She observed that these processes occurred in a non-linear, recursive fashion, continually blending one into the other and often occurring simultaneously. This finding was at odds with the previously held linear model of writing processes, where planning was followed by text production and where revisions completed the composition.

The second category regarding writer's concerns is specific to the writing situation and included the context in which composition occurred, the nature of the writing stimulus, and perceived teacher

influence. The nature of the writing task in particular was influential dependent upon the writing task being either self-directed or assigned by another (i.e. the teacher).

Emig's study had a great impact on the direction taken in the present study. Her methodology using observation, interviews, and the composing aloud technique were all adapted to the present purpose. Unfortunately the problem of 'composing aloud' potentially changing the nature of the composition process remained a difficulty.

Graves' (1973) research also gave direction to the present study. Like Emig, he used a case study approach in his efforts to determine the writing processes of his seven year old writers. Graves made the observer a 'fixture' in the classroom. His primary information source was the observation of students in a naturalistic setting. While he used interviews as his other major source of data, he tended to do so as part of the natural classroom routine. His concept of the writing conference (1983) was a natural extension of his interviewing technique. These conferences were a way of allowing a student to 'teach' the teacher what they knew about a topic or about writing and occurred as the teacher posed questions then waited for the student to give a personal knowledge-based answer. This procedure appeared pedagogically sound in that it encouraged students to perceive data collection as part of the natural classroom environment.

Graves' research paradigm has affected the development of the concept of the teacher as researcher (Bissex, 1986). Bissex defined the teacher-researcher as an observer, a questioner, and a learner; one who

questions educational assumptions, observes students in their natural classroom situation to verify or reject those assumptions, and then modifies that knowledge as required. The teacher-researcher is perceived as a fellow learner by students in the classroom and the process of his or her learning becomes part of the class routine.

The teacher-as-researcher concept provided the means of implementing data collection within the present study. However, describing what was observed also required a standard vocabulary.

A Model for Analyzing the Concerns and Processes of Young Writers Using a Word Processor

As I discovered more literature on the writing process, I found that there existed a reasonably standard descriptive vocabulary and a body of observations upon which I could rely in developing a descriptive model of writing processes applicable to word processing. In particular, Flower and Hayes (1981) developed a cognitive process theory of writing as a means of developing working hypotheses for further research. The writing model generated by this theory is used in this study as a framework for the analysis of the data.

Flower and Hayes' theory was based on four premises:

1. "The process of writing is best understood as a set of distinctive thinking processes which writers orchestrate or organize during the act of composing." (p. 366)

2. The processes of writing "have a hierarchical, highly embedded organization in which any given process can be embedded within any other." (p. 366)

3. "Writing is a goal-directed process." (p. 377) As a writer composes, he or she creates a hierarchy of goals to direct the writing process.

4. The writer creates goals from two perspectives. The first embodies purposes set by the knowledge the writer brings to the task. The second establishes new goals based on what is learned through the process of writing.

Based on the premises above, Flower and Hayes (1981) created a dynamic model of writing. It involved three major elements: the task environment, the writer's long-term memory, and the writing processes. The task environment was everything that was external to the writer including the text itself. Long-term memory involved all the information the writer brings to the task of writing (e.g. topic knowledge, writing skills, and sense of audience). Finally the writing processes element was categorized into the basic processes of planning, translating, reviewing, and the controlling process of monitoring.

The explanation of the writing processes that follows is based on the schematic of the theory presented in Figure 1. This schematic shows the three elements of composing: task environment, writer's long-term memory, and writing processes and their relationships with each other.

Flower and Hayes considered planning to be an internal representation of the information or knowledge used in writing. They identified three subprocesses of planning. Generating included retrieving ideas from long-term memory. Organizing ideas into new patterns which was seen as a discovery process whereby one could discover what one knows through elaboration of an idea. Goal-setting which referred to the specific ideas being addressed at any one time in the text.

Flower and Hayes used the term translating to refer to the act of putting ideas down in visible language. It involved taking ideas which

Due to copywrite limitations

this Figure has been omitted.

Figure 1. Writing Processes Model (Flower and Hayes, 19[illegible] 37

may or may not be clear and giving them form. The difficulty in performing this process was that so many specific aspects of written language have to be coordinated to create the visible realization of an idea. Not only must the idea be given form but writing conventions must be observed. Smith (1982) went further and differentiated the dual nature of translation by dividing it into the two tasks of production and transcription. Production was the rendering of ideas into visual language and transcription was the process of ensuring that the visual language conformed to writing conventions. Often we have observed children writing who could not coordinate all the demands of translation. They spell poorly or their text might consist of one, long run-on sentence. While these children may have been primarily concerned with the production of text, the demands of transcription made production difficult as the conventions of writing were not yet automatically accessible.

Flower, Hayes, Carey, Schiver, and Stratman (1986) later divided the reviewing process into two sub-processes: evaluation and revision. They found that writers evaluated largely through reading their text. However the purpose of this reading was defined by one of three writer's goals. These goals included: reading for comprehension where the writer was trying to grasp a mental understanding of the text; reading to evaluate which was a specific search for problems or confirmation of achieving a goal; and reading to define a problem which occurred when either of the previous evaluation processes detected a problem. This

latter process was the point at which evaluation became diagnosis and problems were defined.

Revision followed the evaluation of a problem. If a faulty text were discarded but the meaning embedded in it carried over to the new writing, this revision procedure was called rewriting. If the text was discarded in its entirety due to a change in topic goals and the rewriting involved the entire text, this revision procedure was called a redraft because the writer was no longer involved in the reviewing process but had to go back to planning and transcription. If a smaller segment of text was discarded (sentences or clauses), the revision procedure was called paraphrasing. This discarding of text and beginning again usually occurred when the problem was not well defined.

When a problem was clearly defined, the classic revision process was invoked in that the text was reconsidered and rewritten until the problem was resolved.

The final basic writing process was monitoring. Flower and Hayes identified monitoring as a controller of other processes that might be operating at any given time. Although pervasive in its influence, this process was difficult to observe. Monitoring was evident when a writer changed from one process to another and its form was apparent in the pattern of goals set and the habits and writing style of an individual writer.

Flower and Hayes' model served as a basis for the analytic writing model developed for the present study. However, the work of a number of other researchers also influenced the model used in the analysis.

The planning process was given depth and detail based on Pianko's (1979), Perl's (1979), and Faigley and Witte's (1981) observations and definitions of the levels of text at which planning occurs. Pianko and Perl defined a specialized planning period which occurs before any text is actually created on the medium being used. This general planning (Perl, 1979) or prewriting (Pianko, 1979) set the initial direction and method by which a text would be developed by the writer.

Perl (1979), and Faigley and Witte (1981) identified all subsequent planning as occurring at the local level, or at the global level of a text. Local level planning occurred when the writer was creating text and was specific to a small section of the overall text. Global level planning occurred when attention was given to the topic or the 'gist' of the composition being written.

Revision and revision concerns were also modified in the present study's analytical writing model. The work of Bridwell (1980) and Faigley and Witte (1981) were instrumental in developing this part of the model.

Most studies tended to look at writing over the period of a single writing session. Bridwell (1980) tried to consider the nature of revision over a period of time and two drafts of a piece of writing. Her subjects were grade twelve students and she had them write "without specific instructional intervention" (p. 200), an informative or argumentative essay. From the revisions made by students during a first draft, between the first and second draft, and during the second draft, Bridwell was able to construct a classification scheme. She identified seven levels of revision. The first level was surface revision which

would be the equivalent of editing. These changes did not change the meaning of the text. The other six levels of revision resulted in a change to the meaning of the text. Of these the five lower levels differed in the amount of text involved in revision from simple lexical changes to multi-sentence changes. The last level involved whole text changes. These would have included changes to the function of the piece, changes in audience, changes in context, or complete rewrites of the entire text.

Refinements to Bridwell's classification system were found in the study by Faigley and Witte (1981). An expansion of the concept of surface changes included changes that paraphrase ideas in the text. Faigley and Witte realized that lexical and even multi-sentence changes need not change meaning. For example, the sentence, 'The writing process is cyclical and nonlinear in nature.' can be revised to 'The writing process is recursive.' The basic meaning has not been changed.

Studies of Collaborative Writing

Several authors have noted how the social interactions within the classroom changed when computer use was introduced (Bruce, Michaels, & Watson-Gegeo, 1985; Muldrew, 1986). Mehan et al. (1984) went so far as to claim that, "It is this social organization and not the computer alone that has positive effects on the reading and writing process" (p. 512).

Such peer interaction effects on learning and cognitive development were explored by Piaget as early as 1932 (Light, 1983). Recently, a

great deal of interest was focused on how social behavior could be interpreted in cognitive terms (Light, 1983). Peer interaction studies suggested that students performed better during interactive sessions and that performance carried over to individual sessions (Doise et al., 1975). Light (1983) reviewed the literature and found that a key factor in replicating earlier findings was that a state of conflict be present for subjects who showed the effect. This conflict often addressed how best to approach a task presented and was often created through argument and discussion among the participants. The conflict could be either within a subject's own approach to the task or between the subjects' individual approaches.

Johnson, Johnson and Scott (1978) explored the attitudes students had toward cooperative learning at the grade 5/6 level. They compared attitudes and performances of students involved in individual math instructional environments to those in cooperative situations. Performance scores replicated the higher levels found in earlier research for the cooperative environments. Cooperative learning was reported to promote more positive attitudes among peers with differing abilities; higher self-esteem; more positive attitudes towards teachers, cooperating peers, and conflict; and more sense of internal control.

An interesting study of cooperative versus individual learning was that done by Fletcher (1985) where the computer was used as a primary element. He had nine to eleven year old students try to solve four progressively difficult problems on the computer. They were assigned to one of three conditions: silent-individual where they worked alone; concurrently verbalizing individuals who were required to talk aloud to

themselves throughout the sessions; and verbalizing groups, also instructed to talk aloud. The group was found to perform better, corroborating the earlier research not involving the computer. However, the verbalizing individuals performed better than silent individuals. Although verbalization was not able to account for the group versus individual differences, this finding was a significant one considering the use of the composing aloud technique in the present study.

Little literature on collaborative writing with paper and pencil was found and research on collaborative writing with a word processor was very limited. Wheeler (1985) differentiated collaborative composition into two procedures: simultaneous collaborative composition occurring when "students share the task of planning, transcribing, and revising a piece of writing" (p. 57) and consecutive collaborative composition, when one student begins a composition and takes turns with another, to work with the text until its completion.

Daiute (1985) used a case study approach to explore the effects of collaborative writing on word processing. She compared individual composition to simultaneous and consecutive collaborative composition under the two conditions of writing with pencil and writing on the computer. Her subjects were two seven year old boys who took part in the study in a writing lab at the researcher's university. Analysis was based on the text produced. The results of Daiute's study showed that word processing was facilitative in the individual writing tasks; collaborative writing with pencil was detrimental to composition; collaborative writing on the word processor while better than with

pencil was not as effective as when the individual wrote alone. Because this study only involved two students it is possible that the collaboration broke down because of relations between the two participants.

Daiute noted that the collaborative findings were contrary to the finding of other research on collaborative learning. Performance was not better than in the individual condition. However, she noted that these students had not worked together before. She postulated that problems with establishing ownership may offer a possible explanation of her findings. Gerster (cited in Daiute, 1984) noted that the decision about authorship requires discussion and establishment of rules between partners. Collaborative writing, like any social interaction, requires a set of rules, implicit or explicit. Once established, one might expect collaborative writing to be like any collaborative learning situation, in that some enhancement of performance will be shown. Other possible explanations for unsuccessful partnering included differing personalities and working styles, developmental differences in writing skills, the age of the children (may not be cognitively ready for collaborative work), and lack of discussion during simultaneous collaborative writing.

Based on the literature reviewed and the data collected, a modified analytical writing model was developed to address collaborative writing.

CHAPTER 3

METHODOLOGY

Introduction

In order to address the purpose of the research it was necessary to design a study in which the data about the concerns and processes of young writers could be collected under classroom conditions. Data collection is known to be a disruptive activity in any natural setting. The presence of new people, data collection equipment, and novel tasks can often be perceived as major shifts from the norm. It was important therefore that the children who were observed in the study have an opportunity to participate in a writing program and that they be very familiar with the procedures employed at the time of the data collection. To that end a number of steps were taken as early as the beginning of the school year to ready the classroom for the study and to prepare the children for their participation. Given the complexity of the time line a research schedule that shows what was done and at what point in the school year is provided. Information referred to in the schedule, including the selection of the children who participated in the study, the data collection procedures, and the treatment of the data are expanded upon in this chapter. The limitations of the research and a description of Flower the and Hayes' model and its use in the analysis of the data are also included.

The Research Schedule

September, 1986

1. The classroom was set up to accommodate a computer corner where the children could use a word processor to write. The computer was introduced to all the children in the class.
2. Appleworks was selected as the word processing program to be used in this study. Selected commands were introduced, including creating new documents, saving documents, retrieving saved documents and initial commands for manipulating text (moving the cursor, deletions, tab stops, escape, shift, etc.) All the children had access to the word processing program outside regular class time.
3. The classroom writing program was introduced. All the children in the class were encouraged to write everyday about topics of their choice which could be shared with each other. All the children were also required to engage in conferences with the teacher. This activity continued throughout the school year.
4. Personal journal writing was introduced and journals were started by the students, all of whom were encouraged to discuss what they had written with the teacher. The journal writing and conferencing continued through the school year.
5. As teacher, I started keeping a journal as a means for recording what was observed in the classroom writing program. This activity continued throughout the year.

6. A regular instructional program to address specific writing skills was started and continued throughout the year.

October

1. A schedule for out of class time use of the computer was implemented. This made the computer available for an additional two and one-half hours per day for the rest of the school year.
2. I divided the class into groups of four. Each group was assigned exclusive in-class computer time for a four-week period throughout the year. This allowed each student approximately two to three hours per week working with the word processor.
3. I introduced the first group to the word processor. This group became the class 'experts'. The training of this group was extensive but it did easy my involvement in trouble shooting problems others had writing with the word processor since the 'experts' assumed that role.

January

1. The video recorders and the microphone were introduced to the class and their use was incorporated into the classroom routine.
2. The composing aloud technique was introduced and incorporated into the classroom routine.

February

1. Four students were selected for the data collection phase of the study and they were put on the computer to practice using the video equipment and the composing aloud technique for a four week period.
2. Trained the classroom 'experts' in the operation of all equipment, not just the computers.

March

1. The written records of the four students whose work was used for the data analysis was collected over a three week period.
2. The student teacher conferences were increased to fifteen minutes with each of the four children and carried out at the end of the school day.

April, May, June

1. Other groups continued their normal writing schedule at the computer.

Teacher as Researcher: Establishing the Setting for the Study

The nature of the classroom situation and the writing program therein can have a profound effect on the writing performance of students. As this was to be a descriptive study based on a sampling of writing behaviors taken directly from a natural classroom situation, it is important to be aware of the point of view of the teacher researcher.

As teacher-researcher I attempted to develop a classroom atmosphere in which research was accepted as a natural extension of the normal classroom routine. An outcome of this approach was that I was encouraged to review, restructure and rethink my own knowledge about how children think and learn. As I learned, I adjusted what and how writing was presented and practiced in the class. As Rich noted, "the research . . . informed [my] teaching and [my] teaching shaped [the] research" (McConaghy, 1986, p. 724). I became immersed in the process; a participant in the micro-culture of that classroom and a prime shaper of

that culture. I was intimately aware of the writing environment and strived to comprehend the students' perceptions and interactions within that environment. The result specific to this study was a classroom environment of which I was unusually aware of specifics of students' collective and individual writing behaviors. As the study required at least three and preferably four subjects, my interactions with individual students affected the choice of subjects for the study.

Bogdan and Taylor state that; "In order to grasp the meanings of a person's actions, [one] attempts to see things from that person's point of view" (1971, p. 11). Since the data would ultimately be a sample of selected students' composition activities over a limited time period, my seeing the data from the writer's "point of view" could best be achieved by an intimate knowledge of their purposes, feelings, and thoughts. Close observation of my student writers as they wrote throughout the year in the classroom was a means of developing that intimate knowledge. My observations from the beginning of the school year provided a broad information base about the grade four writers' environment, development, motivation, and composition styles from which would, by design, affect the final data analyses.

Description of the Classroom Writing Program

The writing program was introduced at the beginning of the school year to all the students. Writing was taught as studio craft (Graves, 1983) and was encouraged across all subjects of the curriculum. The emphasis was always on process, with the end-product being considered as part of the process.

Class routines included two specific writing activities daily. One was writing in a daily journal accessed only by the student and myself. Throughout the year I read each journal at least once a week and encouraged a two-way written correspondence with the students based on what they had written. The second activity was a daily half-hour period devoted to writing activities of the students' own choosing and/or specific activities or lessons where I addressed skills and issues related to the improvement of one's writing. The specific writing lessons were organized to accommodate individual and cooperative composition as well as opportunities for participants to share and discuss each other's work.

Six groupings of four to five students were organized for peer conferencing opportunities. These conferences occurred once a week for each group with two groups meeting on a given day. Formal group lessons or discussions occurred twice a week for approximately fifteen minutes. Student-teacher conferences were held once a week and could be initiated or deferred by either the student or myself. No student went longer than two weeks without a conference with me. These conferences lasted no more than five minutes and focused on the communication purposes of the composition rather than editorial needs. This allowed all students about one and one-quarter to one and one-half hours of self-directed writing over the course of a week. All students had at least one, half-hour period a week with no interruptions.

The editing and publishing of student's work was an important part of the program but was handled outside the framework outlined above.

Students could publish their material through display in the classroom or school hallways, or in one of the class-produced books. These latter were bound at year's end and put in the school's library. To publish, students submitted their compositions for me to edit technical content such as spelling, punctuation, and grammar. The student then had to correct their work and provide a 'good' copy for publishing.

Other curricular areas also had a strong writing component including activities such as composing sentences, paragraphs, lists, notes, poetry, reports, and some short essays. Such activities were included in the writing and conferencing periods.

Introduction and Use of the Word Processing Medium in the Classroom

Word processing was incorporated into the classroom writing curriculum as part of that curriculum at the beginning of the school year. A computer centre was placed in the classroom so that there was easy access with little interference between activities in the centre and the rest of the class (Figure 2). A tri-wall cardboard barrier on two sides of the centre and a cork-board bulletin board on a third wall helped to minimize sound disturbances in both directions. Coincidentally, the room also had a fan system operating permanently during much of the year which acted as a source of white noise, a further means of lessening noise distractions within the room.

The centre was equipped with an Apple IIe microcomputer with an extended 80-column card and 128 K of memory. Two disk drives, a green-screen Apple III monitor and an Apple DMP printer made up the remaining computer hardware.

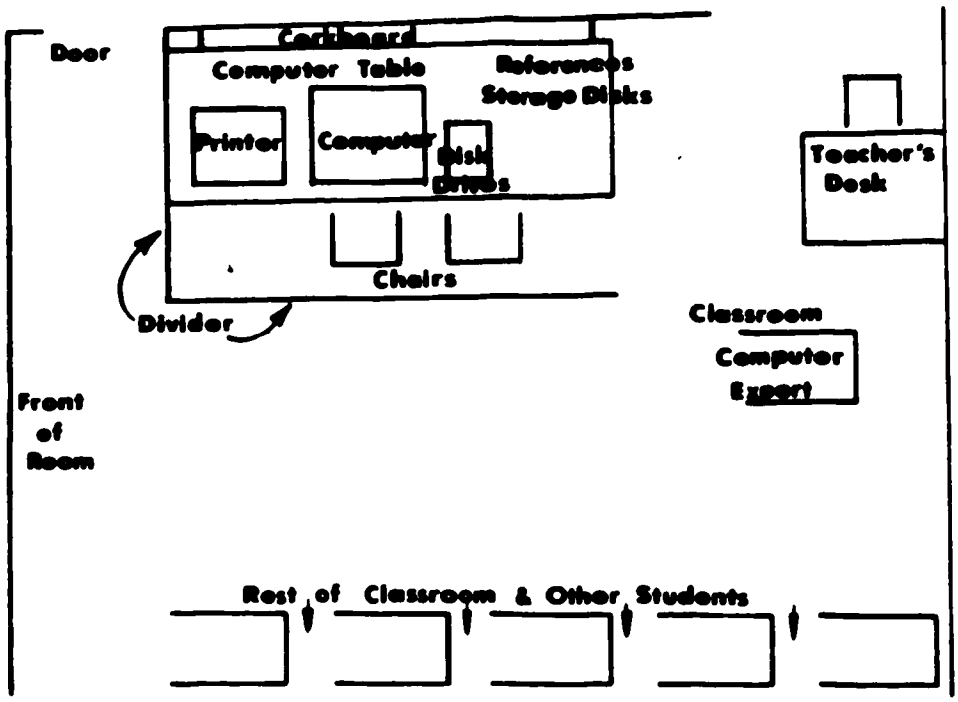


Figure 2. Arrangement of the Computer Centre Within the Classroom

The word processor used was Appleworks (1983), the standard word processing software for the Apple II line of computers and readily available in most schools. Appleworks is partially menu-driven but the more advanced features are accessed with control keys. This flexibility for growth in word processing sophistication was important (Elser, 1985) as some students were expected to go beyond the limitations of the menu-driven capabilities of the program. All students had their own data disk for saving and retrieving compositions stored at the centre. Students were required to demonstrate competency in care and use of hardware and software before they were allowed to use the centre other than for computer literacy. All the students in the class demonstrated this competence by the third week in September.

The class was divided up into groups of four with each group having exclusive in-class computer time (2 to 3 hours per week) assigned on an individual basis for a four-week period starting in October. This allowed all students equal access to the computer over the year although obviously some groups had to wait several months for their exclusive in-class use of the computer. However, many children in the class took advantage of out of class time to write at the computer, with the result that most were able to handle Appleworks well enough to be writing with it by the end of the first six weeks of the school year.

The first group who were given exclusive in class time on the word processor were those students who expressed and demonstrated a strong interest in the computer. Two of the first group went on to become class 'experts' on the computer using the Appleworks program. The training given these students was considerable in the initial two weeks

but paid dividends as the year progressed when they took turns training other students and solving problems during class time. By the end of October, my need to be involved with the computer during class time averaged once per week, a statistic which held throughout the year.

Students were encouraged to ask questions when they wanted to try something different while composing on the word processor. Through questions addressed during a student's hands-on computer time and those posed during student-teacher conferences, students developed a repertoire of word processing skills to meet their own needs. Some requests occurred often enough to warrant specific lessons during writing periods. These lessons included: deleting blocks of text; printing text; rapid movement across blocks of text; and use of the printing options for centering, spacing, underlining and bold face type.

Keyboarding was not introduced formally in this class, however interference due to poor keyboarding skills appeared to be minimal after two to three hours of word processing. Keyboarding errors were usually noted by most students immediately and appeared to be corrected with less effort than went into correcting handwriting errors.

Students looked forward to their time on the computer and rarely chose to work less than thirty minutes with the word processor (most worked forty-five minutes to an hour). This enthusiasm remained constant throughout the year.

As I observed different children throughout the year, I felt that the quality of the organization and communication of their compositions on the computer did not vary much from their pencil and paper work. The

exception was two boys. One was a poor writer who found writing disagreeable but who liked working on the computer. He created some exceptional, personal compositions at the computer. The second was a learning disabled boy who found writing difficult but showed dramatic progress on the word processor. Neither of these boys were considered for the study.

While a variety of writing assignments were encouraged throughout the school day, most students wrote personal narratives or fiction. Students were also free to have one other student with them to work cooperatively. This was done occasionally but mostly students chose to work alone.

Selection of the Subjects for the Study

The criteria for choosing students for the study were threefold. First, subjects had to be comfortable as writers in that they not only expressed a liking for the craft but showed it in their daily efforts. Students who tended to write during the writing periods and involved themselves in writing activities outside of these times were preferred. Not only were such participants involved with their writing but they would also tend to produce a larger volume of material with which to work when it came time for the analysis of the data.

Second, subjects were required to be competent writers for their grade level. The measure of competence was based on a consistent score on a holistic scale (Appendix I) of at least three on a scale of five. In addition, students' cumulative records and interviews with their

grade three teachers were used to corroborate the researcher's evaluations.

Finally, subjects would have had to demonstrate an interest and level of competence with the computer as a writing medium prior to their selection. This was determined by observing all the children in the class in terms of the quantity and quality of compositions produced on the computer and those produced with pen and paper; the relative time they devoted to composition on the computer and the quantity of times they signed up for extra time on the computer and the use they put that time to. No student who appeared more competent in one medium or the other would be considered for the study.

As the year progressed, four students were finally chosen from fourteen who had had the opportunity to work with the word processor. Three girls and one boy were chosen. Two of the girls consistently scored a four on the holistic scale. The other girl and the boy scored a consistent three on the scale. The parents of these students were contacted and permission for them to participate and be videotaped was obtained.

A brief description of each of the four subjects as writers and users of the word processing medium prior to the data collection follows.

Description of the Subjects

Tammy

The writing that Tammy had produced over the year showed her to be fairly advanced in her concepts of what writing could be and what she could accomplish with it. Her focus tended to be on content more often than on surface features. She was at Calkin's interactive stage of revision (1980) and spent a fair amount of time on story development, plot, and maintaining coherence throughout her work. Her skills were reflected in her consistent scores of four on a five-point holistic writing scale used to choose subjects for the study (Appendix 1).

Of all the students chosen, Tammy seemed most comfortable with the composing aloud technique. She was not all that proficient with the word processor but this did not seem to be interfering with her composition efforts nor her desire to use the word processor.

Hilda

When Hilda wrote she seemed aware of problems she felt needed to be addressed but dismissed them to be dealt with later. Her writing tended to be far-ranging in topic, including description, first-person narrative, and fictional prose and poetry. As she did eventually deal with problems she had identified, she was in Calkin's interactive stage of revision. Hilda consistently scored a four out of five on the holistic writing scale used in this study (Appendix 1).

Gail

The writing style that Gail cultivated over the year emphasized lengthy story lines. Her work was often written from start to finish with revisions being performed at the point of production. She often reread her work and revised surface features. More extensive revisions or rewrites were done when she wished to publish. Although capable of meaning-changing revisions, she tended to revise surface features that preserve meaning (Calkins, 1980). She consistently scored a three out of five on the holistic writing scale in Appendix 1.

Gail was exceptionally good at keyboarding and spelling skills. Her proficiency on the word processor was bolstered by her skills in using more advanced functions. She had little trouble deleting or adding text and could move text from one part of a piece to another.

Randy

Randy was the best writer among the boys in the class and he was very competent with the word processor. Of the four students he was most conversant with the formatting options of the word processor.

The range of topics in his writing was much like that found in his reading. During data collection, he wrote fiction and non-fiction which included scientific reports, journal entries, descriptive pieces, and third-person fictional stories and plays. He was potentially a very competent writer. His revision skills were interactional. Randy's scores on the holistic writing scale in Appendix 1 was three out of five points on the majority of his completed texts during the year.

Classroom Computer Center and Data Collection Equipment

In preparation for the study, in early January an Hitachi video recorder with camera and lapel microphone was introduced in the computing center. A Mitsubishi video recorder was added to the computer system to provide a video record of all the writing behaviors that the children did at the computer. Both video recorders were connected so that the video/audio recordings of the children could be matched with the writing products of the children simultaneously. Remote control devices were installed so that all the equipment could be switched on at one time to help insure that the record of the children's work would be complete. A diagram of the center is included in Figure 3. After January, any of the children in the class who wrote at the center, which included the children selected for the study, were trained in the operation of the equipment and were required to turn it on whenever they worked there. This procedure was initiated to insure that the equipment would not be a novelty when the data collection for the study began.

Data Collection

The Data Collection Period

The writing behaviors which constituted the basic data for the analysis of grade four writers' concerns and writing processes were collected as video and audio recordings as well as written drafts over a three week period in March, six months after the computer, the word processor and the writing program were first introduced to the classroom

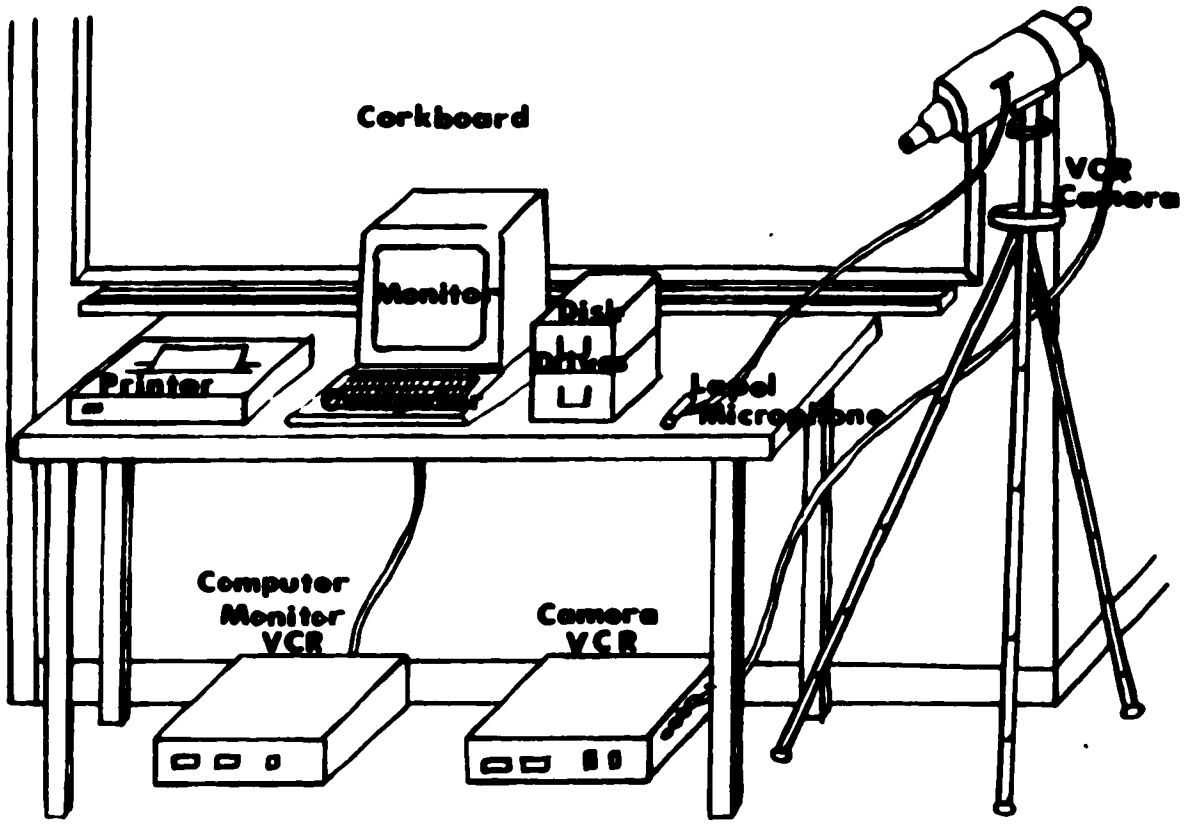


Figure 3. Arrangement of the Data Collection Equipment Used to Record the Composing Activities of Students

and the two months after the data collection equipment was introduced to the computer corner. Observations of the children's writing during the first six months suggested that the writing behaviors of good writers during a three week period would provide enough data for the analysis.

During the three weeks in which data were collected each of the children had nine scheduled hours writing at the computer. Since they also chose to write at the computer outside class time all the writing done then was also recorded.

Preparing the Four Subjects for the Data Collection Period

The four children who were chosen to participate in the study proper were informed about when the data collection would start and what expectations they were to meet during the data collection period. Except for one change the procedures were similar to those which they had been following during the year. That is, they were expected to select their own topics and to compose aloud (as described in the next section) while writing about those topics using the Appleworks word processing program available in the computer center. They were also expected to make sure that all the video and audio recording equipment was working, just as they had been since January.

Description of the composing aloud technique

The technique of composing aloud while writing was introduced in January when the audio-video equipment was added to the center. All the

children who worked in the center from that date were trained and expected to verbalize while writing in the computing center. The composing aloud process was explained to them as thinking out loud about everything they were doing while writing. In order to get the students composing aloud I observed them whenever possible and encouraged them to compose aloud with two standard phrases: "talk to yourself" and "say whatever is going through your mind."

The Extended Teacher-pupil Conference: A Rationale

The one major difference was that they were expected to meet with the teacher-researcher for a fifteen minute conference at the end of the day, instead of for 5 minutes each week which had been the case during the rest of the year. The extended conference was used to encourage the children to talk about their compositions in response to questions about why they had done certain things, how they had approached their writing and what aspects of their writing were most interesting. These informal conferences helped the teacher-researcher make better sense of the video and audio data generated during the writing sessions. As teacher-researcher I had to be concerned with all the other children in the class and the total school curriculum throughout the data collection period which meant that my opportunities to observe the children in the study were limited. The information gleaned from the conferences were written up in my own journal later in the day and provided additional information that helped me understand some of the things that were happening when the audio and video records were examined.

Collaborative Writing: An Unexpected Development

Prior to the data collection period all the children in the class had mostly written on their own at the computer. However, as the data collection proceeded each of the four children in the study began to involve other children when they were writing at the computer. Since this collaborative type writing had been rarely observed before the data collection period, as teacher-researcher, I was quite unprepared for this eventuality. While I could not explain why the collaborative writing started, since I was interested in maintaining as natural a setting for the writing of these four students as possible, I decided to allow it to occur and to include collaborative writing as part of the analysis should it continue and provide enough data for an analysis. It did continue and I did include its analysis as a legitimate part of this study. (Information about the children who collaborated with the four subjects is included with the analysis of the collaborative writing concerns and writing processes in Chapter 5.)

Description of the Basic Data Available for the Analysis

The basic data for the analysis consisted of the audio recordings of the children composing aloud alone or with another pupil; video recordings of the children as they wrote at the computer alone or with another pupil; video recordings of the writing done on the computer during each session alone or with another pupil and hard copies of any of the writing that were produced alone or with another pupil. My

journal entries were used to help me understand the setting in which some of the recorded behavior occurred.

Data Treatment

Previous to the data collection period, the writing process model presented next was developed. This model was used to identify concerns and processes observed in the data and was modified as the data presented new insights into writing concerns and processes on the word processor.

At the end of the three week data collection phase, all data were reviewed and rough notes made of each recorded session. These were descriptions of the nature and length of the recordings, notes on questions addressed during student-teacher conferences, and comments on drafts collected for a specific session.

All data for each session were then re-examined in detail and a running commentary of concerns and processes observed made for each data source. The writing processes model was used as the source for this labelling process. Additional composition aspects noted in the data and not anticipated were added to the writing model as they were encountered. Aspects that were ambiguous or served multiple purposes were compared between data sources in an effort to tease out all concerns and processes recorded. My experiences with the students over the previous six months were also drawn upon to make labelling decisions. Less than one percent of the incidents were not possible to label with any certainty. They were noted but left out of all further data considerations.

This operation's reliability was checked by comparing my labelling commentary and those of another graduate student on three different sessions involving different students. We agreed on 86% of the labels when considering the data separately and had 3% disagreement after discussion.

The resulting commentary of concerns and processes were used in the data analysis.

The Writing Model Used in the Analysis of Data

Flower and Hayes' cognitive process model (1981), discussed in Chapter 2, was basic to the writing model which guided the analysis of the data in this study. Other research studies discussed in Chapter 2, relating to specific aspects of the Flower and Hayes' model were drawn upon to provide additional descriptors of the writing processes observed (i.e. Bridwell, 1980; Faigley & Witte, 1981; Flower, Hayes, Carey, Schiver, & Stratman, 1986; Perl, 1979; Pianko, 1979; Smith, 1982). Detailed descriptions of how this other research was applied to the Flower and Hayes model is recorded in Appendix 4.

Flower and Hayes developed their model from their observations of the writing behaviors of adults. Since the model was being used in this study to explore the writing processes and concerns of children, it was expected that some aspects of the Flower and Hayes model would not apply to the children's writing, however since those aspects could not be identified in advance the model used for the analysis of the data in this study retained all the original details (Figure 4). Each of the

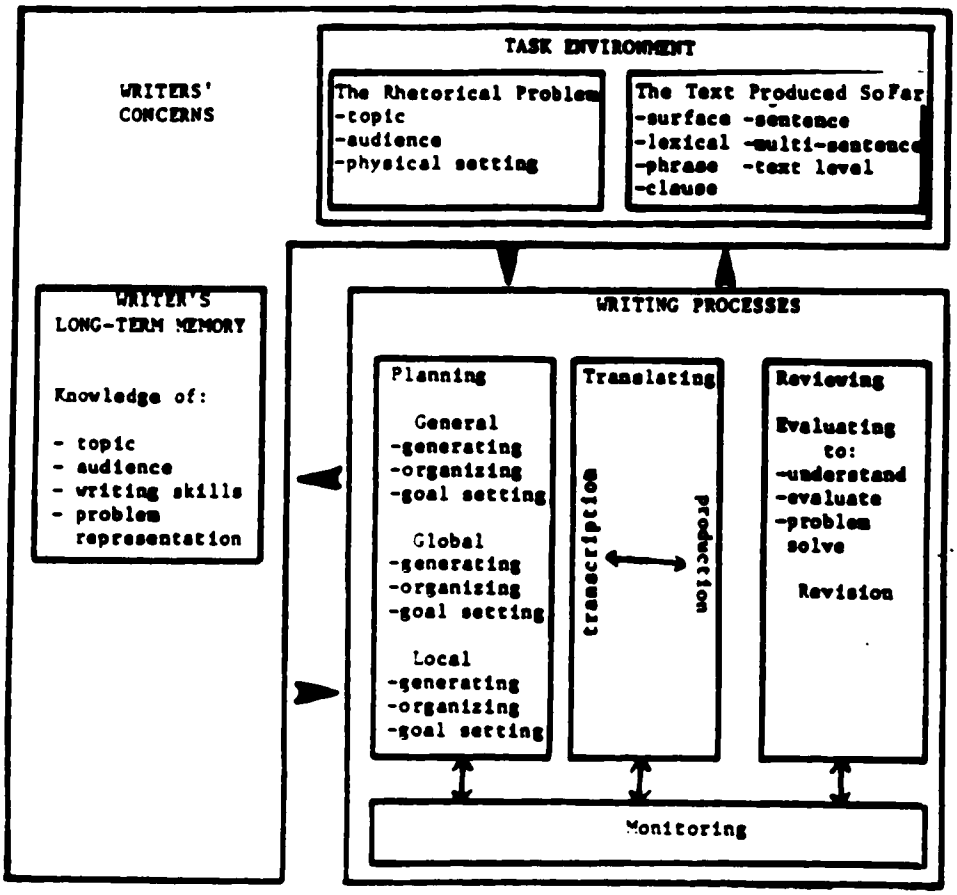


Figure 4. A Writing Process Model: A Modification of the Flower and Hayes' Model (1981)

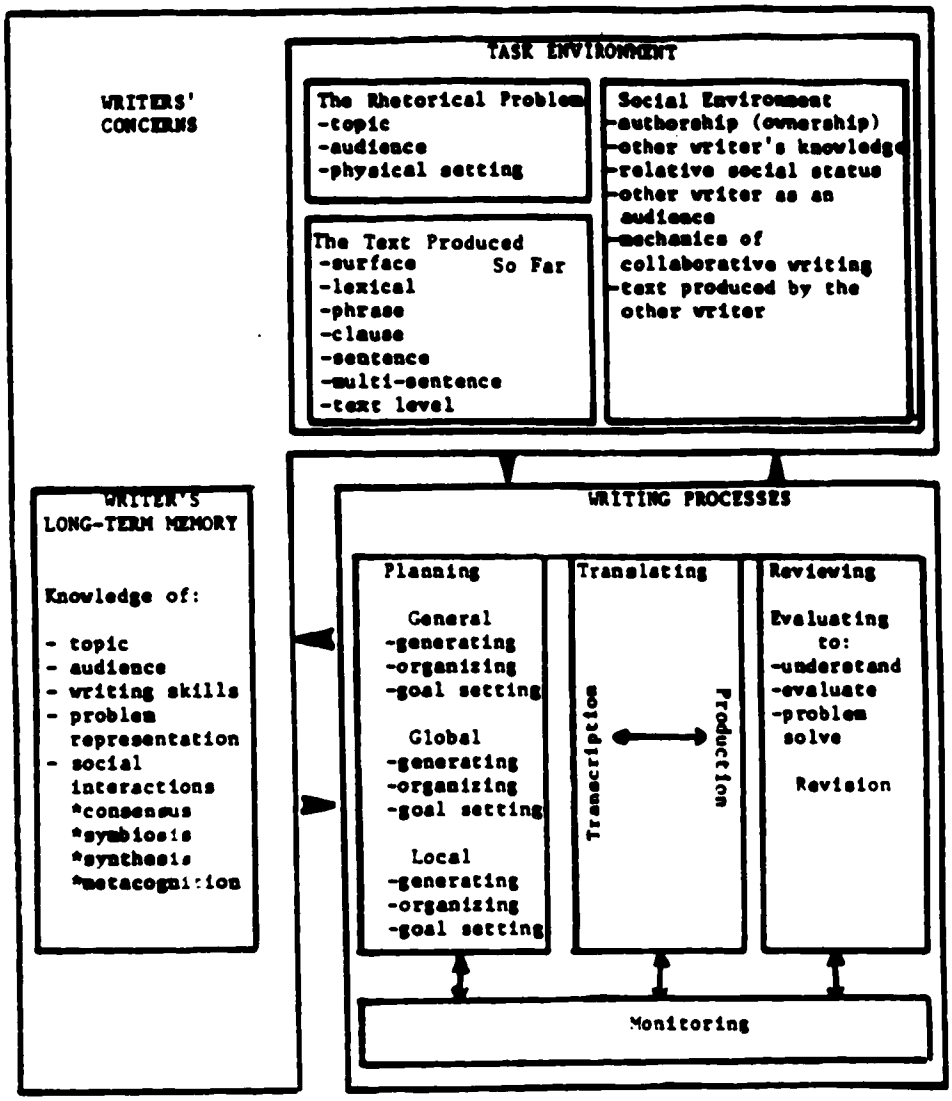


Figure 5. A Collaborative Writing Process Model: Adapted from the Flower and Hayes' Writing Processes Model (1981)

processes and subprocesses of writers' concerns and writing processes identified in the model and observed in the subjects' writing are described in detail in Chapter 4 at the point where the results of the analyses are reported.

A further modification of the Flower and Hayes model was necessary in order to analyze the collaborative writing behavior observed in this study. Specifically, it was necessary to add a social dimension to the individual model (Figure 5). The nature of that social dimension is discussed along with the analysis of the collaborative writing data in Chapter 5.

Limitations of the Study

1. The small number of subjects were selected on the basis of pre-determined criteria. This limited the generalizability of the study's findings regarding other students of differing ability or age.
2. The writing tasks were student chosen and limited in purpose. Performance could not be generalized to other genre or writing purpose with any one student.
3. The writing composition environment was specific to the classroom the students were drawn from. Generalization to other classroom environments were limited in that observed behaviors may have reflected the program rather than the average writing behaviors of students.

4. The composition behaviors were sampled at a specific point in the school year and may not hold within other time frames in the school year.
5. The study was initiated and carried out by the researcher in his own class with his own students. While the data treatment was exposed to inter-observer comparisons for reliability, analyses were done by the researcher alone. Biases and idiosyncratic perceptions may have occurred beyond those presented in this chapter.
6. The anecdotal records of the student-teacher writing conferences were subjective and not verified by another observer. Their reliability was thus limited and the data from them considered cautiously.
7. While the design of the study was such as to try to discern the thinking processes of students while on the word processor, it was recognized that the writing process does not occur at this time alone. No exceptional efforts were made to tap the students' thinking processes outside the classroom. It was acknowledged that discussions, research and other activities related to the growth of a text may have occurred which were not tapped by the study.
8. Word processing programs share many major features. In this sense the findings of the study were applicable beyond the program used. Yet specific features or less versatile programs may have caused subtle differences. Thus the study did not consider the process beyond the features present in the word processing program used.

CHAPTER 4

ANALYSIS OF THE DATA:
INDIVIDUAL WRITING ON A WORD PROCESSOR

Introduction

This chapter presents the analysis of writing concerns and writing processes observed when four fourth grade writers composed alone on the word processor. This individual writing is the creation of a written product by a single writer. While interactions with others may contribute to the ideas and evaluation of the product, the text and its organization are attributable to an individual.

The students in the study were Tammy, Hilda, Gail and Randy. They were chosen for their writing ability and their skill in using the word processing program. Word processing skills for all four students were sufficient for them to keyboard with better than 90% accuracy[1], move around the text, and insert and delete text. All four children were known to be at a point in their writing development where they were interested in the information they were trying to convey and were making revisions that were meaningful if not consistently effective.

Hilda and Tammy had been judged to have good control over their writing and used more sophisticated analyses in evaluating their work

---

[1]All students' keyboarding skills were analyzed from a sample of the first one hundred keystrokes from each students second writing session on the word processor. An accuracy percentage was taken from a count of their errors and did not try to account for keyboarding speed.

than did Gail and Randy. Gail was particularly adept at keyboarding and using word processing functions while Randy was skilled in the formatting options of the program.

These students' composing processes were analyzed using the writing model outlined in Chapter Three. The model delineates the composing process into the writer's concerns, which dictate the substantive nature of the composition, and the writing processes, which are the procedures used to create the composition. While the model posits a strong interactional relationship between the writer's concerns and the writing processes employed, the focus of this study was on what concerns and processes were apparent in observations of the four grade four students as they composed.[2] To this end, the analysis begins with the writers' concerns based on their originating sources and then considers the writing processes observed in the data.

Analysis of The Writers' Concerns

The writers' concerns come to the composition process through the writers' long-term memory and the task environment within which the composition occurs. The writers' long-term memory is the internal source of concerns, and the task environment is the external source of concerns.

---

[2]All references to the writers in Chapter 5 refer to the four grade four students chosen as subjects for the study.

Concerns Derived from Writers' Long-term Memory

Concerns the writer addresses in the composition process whose source is the writer's long-term memory must often be inferred from what is observed. Concerns for audience, topic, writing plans and problem solving strategies originating in long-term memory are implicit in the writer's actions. A person's thoughts cannot be examined directly. Instead, the person's actions must be considered and the thought behind the action deduced.

The technique of composing aloud was used in the present study as a means of addressing the problem of getting at internal, unseen thinking processes. By having the writers vocalize their thinking while they wrote, it was postulated that underlying thought processes would be reflected in the resulting monologue. The analysis of students' composition concerns and processes attested to the partial success of using the technique.

Writers' Concerns for Audience

A sense of audience can have its source in both the writer's long-term memory and the task environment. That situation occurred in the present study and to simplify the analysis, audience concerns are discussed in this section.

For the children in this study, a concern for audience initially originated from the task environment. At the beginning of the year, a systematic promotion of audience awareness was established in the classroom through publication procedures and peer conferencing. The

continued focus throughout the year on writing for a defined audience was expected to establish some internal sense of audience with students by the time the data collection process was begun. By the time data collection started, the subjects had had several pieces chosen for publication or display. Therefore a sense of audience was a concern for these four writers generated from their long-term memory and the task environment. However as Table 1 indicates, no such concerns were observed in the comments of children nor in their writing activities.

Table 1. Writers' Concerns for Audience

Tammy:	No record of her expressing a concern about reading audience. However, some editing in preparation for publication did occur.
Gail:	No record of concerns.
Hilda:	No record of concerns.
Randy:	No record of concerns.

What is really not known is whether or not this was due to a lack of or limitations on the composing aloud technique in reflecting on those concerns.

While these young writers seemed to show no concern for a true audience they certainly reviewed what they wrote to make certain that it made sense to themselves, in that sense they were themselves an audience.

Writers' Concerns for Choice of Topic

Choice of topic was a second area of concern that could have its source in long-term memory or the task environment. In the study the choice of topic (fiction/non-fiction) was entirely within the control of the subjects both during regular classroom writing sessions and throughout the data collection period. The task environment may have stimulated topic choice but their knowledge and internal motivation controlled that choice.

As can be seen in Table 2, there was a preference for all four students to write fiction.

Table 2. Writer's Concerns for Topic

Tammy:	Fictional; third-person based on a fairy tale story structure. Used a standard opening of "Once upon a time . . ." but varied widely in topic and detail.
Gail:	Fictional; third-person. Personal narrative.
Hilda:	Fictional; third-person. Personal narrative.
Randy:	Fictional; third-person. One non-fictional report.

None of the students were at a loss for topics in that their ideas seemed to come quickly. Most of the topics were fictional with the majority developed from previously experienced material (i.e. T.V. characters or programs, stories read or heard before, favorite action toys). Personal narratives were also popular and a few original works

were also observed. Only Randy chose a non-fiction topic.

Writers' Concerns for Writing Plans and Problem Solving Strategies

Writing plans and problem solving strategies are the knowledge about the writing process that the writer brings to the composition task. Writing plans specify how one goes about the task of writing from conception to completion. Problem solving strategies reflect solutions to problems that the writer has encountered in past writing tasks. The strategies are solutions that have worked in the past which the writer can draw upon when a need arises.

While no concerns for writing plans were observed among any of the four students some specific concerns related to problem solving strategies were. These are reported in Table 3.

Table 3. Writers' Concerns for Problem Solving Strategies

Tammy:	Spelling problems (e.g. how do you spell 'beauty'?) - used visual representations (i.e. spelt 'beauty' different ways) - trial and error
Gail:	None observed
Hilda:	Spelling problems (e.g. "That's not 'abandoned'; there should be only one 'b'.") - used phonetics and visual memory - usually a one-shot effort - occasionally used the dictionary
Randy:	Spelling problems (e.g. "How do you spell 'station'?") - used the dictionary

Writing plans were not an observed source of concern for the students in this study. However problem solving strategies specific to spelling were observed.

Writers' Concerns Derived from the Task Environment

The environment in which the writing task is performed puts some constraints on the nature of the writing process. These constraints are beyond the control of the writer and represent external sources of a writer's concerns. The sources involved are the physical environment of the task, the rhetorical problem as it is imposed from an external authority, and the interaction of the writer with the evolving text.

Writers' Concerns or the Physical Environment

The physical environment refers to the place where writing occurs and includes constraints and limitations inherent in the writing situation. In this study, all students worked at a computer centre with everything required for writing on the computer made available. If a writer required something for his or her work that was not available, arrangements were made to provide for that need. The only limitation was that the subjects use the centre at scheduled times.

Physical environment concerns for all students in the study were specific to the word processing functions. Table 4 shows how each student addressed those concerns.

Table 4. How Subjects Addressed Concerns with the Word Processor

Tammy:	- asked the classroom 'expert' (e.g. "How do I print this?") - trial and error exploration (e.g. switching between several of her stories in the computer's memory)
Gail:	- asked the classroom 'expert' (e.g. "How do I centre the title?") - trial and error exploration (e.g. moving blocks of text from one place to another)
Hilda:	- asked the classroom 'expert' (e.g. "I don't know how to get rid of these stories.") - trial and error exploration (e.g. movement of text) - selective ignoring (e.g. "It doesn't matter. I can fit it later anyway.")
Randy:	- asked the classroom 'expert' (e.g. "How do I get it to triple space?") - trial and error exploration (e.g. tried as many of the formatting options as he could find)

The students in the study expressed no concerns about the writing centre. However, the word processor was a common source of concern and fell into two categories: those involvir word processing functions which they needed and those with which they experimented out of curiosity rather than need.

Although the students had had extensive experience with the word processor before they became involved in the data collection period, they were still learning how to use it. The limitations of their knowledge of the program did not detract from their using the program nor did it appear to cause undo frustration with the writing task.

Writers' Concerns for the Rhetorical Problem

Under normal writing conditions, the rhetorical problem which embodies the concerns of writers regarding the topic of the text and the audience for which it is written must be addressed before translation of ideas into text can begin and its solution continues to guide the development of the evolving text. In this study the subjects really did not need to deal with rhetorical problems because they were free to choose their own topics and the audience was largely defined for them.

Writers' Concerns for 'Text Produced So Far'

The 'text produced so far' is the composition already developed. Once a writer begins to translate ideas into text, that text becomes a part of the task environment. A title typed at the top of a page immediately puts constraints on the text to come, as does every word, phrase or sentence a writer creates.

Concerns regarding the text already produced were often observed among the writers in the study when each read the text he or she had created. Their concerns addressed features at the surface level (e.g. spelling, grammar, formatting) as well as progressively larger text-based units such as words, phrases, clauses, sentences, multiple sentences, or whole text. Figure 5 shows the text-based units in the evolving text that each student in the study addressed.

Concerns arising from the text produced so far by the writer tended to occur during the reading of parts of the text by the writer. When this reading led to production of more text, the text being read was

Levels of Text	Tammy		Gail		Hilda		Randy	
	read	revised	read	revised	read	revised	read	revised
surface features		*		*		*		*
words	*	*	*	*	*	*	*	*
phrases	*	*	*	*	*	*	*	*
clauses	*	*	*		*	*	*	*
sentences	*	*	*		*	*	*	*
multiple sentences					*		*	*
whole text				*			*	

Figure 6. Observed Concerns with the Evolving Text.

usually that immediately preceding the point at which production was occurring.

Reading leading to revisions tended to involve surface features and lexical terms when revision occurred recursively within the first draft production of a piece. Beyond the first draft, revisions could involve text units up to the whole text level.

Analyses of Writing Processes

The writing processes encompass the procedures used to create a composition. The four basic processes are planning, translation, reviewing, and monitoring. Planning, translation and reviewing are the processes which act directly upon the evolving text. Monitoring is the controlling process which coordinates and acts as a switching station between the other three basic processes. Due to the nature of the monitoring process and the inherent difficulty of evaluating its impact on composition, it is omitted in the present analysis.

The Writers' Planning Processes

The planning process has three distinctive levels: general planning, global planning, and local planning. General planning begins with a decision to write and ends when the first word of text is created. Sometimes referred to as pre-writing, it occurs first in the writing process. Of the three levels of planning, general planning is the only one that is not recursive.

Global planning refers to planning that focusses on the overall topic of the composition. This is often described as the main idea.

While global planning sets direction for total text development, text would not be produced without local planning. Local planning is focussed on that point of the text being physically produced or revised at any given moment. Global and local planning often occur recursively and simultaneously, initially occurring when general planning ends and text production begins.

General, global and local planning are further characterized by the same set of planning subprocesses: generating, organizing and goal setting.

Generating involves the creation of ideas. These ideas can be gleaned from the writer's long-term memory, be assigned or triggered by the task environment, or occur as a result of an interaction between these two sources.

Once an idea is created, it must be organized and given structure. Sometimes a new idea will be clearly defined and ready to be translated into text. Usually though, a new idea lacks substance and must be explored and manipulated into an understandable format. The final stage of organizing is evaluation of the new idea. If an idea is not acceptable, further organization occurs or the idea is abandoned and a new idea is generated. However, if an 'organized' idea is accepted, then goal setting occurs.

Goal setting defines the process to be used in incorporating an organized idea into the writing text.

Writers' General Planning Processes

General planning occurred so rapidly for the students in the study that it was hardly observable. Most stories were started with little pre-amble (Table 5).

Table 5 Observed General Planning Activities

Tammy:	- often observed thinking - began translation with a (story) file name - file name tended to be a variation on a title or an abbreviation (e.g. "B.P." for "The beaty pagent" [sic][3]
Gail:	- varied her general planning - on some occasions she sat down and started - on others she thought through the idea. e.g. "What am I goin' to write about? Red . . . Maybe red . . . That would fit in with the other stories about red birds. Maybe red . . . shirts. The red shirts. The red shirts."
Hilda:	- no observable waiting time between setting up the word processor and translation - began translation with a (story) file name - file names tended to be a variation on a title
Randy:	- several minutes of varied activities before writing. e.g. sit silently, talk aloud, look around the class, look through his file folder, read a few sentences from a book and/or talk with another student) - translation did not begin with a file name (these appeared to be arbitrarily chosen) but with the title of the work

A good example of the use of generation, organization and goal setting subprocesses was observed in Tammy's writing of "The Beaty Pagent." During a student-teacher conference, Tammy discussed this story and where she had got the idea for it. She explained that she had

[3]All titles and quotes from materials produced by the students are presented in the students' own language and feature original spelling and grammatical forms.

wanted to write this story for a couple of days and when she found that she was not interested in any of her other stories, she remembered this one.

She described this story as one about a messy girl who discovers that she was really beautiful. When asked where she got the idea, she replied that she didn't know; she had just thought of it.

Several features of general planning were deduced from Tammy's comments. The planning of the story idea was not observed but Tammy's statement about remembering this idea, suggested that she had gone through the sub-processes. She had a goal (which she remembered) and she was observed acting upon it. Her description of the story showed that this was a self-initiated writing task (it was an idea she had had for a few days); that the topic was well defined if not detailed; and that she had some idea of genre to be used. The sub-processes of general planning were not completely discernible here, a problem that occurred throughout the study.

General planning was observed in the writing process of all writers in the study. However its sub-processes were not always discernible or complete. Much of the process was internal with only small parts reflected in the writers' behaviors. An exception was observed with one of Gail's stories, in that all three sub-processes were present but they were abbreviated (see Table 5). General planning ended when the story was assigned a title.

Writers' Global Planning Processes

When the writers were focusing on global planning, the sub-processes of generating, organizing and goal setting dealt with ideas that affected the entire text. The processes worked much like they did in general planning except that idea generation could also occur through interactions with the text already produced. As can be seen by the examples in Table 6, all three sub-processes in general planning were observed.

Global planning did not occur on an ongoing basis during the writing process. It tended to occur early in text development and there was some evidence that it was involved in the evaluation of text later in the writing process. The generation and organization of ideas was observed in many of the instances of global planning. Goal setting was inferred from the nature of the text these writers produced from those ideas.

Writers' Local Planning Processes

Every time an idea was translated into text there was evidence of local planning but the sub-processes of generating, organizing and goal setting were not easily observed due to the immediacy of the local planning role. With these children's writing local planning dealt with the minute details of production which occurred so quickly that the sub-processes often needed to be inferred from the text created. The composing aloud technique seemed too slow to capture these activities.

Table 6 Examples of Writers' Global Planning Sub-processes

Tammy

Example from "The Beaty Pagent" (Appendix 2)

1. Generation of an idea. Tammy's idea for her story was to write about an ugly girl who wins a beauty pageant.

2. Organization of the idea. The components of her idea were an ugly girl, a beauty pageant, and how the girl became involved in the pageant. Tammy tried out the first two components as possible starting points for the story.
i.e. Tammy says, "Once upon a time there was . . . there was . . . a girl . . . who was very ugly. No! Once upon a time there was . . . there was a beauty pageant."

3. Goal set. Tammy decided to begin with the beauty pageant and wrote, "They were going to have a beaty pagent."

Gail

Example from the incomplete story, "The three girls"

1. Generation of an idea. Gail was struggling with a story when she was observed to stop and go back to the story beginning and start to read. Her generated idea was that her story was not working.

2. Organization of the idea. In reading the story from the beginning, Gail was evaluating her total text in order to put some organization on her idea that there was something wrong with the way she was writing.

3. Goal setting. When she had read into her third line of text, she stopped and emphatically stated that she did not want to write "this story." As a result she set a goal of deleting all the text she did not like and proceeded to do so.

However, Table 7 provides some examples of the three sub-processes that were observed during local planning.

Table 7. Observed Examples of Local Planning Sub-processes

Tammy

Example from "The Beaty Pagent" (Appendix 2)

- Tammy had decided to focus initially on the idea of a beauty pageant but switched to local planning when she stated, "But where is it [the beauty pageant]?" This was a local concern.
- Her statement, "I know . . ." signaled her having generated an idea, organized it and set a goal. The result was, "Once upone a time there was a school named Queen Elizabeth."

Hilda

Example from "The Funny Day"

- Hilda wrote about how one of her characters was running when a binder fell apart. She stopped and commented that, "that's not what happened. The binder was thrown." She then proceeded to try three different revisions, discarding each in turn. This organizational process was embedded in the execution of her goal to write about how the binder fell apart because it was thrown.

Local planning was expected to be a constantly recurring process punctuating the entire writing process. However, its presence was not easily identified in the data. Perhaps its pervasive nature made observation of all the sub-processes involved difficult. It seemed as if local planning was so specific to the local text at the point of translation that goals set were completed before the writer could vocalize the thoughts behind the actions. The composing aloud technique was not effective in capturing the entire process.

The Writers' Translation Process

Translation is the process whereby ideas generated during planning become text. The translation process involves two simultaneous activities. The first is production by which ideas are translated into conventional written language form and transcription by which that language is made to conform to standard print conventions (letters, spelling, syntax, etc.).

Table 8 shows how students in the study exhibite. specific translation patterns.

Table 8 Translation Patterns of Students in the Study

Tammy, Gail, Hilda:
- production predominated during first draft
- revision predominated during second draft
- translation at the beginning of a writing session usually involved a lot of planning activities
- transcription skills were largely mastered; they were automatic
- transcription problems were usually addressed within several words of the point of production. Production continued after the writer read the immediately preceding text in order to orient thinking
- transcription problems were largely keyboarding or spelling concerns
Randy
- production and translation were given equal attention on all drafts of a text
- production and translation were consistently separated by reading to orient or reading to evaluate text
- translation and reviewing were recursively used

As noted in Table 8, Randy did not go about translation like the other writers in the study. His composition process tended to be far more recursive, involving all three basic processes consistently. The following sequence of typed transcript shows this recursive aspect during the first draft of his science report:

Randy first typed:

ELECTRICITY
HOW IS IT MADE?

There is many ways to make electricity. A power

He paused here and used a dictionary in the computer centre to look up 'station'. When he had it he continued typing:

station can be used to make electricity.

Randy then read his entire text. He went back to the title and revised it to:

HYDROE-ELECTRICITY
HOW IS IT MADE?

He then read from three separate books and revised the first sentence to:

There is many ways to make a dynamo work.

The sentence was not plagiarized. In fact it was hard to figure out where the idea had come from. Randy read the entire text again and revised the title to:

HYDROE-ELECTRICITY
HOW DOES IT WORK?

Randy's compositions were like this consistently. He would check spellings, consider information, revise and rewrite as the text was emerging. Revisions were likely to occur anywhere in the text at anytime. Randy treated translation and reviewing as equally important during his first drafts. He seemed to be a perfectionist who put equal value on the spelling of a word as was attributed to the idea that that word might represent.

Production and transcription were both observed with all students with most of them emphasizing getting their ideas into written form (production) during the translation process. Only a few problems with transcription occurred, although when they did they often resulted in revisions to the written text.

Randy's translation process showed a variation on the process of the other three students in the study. He emphasized all three writing processes. Transcription concerns were often part of the reviewing sub-process of revision and those revisions went beyond the surface features observed with the other three students.

The Writers' Reviewing Processes

Reviewing is that part of the composition process where a writer inspects the printed text and makes changes believed to be appropriate to the text. There are two basic sub-processes involved: evaluation and revision.

At its simplest level, evaluation involves reading the text to understand what has been written so far. This may be done to reflect upon the information translated or it may be to help orient one's thinking for further text production. A second level of evaluation is reading to evaluate critically the text produced and if this reading detects a problem in the text, a third level of evaluation, reading to define the problem may be necessary.

The students in the study used all three evaluative levels in their writing, using reading to comprehe the text most often. Table 9 presents examples observed of how each e uative level was manifested in the students' writing processes.

Table 9. Observed Examples of the Three Levels of the Evaluation Sub-process

---

1. Reading to help orient one's thinking to production or revision:

   Tammy spent two writing sessions in completing her first draft of "The Beaty Pagent." At the beginning of the second session, she read the text through once, moved the cursor to the end of the completed text and began to type. She read the entire text for comprehension.

2. Reading to critically evaluate the text:

   Upon reading the second draft of "The Beaty Pagent," Tammy commented upon completion of her reading, "That's good!"

3. Reading to define a problem:

   Gail was struggling with a story when she was observed to stop and go back to the story beginning and start to read. She was not happy with how this story was progressing; she knew something was wrong. She was reading to discover what the problem was. She discovered that she did not want to write the story.

Revision occurs when a problem has been found during evaluation and an effort to correct the problem is initiated. Depending upon the clarity of the problem definition, revision may be very specific based on a problem solving strategy or it may involve rewriting in which the text is deleted and the idea translated in different language. Revisions resulting from evaluation were observed to result in possible changes to all levels of the text (Table 10).

The revision data also alerted me to a time constraint concern that several students had with having to write at a scheduled time.

For example, Tammy was observed to [illegible] to a first draft and begin adding to it. Her addition involved a lot of recursion between the basic processes. When asked about the special effort she seemed to be putting on the last part of that story, Tammy pointed out that she was rushed at the end of her last session with the first draft. For her, the important thing on that first draft was to "get the story down." With the time constraints removed, Tammy gave more attention to developing her ideas rather than just 'getting them down'. She was willing to take some time to go back and revise what she had just written. As she wrote she evaluated and discovered better ways of writing what she wished to say. The similarities between this behavior and Randy's first draft writing pattern was striking. This recursion amongst the various processes of writing was not consistently observed with Tammy over the data collection period. However, Tammy's comments about her writing efforts when she was in a hurry are noteworthy.

Table 10. Observed Examples of Revision at Different Levels of the Text

Surface Features:

- changing an 'sie' to 'sir' (keyboarding error)
- Tammy tried several versions of the word 'beauty' before she finally settled on the spelling, 'beaty' (spelling)

Word:

- Tammy typed the following line:
  "The next day when she went to school everybody said"
  She deleted 'said' and continued typing "couldn't believe their eyes"

Phrase:

- Tammy types, "couldn't believe their eyes." She later changed this to, "couldn't believe that it was Amy."

Sentence:

- Hilda wrote, "my binder fell apart and the papers went everywhere." She changed this to, "while she was running she throw my binder because I was carrying hers."

Multiple-sentences:

- Hilda wrote: The guy was saying . . . watch your mouth! Sharon said you can't boss me around so there! They guy said "I said
- She revised it to:
  The guy was saying . . . watch your mouth! Sharon said "Why is it doing tricks or something! O boy that guy sher got mad!

Whole Text:

- Gail worked on a text for close to a half hour when she stopped, went to the beginning of the text and began to read it. Three sentences into the text she exclaimed, "I don't want to write this story!" and she deleted all of it except the title and the first sentence (this was an isolated incident).

A second atypical revision behavior was also noted with Tammy. At the end of one story with which she had expressed considerable satisfaction, she again evaluated her text for the specific purpose of editing surface features. She put in capitals and periods, fixed keyboarding errors and worked on spelling. At one spot Tammy noted a run-on sentence and replaced 'and' with a period and a capital letter. She also introduced the name 'Amy' earlier in the text. This was a name she had introduced late in her first draft as a result of a discussion with Hilda. Tammy's choice to evaluate her text and edit it was unusual as it was observed at no other time with her or any of the other students in the study.

There was a great deal of variation in the reviewing processes of the four subjects, particularly with revisions. However there were some common behaviors. The evaluation sub-process was observed with all students. Reading to comprehend or orient oneself to the text was a common practice during the translation process, occurring when the flow of text production had been interrupted, for whatever reason.

Reading to evaluate was largely done after the first draft. However there was some evidence of it occurring during first drafts if the writer did not feel hurried or had a tendency to perfect the work. Reading to define problems was used less often and only when a problem was not clear to the writer.

The majority of revisions tended to be largely meaning-preserving changes to small units of the text. Meaningful revisions were observed with all writers and evidence of large unit revisions even up to the whole text level were noted.

CHAPTER 5

ANALYSIS OF THE DATA:
COLLABORATIVE WRITING ON THE WORD PROCESSOR

Introduction

Although most of the material cited in this chapter involve collaboration between students chosen for the study, some examples involve other students in the classroom.

The collaborative writing observed in the study was identified as simultaneous collaboration because collaborating pairs planned, translated, and reviewed their text at the same time and input from either one on any aspect of the writing process could occur at any time (see Wheeler, 1985).

While the original intent of the study was to analyze the individual writing processes of a sample of fourth grade writers using the word processing medium during the data collection period, the original four subjects spontaneously began to write collaboratively with each other and sometimes with other children in the class. Rather than interfering with this collaboration, it was decided to collect samples of the writing behavior that occurred and to subject these writing behaviors to analysis.

While all aspects of the writing process model are affected by the collaborative situation, the social dimension was found to be a key feature and became a focus for the analysis presented here.

Three older children from the class worked collaboratively with one or the other of the four subjects who had been selected originally. The writing behaviors of those children involved were observed during the year prior to the data collection period, are important to the discussion and are described as follows.

Sharon

Sharon was a verbal student whose writing tended to be largely first person personal narratives. She scored twos and threes on the five-point holistic writing scale. Her keyboarding skills were low but she picked up the word processing functions quite quickly.

Perry

Perry was a low academic abilities student who had a great deal of problems with writing. His scores on the holistic scale were ones. His keyboarding skills and ability on the word processor were low.

Sam

Sam was an English as a Second Language student who had been in Canada for three years. His writing skills were fairly good and he scored threes on the five-point holistic writing scale. Sam's keyboarding skills were low but he was quite proficient with the word processing functions.

Tammy and Gail who were selected for the study spent considerable time together as a collaborative writing pair but also collaborated occasionally with others in the class. Those occasional collaborations

were not analyzed. Hilda worked collaboratively with other children in the class but her preferred partner was Sharon and their collaborative writing behavior was analyzed. Similarly, Randy's preferred partners were Sam and Perry and his collaborative writing with each was analyzed.

The collaborative writing process was analyzed using the modified writing model which was extended to include social aspects noted in the collaborative data. Collaborative writing with a word processor was much more public than individual writing and therefore the collaborative writing data were more extensive, lessening the need for inductive analysis.

Collaborative Writers' Concerns

The collaborative writers' concerns c[illegible]re for each individual in either long-term memory or the task envi[illegible]. However, the collaborative process adds a social dimension to the concerns originating from these two sources. The writers' long-term memories are extended to include knowledge of social interactions. The task environment obviously has a social dimension because there are two writers in that environment.

Knowledge of Social Interactions: A Concern of Collaborative Writers' Long-term Memory

The collaborative writing situation is influenced by the social interaction that occurs between the two writers involved. As with any

social interaction, there are a number of implicit rules which allow the participants to understand the nuances of that interaction.

Four characteristic social interactions were repeatedly observed during the collaborative writing sessions and can be identified as consensus, symbiosis, synthesis, and metacognition.

Collaborative Writers and Consensus

Consensus is the mutual agreement of both writers to proceed with a specified idea during the composition process.

The following discussion[4] was part of the first discussion that Tammy and Gail had in preparation for writing their story, "The New Care Bear." It demonstrates how consensus was achieved.

Tammy: Well how 'bout little . . .

Tammy: pig
Gail: Care Bear.

Tammy: Yeah!

Gail: The Little Care Bear.

Tammy: The New Care Bear.

The social interactions observed in this transcript were characteristic of each of their collaborative sessions. They discussed options back and forth between themselves until consensus was reached regarding specific aspects of their text. They seemed to have an

---

[4]The transcripts of all students involved in the study have discussion, dictation, and reading of text presented in normal type with read text indicated and bracketed. Typed text is presented in bold faced type. Material occurring simultaneously are connected by a bracket.

implicit set of social rules for attaining consensus. They did not discuss how they would reach decisions except when I specifically asked about their decision making during a student-teacher conference and Gail said, "we talk until we both agree". In practice, failure to reach consensus in this way was rare and usually involved local aspects of the text.

Collaborative Writers and Symbiosis

A second characteristic of collaboration is symbiosis which is the division of labour according to each writer's stronger skills in order to complete the writing task. Table 11 shows some examples of symbiosis.

A phenomenon at odds with the symbiotic interactions was observed with Hilda and Randy when they worked collaboratively with other children in the class with relatively little experience in using the word processor. When a collaborating partner was taken on who had not yet had in-class time on the computer that partner demanded equal or better than equal time transcribing text and using the keyboard. The novelty of the computer exerted a strong negative influence the symbiotic relationship observed when the partners were more equal in their word processing experiences.

Collaborative Writers and Synthesis

Synthesis is the sharing of the creation of a text so that the boundaries of ownership for any part of the text becomes blurred. Each writer internalizes the ownership of the writing as 'ours'.

Table 11 Observed Examples of Symbiosis

Tammy and Gail:

Tammy was a good writer but less capable than Gail at keyboarding and spelling. When problems occurred in production, Tammy tended to deal with them.

e.g. The two girls were trying to decide how the characters in their story could be summoned together. Tammy suggests, "How about, 'When they got there they could hear' . . . you know when something goes wrong that little buzzer or something goes on."

When the problem involved keyboarding or spelling, Gail was deferred to it.

e.g. Tammy was trying to spell 'geniuses' at the end of a line and after two attempts, said to Gail, "I can't get this. You do it."

Hilda and Sharon:

Because of Hilda's greater experience on the computer, she tended to do more than half of the transcription.

Randy and Sam:

Randy's skills with keyboarding and particularly formatting had Sam relying heavily on Randy's skills when a problem was encountered in either of these two areas.

Tammy's excitement about "The New Care Bear" story was expressed in her statement to Gail, "I can hardly wait to have this finished; can you?" Tammy found 'her voice in the text' (Graves, 1983) before Gail did. However, this changed as Gail became more involved in the story as it progressed: "I can't wait to get this done!"

As the transcript segment below demonstrates, it became difficult to assign any part of the text to either writer.

Tammy: Meanwhile . . .

Gail: panda put . . .
Tammy: told . . .

Tammy: O.K. you write it . . .

Tammy: Meanwhile panda
Gail: MEAN

Tammy: (Notes that the caps lock key is down and the letters are all capitalized; she reaches across and deletes back to the capital 'M')

Tammy: Meanwhile
Gail: meanwhile the panda was . . .
Mean while the panda

Gail: telling Grandma Bear . . .

Tammy: something that Beastly said . . .

Gail: something occurred to the panda . . .

Tammy: and . . . then she said it meant . . . ah

Gail: O.K. just a minute. Meanwhile the panda was yelling to Grams, "What does this mean? What does this mean? and something was very strange about the panda and she's beginning to change . . .

Tammy: every time she said the word. And Grandma said keep on saying it, keep on saying it and all of a sudden she just turned all colorful and she said this has got to be your name--Problem Solving Bear and then it had . . .

Gail: Problem Bear

Tammy: Problem Solving Bear so on his heart it had a little magnifying glass shaped like a heart . . .

Gail: You don't have to have it on a heart.

Tammy: (Begins to type)

Gail: It's my turn

Tammy: (Lets Gail at the keyboard)
(READING: "Meanwhile the panda") . . .
Gail: (READING: "Meanwhile the panda")

Gail: I can't wait to get this done!

Tammy: I know

Gail: . . . yelling the spell
yelling

Tammy: and he started to feel funny

Gail: but she didn't know she was saying the spell . . . but how are we going to say that? . . .

Tammy: Well she could hear it and could see it changing and she knew . . .

Gail: Have her say, "Grams, Grams. What does this mean? . . .

(Tammy types and Gail dictates rest of the sentence.)

This interaction was typical of the interaction between most collaborating writing pairs in the study. Both partners contributed in such a way that it became difficult to distinguish any great part of a text as belonging to one or the other in a pair. When any stories were discussed, they were always spoken of as 'their' stories. Each collaborating writer seemed to internalize a belief that the other writer had made an equal and equitable contribution to the story and so both had ownership.

The type of synthesis discussed thus far was not observed when Randy wrote with Perry who had learning difficulties. The following transcript shows that Randy did most of the composing in that context and that discussion was limited with Perry serving as little more than a sounding board for Randy's ideas.

Randy: First thing Randy tried was
Perry: **Frist thing Randy tried**

Randy: maybe he should just draw parts of the bunny, you know- the ears then the nose, eh?

Perry: Yeah. O.K.

Randy: First thing that Randy tried to draw
Perry: **to draw**

Randy: was two ears like this . . . and we can
Perry: **two ears like this**

Randy: make a drawing here to show what the ears look like. Write it . . . two ears.

Perry: two ears

When the production and transcription roles were reversed, Randy not only transcribed but continued to do much of the production of text too. Despite this apparent lack of synthesis, both writers spoke of the work as 'ours'.

Collaborative Writers and Metacognition

Metacognition or discussion of how one thinks about a task was observed only occasionally. For example, Gail asked, "but how do we do that?" when she and Tammy were faced with the problem of clarifying a detail in one of their stories. The discussion was as follows:

Gail: . . . yelling the spell
yelling

Tammy: and he started to feel funny

Gail: but she didn't know she was saying the spell . . . but how are we going to say that? . . .

Tammy: Well she could hear it and could see it changing and she knew . . .

Gail: Have her say, "Grams, Grams. What does this mean? . . .

(Tammy types and Gail dictates the rest of the sentence.)

Metacognitive discussions involving various aspects of the writing process were observed in most collaborative writing sessions but not during individual writing sessions. Most episodes of metacognitive discussion observed involved questions of spelling (e.g."How do you spell 'quietly'?"). However, questions addressing how to convey meaning in a text were not uncommon.

In one session, Tammy actually asked Gail if she thought she wrote differently on a computer than with pen and paper. Both agreed that they thought not. It is possible that my interest in this question sparked their curiosity and the question.

The Social Environment:
A Dimension of the Task Environment

The presence of another person in the writing situation requires that a writer attend to a social dimension beyond envisioning an audience for whom a text is created. Concerns regarding authorship, the other writer's knowledge, the role of relative social status, the other

writer as an audience, the mechanics of collaborative writing, and the text produced by the other writer, all stem from the social dimension of the collaborative writing environment.

Collaborative Writers and Authorship

The collaborating writers in the study had very little trouble dealing with who had authorship of the collaborative writing they created. Observations of their sense of authorship were strengthened by their sense of what was not jointly owned. For example, during one session Gail offered a copy of one of her stories to Tammy. Tammy declined the offer "'cause I didn't write it."

Even material that was collaborative in part took on a sense of one-writer ownership if a substantial part was done by one writer only. Tammy and Gail wrote a story called "The Three Boys" collaboratively. They completed well over half the first draft together, however Tammy completed one version of the story by herself. The next time she and Gail got together to work on the story Tammy insisted that they work on the original version and that Gail should produce the text of the story. More often a writer would put off working on a piece alone because he or she was working with somebody on it.

Collaborative Writers and the 'Other Writer's' Knowledge

Examination of the collaboration transcripts suggested that discussion was constant and that the verbal interaction seemed to stimulate the creativity of collaborative pairs.

Each of the writers seemed to thrive on the knowledge their partner

brought to the discussion. Each acknowledged the partner's contribution by reacting to it. The sharing of knowledge was integral to the collaborative writing observed in this study.

Collaborative Writers and Social Expectations and Status

Every student has a particular status in his or her class, school, and community. While status is neither uniform nor static, it does affect the degree of influence a student has in any given situation. Status is a multi-layered concept with any given person having different relative status in a group dependent upon what criteria are used for comparison. For example, Hilda's status as a student was high in the class, her athletic status was average and her leadership status was average.

Three comparative criteria could be applied to the collaborative situation. These involved social status, academic status and status in writing ability. As as teacher, I made some judgments regarding the students in the study and their relative status to each other. As the students tended to have a preferred partner for collaboration, a comparison of relative status as I perceived it is presented in Figure 6 for each collaborative pair. I believe these are a reasonably accurate estimation of how these students were perceived within the class.

However, their collaborative interactions during the study showed little effect of their relative status in the writing process. Each member of the pair seemed to hold his or her own throughout the creation of a text. The friendship apparent in the pairs may have contributed to

	Tammy	Gail	Hilda	Sharon	Randy	Sam
Social	High	High	Average	Average	Average	Average
Academic	High	High	High	Average	Average	Average
Writing Ability	High	Average	High	Average	Average	Average

Figure 7. Relative Status Between Preferred Collaborative Writing Pairs

the success of the collaborative effort. They seemed to enjoy what they were doing and to enjoy each other. Writing collaboratively appeared to be a stimulating experience for both members of each pair.

Interactions with students other than the preferred partner were also productive and cooperative but not as consistently. For example, Randy was involved in a collaborative writing session with an assertive student of relatively high social status but low academic and writing skills status in the classroom. Instead of his normal collaborative writing behaviors, Randy tended to acquiesce more to the suggestions of this partner and that interaction led to problems. The resulting text was unreadable and the text and the partnership were soon abandoned.

Collaborative Writers and The 'Other Writer' as Audience

Collaborative writing has a built in audience for any text produced. While one keyboards, the partner can inspect the emerging text. Very little immediate feedback occurred with emerging text. This

appeared to be because collaborative pairs discussed what was to be written before any production occurred. However, when a partner did react to the text as it was emerging, the suggestion was usually quickly incorporated into the text with very little discussion. For example, when Tammy was producing some text, she dictated, "When they got there, the buzzer . . .". Gail while transcribing typed, "the bell" for "the buzzer" and drew Tammy's attention to it. Tammy incorporated the change into her dictation and kept going.

All students in the study used each other as an audience for work they had produced alone or with other students. For example, Tammy started one session by showing Gail her second draft of "The Beaty Pagent". After having it read to her, Gail asked if she could have a copy to look at later. During the student-teacher conference, Gail was asked what she was going to do with her copy. She answered that she wanted to read it to her parents. In this instance, the collaborative situation opened up new opportunities for an audience.

Preferred partners were often used as audiences for material produced alone or collaboratively with other students. This tended to occur at the beginning of sessions or between pieces worked on in the same session. Collaborative work was usually preceded by students looking over work in various stages of completion from their storage disks much like one would look through a writing folder of pencil and paper compositions.

It should also be noted that the sharing of both individual and collaborative stories extended to the whole class. Many students were found to have hard copies of stories that had not gone through the

'normal' publication process set up for the class. This unofficial publishing was not observed to be happening as a conscious, deliberate activity of writers but as an extension of their 'electronic browsing' through previous work.

The Mechanics of Collaborative Writing Translations

At the beginning of the first session, each collaborative pair would discuss the mechanics of how their collaborative text would be recorded. They would talk about how they could share the production and transcription (translation) tasks fairly and then they would set explicit rules for translation to occur. In all cases, they would agree to take turns, with one transcribing what the other produced. Initially, the two roles were switched at the end of every sentence but as the text emerged they would switch roles at the end of phrases or clauses or when one or the other was having a problem producing text or transcribing it.

Hilda exemplified these initial discussions when she said to Sharon, "Don't worry, you get to do the next whole sentence. I get to think of the next sentence and you write it."

Collaborative Writers and Text Produced by the 'Other Writer'

During collaborative writing, the transcriber sometimes produced text without consulting his or her partner. When this resulted in new elements which had not been discussed, no problem was observed because the new text tended to be strictly at the local level.

Collaborative Writers' Writing Processes

Because the partners in a collaborative writing pair discuss what they are doing, the data available for the analysis of writing processes is greater than for individuals. An examination of that data revealed both very subtle and some very obvious differences. Only the more obvious differences are discussed here.

Collaborative Writers' Planning Processes

One of the outstanding features of collaborative writing was the constant discussion that accompanied the process. The majority of this discussion involved planning and as a result the planning sub-processes of generating, organizing and goal setting were easy to follow in the collaborative transcripts. For example, general planning was relatively poorly represented in the individual writing observations. Yet as illustrated in the transcript below, the general planning process that Tammy and Gail followed in initiating their story, "The New Care Bear" was clear.

Tammy: Are we writing a new story? . . . O.K. What do you want to write?

Gail: Let's make a new story.

Tammy: The Blue Bird.

Gail: I already wrote that . . .

Tammy: The Monster Mash . . . How about The Monster Mash (laughs).

Gail: The Monster from the Chocolate Factory.

Tammy: The Weirdest Monster in the World. How about The Ugly . . .

Gail: duckling.

Tammy: No, there's already an ugly duckling. There's already a story called The Ugly Duckling. How about The Ugly Monster. No. The Ugly Kid?

Gail: The Ugly Kitten.

Tammy: O.K. No. I don't want anything to do with animals. I get bored with stories of animals. What do you want to write about?

Gail: I don't know.

Tammy: Adventure? No--not romance! Ohh, I hate that. How about a horror story?

Gail: No.

Tammy: Adventure story. How about The Greatest Adventure I Ever Had.

Gail: The Greatest Adventure.

Tammy: No.

Gail: The Greatest Adventure.

Tammy: Do you know what the greatest adventure is . . . How About . . . ah . . . Adventure I'll Never Forget.

Gail: No, that's too . . . a fairy tale.

Tammy: That is a fairy tale kinda'. . .

Gail: Well its not . . .

Tammy: Well how 'bout little . . .

Tammy: pig
Gail: Care Bear.

Tammy: Yeah!

Gail: The Little Care Bear.

Tammy: The New Care Bear.

Taken as the thinking processes of a single writer, this transcript would have been a classic example of general planning or pre-writing in that it involved all three sub-processes of planning including generation (e.g. "Care Bear"), organization (e.g. The Little Care Bear") and goal setting (e.g. "Let's make a new story.").

From the transcript we see that general planning did not begin with the generation of ideas but with a goal; these girls decided to write a story. No previous ideas of the story topic were apparent so their first goal was to decide on a writing topic. They generated ideas from long-term memory and played off each other's suggestions. The ideas were explored and evaluated as part of the organization sub-process. Then when the evaluation of an idea was positive for both writers, organization became more detailed. This was indicated by the two false starts at the title: "Care Bear" and "The Little Care Bear" with "The New Care Bear" being the final choice. Finally the goal of translating this idea was agreed to and translation began.

Collaborative Writers' Reviewing Processes

The advantages of the word processor, particularly in the revision process was demonstrated in Tammy and Gail's collaboration on "The New Care Bear." Between the first and second sessions spent on this story, the two girls had read the story over together and found it had "a lot of mistakes in it." During a conference they expressed problems with six parts of the story they wished to work on. I suggested that they take their hard copies of the story and pencil in the revisions they

would like to make. The girls later reported that they had done this together at Tammy's home one evening.

Tammy and Gail intended to rewrite the entire draft with their revised hard copy on the word processor. This was not expected because both Tammy and Gail knew how to delete and add text, and Gail knew how to move text. However, it was obvious that they had not yet realized the connection that their revisions could be incorporated into their existing text file using procedures they already knew. I spent about five minutes demonstrating how they could apply the procedures to the revisions and having them try some changes in their own story. They then went on to complete the revision on their own at the word processor. Their efforts yielded the following draft completed over two sessions.

Revisions are in bold face; deletions are marked with an asterisk*

'THE NEW CARE BEAR'

One day Lots of love was playing'with tender heart. When * tender heart threw the ball realy hard and it rolled up to a little baby panda bear. So they took the ball and the panda with them because it looked kind of sick so thats why they brought it home.When they got there the bell that **meant trouble was on the way was ringing** and then brave heart lion looked in he telescope and he saw that **trouble was coming from care a lot.Grams bear took a look** at the panda carefully she said that the bear was really a care bear but she has **had a spell casted** on her. So they set of to go to no hearts **because he was the only person who would do it .In the meantime** no heart was making another spell **that meant caring to go.** While the care bears were on thire way No heart sent **beatly** to spy on the care bears. Then **finally** beastly caught up to the bears with his **disgusting** bike glider.But he did not let them see him.But the new bear was sitting on a cloud **because he felt left out because to** sit so he would not get hurt.Then the new care bear over herd beastly saying the spell he herd it from no heart but it was not the no caring one.Mean while no heart was

all most finished his spell that that ment caring to go and everybody would not care. Beastly saw the panda running to Grams bear so he went to tell no heart but when no heart was poring the spell it hit beastly insted of the care bear.No heart started yelling beastly I'm going to get you next time. it didn't matter because he didn't care so it did not work. Mean while the panda yelling Grams bear what does this mean say it again and again you will become a care bear again because that was the magic spell that would change you back to a care bear .He said it over and over * again and he was a red care bear and they a party and they gave a name and it was Lovable bear and from that day on they never said he couldn't help again.

T E
H N
E D

The girls used the notes they had made at home to make a small number of revisions but they soon abandoned these notes. Instead, they read through the story on screen and made changes. Ideas were discussed in great detail with evaluation a constant occurrence. They read to evaluate and defined problems which prompted further discussion and goal setting. They successfully identified twenty-five problems in their story. Their revisions ranged from punctuation and spelling (surface features) to multi-sentence level concerns. An example of the difficulties they encountered in dealing with multi-sentence changes started with the following original text.

But the new bear was sitting on a cloud and over herd beastly saying the spell.

The discussion about the sentence revealed that they did not feel they were clear why the new bear was sitting on a cloud away from the rest of the bears and second, they felt that the reference to the 'spell' was vague. They wanted it understood that it was an unknown spell. This

was the most difficult of the revisions they tackled. At one point Tammy commented that they were lost. Their eventual solution was an expansion of the sentence to:

> But the new bear was sitting on a cloud because
> he felt left out because to sit so he would not
> get hurt.Then the new care bear over herd
> beastly saying the spell he herd it from no
> heart but it was not the no caring one.

While not an elegant revision, it does get closer to expressing the meaning these two writers intended. It was also an example of these writers taking on an aspect of writing that neither had attempted before this piece.

CHAPTER 6

SUMMARY, FINDINGS, CONCLUSIONS AND IMPLICATIONS

Introduction

The present study evolved to address questions about grade four writers concerns and writing processes when using a word processing medium individually and collaboratively. In this chapter the major findings and conclusions of the study are summarized and the implications for teachers and researchers are reported.

Findings and Conclusions of the Study

The findings and conclusions reported here are organized around the original research questions which gave direction to the study.

Research Question 1

What are the concerns and processes evident in the writing behaviors of able grade four writers while they compose alone with a word processor?

a. What common concerns and processes are found among able grade four writers as they compose alone?

b. What different concerns and processes are found among able grade four writers when they compose alone?

Similarities and Differences in the Concerns of the Writers Writing Alone

Topic concerns were mainly observed immediately before or during the first draft translation process and at that point they had a

significant effect on the evolving text. While topic concerns might come up during later drafts they were not observed to cause changes in topic development. In this study the range of topics across all subjects was broad but each writer tended to focus on a narrow range of writing styles and genre. What this suggests is that topic concerns for writers at this level may be very important in initiating the writing process but that topic concerns do not themselves lead to revisions in subsequent drafts of the written work. Given the age of these subjects, it is possible that they limited their different topics to a narrow range of writing styles and genre because those were the styles and genre they knew best.

When the text produced so far became a source of concern, it was the more immediate text that then tended to give direction to what followed, even when that text had begun to stray from the original topic. It would appear that at this level of writing development children may have difficulty keeping the original topic focus as their writing progresses.

The writers in this study exhibited two concerns with the word processor. In the first instance they were concerned with how to get the word processor to do the things they wanted it to do, such as deleting text, underlining and moving text about. In the second instance they were concerned with simply experimenting with a variety of word processing functions, some of which they discovered on their own. Although these students were considered to be comparatively competent in the use of the word processor they were still in the process of learning

how to use it. Their relative lack of sophistication did not prevent them from trying to use the program in new and different ways.

The audience for these children's writing was mainly themselves. It was they who read over and reacted to what was written and what was written had to make sense to them. The reasons why these children did not seem to be concerned about an external audience is not clear. It is possible that they were simply at a developmental level where the concerns of others were not yet important. However, from the observations of their work, it may also be that they were having to strive so hard to produce the written work that they had no time to be concerned about an audience, even though they knew that their writing would be made public.

Differences in the concerns of the grade four writers in the study were observed. For example, each of the children reacted differently to the limitations imposed on their writing by the schedule that had to be followed in the computer center. Two of the children would hurry through their writing in order to complete a draft in the time allowed, whereas one other child did not vary his pace despite the time restraint. The fourth child varied her response, sometimes hurrying through her work and at other times just taking her time and leaving the draft unfinished.

For the most part, however, the differences among the students were too subtle to warrant comment given the data available or the differences could only be attributed to the children's idiosyncrasies and did not support any major conclusions beyond that.

Similarities and Differences in the Processes of the Writers Writing Alone

The process of writing identified for the analysis including planning, translating and reviewing. All these processes and their subprocesses were observed in the writing behaviors of the subjects in the study.

All levels of planning were also observed in the writing of all the students in the study, including general, global and local planning. None of the subjects spent much time with the general planning process and appeared to approach the general planning somewhat differently. So little of what went on was observable that it was not possible to draw conclusions about what the children were actually doing.

Global planning processes were observed to occur at the beginning of the translation process but were rarely addressed beyond that point. Local planning of text no longer than a sentence preoccupied these writers and subsequently affected the direction taken by the text, independently of the topic addressed during general and global planning. Apparently, these children were only able to handle shorter textual units in planning their writing. What is not known is whether this behavior was developmental or whether it might be affected by writing instruction.

The translation process consists of two simultaneous aspects, production and transcription. During first drafts, three of the grade four writers in this study focussed their attention on production.

While the text that was produced had to be transcribed the transcribing only involved getting what was produced into the word processor. Transcription seemed only to attract attention when a keyboarding or spelling error was noticed. One subject, however, consistently exhibited a recursive pattern involving all three writing processes similar to the writing processes of more mature writers. It could not be determined how he had arrived at this behavior nor whether more children at this level could learn to write this way.

The reviewing process tended to be a greater focus only after the first draft was completed. The only exception to this was with the evaluation subprocess in which the writers read to comprehend the text they had produced. This may have been a rehearsal mechanism or a means of setting one's thinking for further production.

Meaningful revisions, those that changed the meaning of the text, occurred in the writing of all subjects after the first draft but the specific timing of those revisions tended to be idiosyncratic in that some would revise only after considerable production while others would revise after producing smaller units. There was only one occasion when one of the subjects in the study was seen to read over the work and to revise by rewriting all the text to that point.

Meaning preserving changes, those that affected the surface features of the text, occurred consistently throughout each child's writing. The children seemed to be very aware of these types of errors and corrected them as soon as they were noticed. In only one case did the writer specifically go back through her text in order to find and correct these surface feature errors.

Research Question 2

What are the concerns and processes evident in the composition behaviors of able grade four writers when they compose collaboratively using a word processor?

a. What common concerns and processes are found among able grade four writers when they compose collaboratively?

b. What different concerns and processes are found among able grade four writers when they compose collaboratively?

Similarities and Differences in the Concerns of Collaborating Writers

Collaborative writing was characterized by a number of concerns attributable to the writer's long-term memory or the task environment. These concerns appeared integral to the collaborative writing process. Concerns generated from the writers' long-term memory included consensus, symbiosis, synthesis, and metacognition. Those originating with the task environment included authorship, the other writer's knowledge, relative social status, partner as audience, the process of writing collaboratively, and the text produced by one's partner.

Collaboration was primarily characterized by extensive discussion on all aspects of the composition task. Consensus was the primary outcome of those discussions. Students chose their partners but tended to have preferred partners with whom they worked well. The discussions in these successful collaborations always led to some form of consensus about how to proceed. What this finding suggests is that consensus is important to the success of collaborative writing. If a pair is not able to reach consensus early in their writing then the collaborative writing may fail.

Symbiosis was a second result of collaboration. Partners would often rely on each others' strengths to handle problems with the text. For example, if one was a better speller than the other, that one would tend to take on the spelling problems. The poorer speller would often acquiesce to the partner's judgment in spelling matters. Collaborative writing appears to provide younger writers with a support system within which they can learn from each other.

Synthesis was a third outcome of the collaborative process. The question of ownership of a composition became blurred. It became difficult for the observer, and more importantly, the collaborating students, to determine which parts of the text belonged to whom. The text became 'ours' rather than 'mine' or 'yours'. Apparently, these children have no trouble sharing their authorship of a selection so long as they have worked on it together.

Metacognitive discussions which focussed on how one went about writing were rare but examples did occur. This was in contrast to individual writing where no occurrences were noted. At this level it would appear that the children may not be ready to step outside themselves in order to look at their own work.

Concerns about authorship were closely related to synthesis. Collaborative time was used to share stories written by individual writers or with other collaborative pairs, demonstrating that partners were very aware of who owned a specific piece of writing. On the other hand, collaboratively produced text was always acknowledged as having dual authorship.

Since most of the collaborations were between writers with comparative social status within the classroom, there was little evidence that social status was a concern. However, observations of a mis-matched pair suggested that collaboration between writers of unequal social status could lead to a breakdown in the collaborative process.

All collaborative pairs were observed to set up rules regarding how transcription would be achieved. A structured system for taking turns was always agreed to at some point during a pairs' first session together. In order for the collaborative pairs to work together they require a set of mutually agreed to rules which affect their turn-taking at the keyboard.

Concerns regarding one's partner producing text or a partner's reaction to text produced by oneself were noted but of a minor nature. The effect appeared to be negligible due to the extensive discussion involved in collaboration. The meaning of the text agreed upon tended to be preserved in these situations.

Writing Processes and Collaborative Writing

Grade four students working collaboratively are capable of using and understanding all aspects of the writing process. This was an unexpected finding as the writing models presented in the literature are based on observations of adult writers (e.g. Flower & Hayes, 1981). This suggests that students at this level are more sophisticated in their composition abilities than might have been previously suspected. The success of their final product however belies this depth of process competence. They are capable writers but lack the necessary

sophistication in knowledge of writing convention, subject material, and social skills to produce better quality of products.

The primary difference between individual writing and collaborative writing stemmed from the collaborative discussion. In collaborative sessions, the planning process predominated. The data collected detailed the planning processes of collaborating pairs unlike the individual sessions where it was often necessary to posit through inference. General planning, global planning and local planning were all extensive and the latter two were recursive throughout the composition process.

Transcription was characterized by the division of labour between partners. One tended to take on the role of production while the other translated. At predetermined, consistently defined points in the text, partners would trade transcription roles.

Finally, the review process was also distinguished by considerable discussion between the partners. Collaborating pairs spent as much time on second drafts as they did on initial drafts with both meaning-changing and meaning-preserving revisions occurring with most pairs. The pattern of revisions was not consistent across pairs nor were specific concerns of individuals apparent. However, there were some higher level, meaning-changing revisions attempted that were not observed with individual writers. Collaboration clearly lead to more discussion involving evaluation and revision then was seen in any of the individual writing sessions.

Word Processing and Collaborative Writing

A special note needs to be added about word processing and collaborative writing, if only because in this study, the collaborative writing came about while the children were working at the word processor. While there may have been other factors influencing the children, such as feeling uncomfortable with participating in the study, the word processor still seemed to make the collaborative writing experience a viable alternative.

The collaborative pairs in this study were eager to work together at the word processor and clearly cooperated with each other while writing. One reason for their eagerness appeared to be that they could control the writing of the text more effectively with the word processor. Each could try out ideas and change them easily depending on the response of the partner. Each could also make spelling and other errors and change them easily depending on the response of the partner. These features seemed to contribute to the high level of cooperation that was observed as the pairs worked together. If children can learn from each other, especially in a cooperative environment, then the computer with its word processing capabilities may prove to be a valuable adjunct to the classroom writing program.

Implications for Teachers

The findings and conclusions of the study have a number of implications for teachers. Although limited by the number, abilities,

and grade level of the participating students, some insights and applications are suggested.

The degree of agreement between the original Flower and Hayes' writing model and what the study's subjects actually did was clear. All students used all the writing processes recursively but addressed most concerns with mixed results. Sometimes they were successful but usually the success of their efforts were limited. Thus at the grade four level, these students appear to be developmentally capable of working with almost any writing process. However, concerns require more direct teaching strategies. The grade four students in this study required specific help with audience awareness and topic development. Writing processes could also be addressed; specifically in global planning and revision strategies, two processes with which these students had some problems.

The collaborative writing highlighted skills of individual writers not so evident in individual writing situations. Although there were differences between these two writing events, the skills individual writers bring to collaboration can be discovered through observation of collaborative writing. This could be a good method for helping us diagnose specific writing difficulties.

The potential of collaboration beyond a legitimate activity in itself, lies in its use as a teaching tool. Writers who require practice in planning or who are being hampered by their skills in the translation process, can benefit from working collaboratively with another student. Discussion leads to more thorough planning as collaborators strive for consensus and synthesis of a composition piece.

Symbiosis allows a writer to concentrate on either production or transciption and thus work towards a successful integration of both. Even revision can be practically improved as collaborative pairs seem to be more aware of problems with meaning in larger units of the text than many individual writers seem willing to address.

During the data collection period, students were observed composing on the computer nearly fifty hours in total. Observed off-task behaviors totalled less than one hour. This was roughly a 95% on-task rate. Whether this occurred because of a novelty factor or just because writing was found by these students to be easier on the word processor, the use of the word processor as part of the writing classroom could be highly motivational for writing. What this study suggests is that there is a place for the writing processor in the classroom.

The pragmatic issue of only one computer in the classroom was addressed by giving each student an intensive period of time with the word processor. This worked well and is recommended as one way of giving students access to a limited resource.

Finally, the effects of the data collection techniques on the teaching of writing were of interest. The composing aloud technique, the videotapes and the teacher as researcher concept all suggested ways of improving the learning climate in the classroom.

Noting Fletcher's (1985) results with students who verbalized while problem solving alone, the sue of composing aloud to enhance students' writiug performance has some potential. The high on-task behavior and the success students had in utilizing so many aspects of the writing

processes could have been the result of the verbalization involved in composing aloud. This possibility would be interesting to explore under normal classroom conditions.

The use of videotapes of students as they composed and of their text produced so far was also a useful teaching tool. Instead of guessing what the student was doing with his or her text, both the student and the teacher were able to examine what was being done. Students with specific needs or trying to address specific problems could be helped using the tapes of their own writing processes as a learning aide.

As a teacher-researcher, I was very open about my interests in writing and what students were doing with their writing. I presented myself as a fellow learner and the students as fellow teachers. Although not directly addressed in the data, the atmosphere created by my taking this role was, in my opinion, most beneficial. Students knew I was interested and so became interested themselves. A classroom that is perceived by students as a place in which everyone values learning creates a more conducive atmosphere for learning to occur.

Implications for Further Research

Generalizations from the findings of the study will require further research to verify and broaden their strict applicability beyond the environment of one classroom. However, it is important to remember that the focus of this study was primarily to use the knowledge generated in application to one teacher's interests and questions. While there are

implications for broader research concerns, this limited focus is worthy of first consideration.

The teacher-researcher's focus is often a pragmatic one. The reason for research is to answer questions that will help that teacher optimize the learning that occurs in the classroom. Within the limitations of the sample used in this study, several areas for further research are indicated. Foremost, it is a necessity to verify the findings of the study regarding the range and depth of writing processes and concerns that students address during composition on the computer.

This study only provided a description of writing on the word processor. It is now necessary to compare writing with a word processor to writing with pencil and paper. Only then will we discover how writing in a computer environment is different from traditional composition.

While this study has described some of the concerns and writing processes of individual and collaborative writers working with a word processor, there are still many questions about these areas that need to be addressed. For example, longitudinal studies could address such issues as: writing development of students with access to word processors throughout their school years and how long the interest in writing with a word processor is sustained by students.

Specific research is needed to address writing processes and concerns of: students at other levels of development, students with specific learning and writing problems, students who express dislike for writing with the word processor, and students with greater experience with a word processing medium.

In this study the children were not taught specific keyboarding skills prior to writing with the word processor. While the children were able to produce text it was clear throughout the year and during the data collection period that the keyboarding skills were deficient and were affecting the translation process. We need more information about how to deliver keyboarding skills to a wide range of learners in the most effective way. We also need other research studies of writing concerns and processes where the writers are proficient keyboarders in order to understand the full impact of keyboarding on the writing process.

It would also be interesting to determine to what degree ease of accessibility for collaborating writers to transcribe text would have on the collaborative writing process. What could be studied is the effects of having each of the pair with his or her keyboard so that both could input to the writing as their ideas were produced.

The use of video equipment in the class for collecting data did not seem to create much of a problem after the two months of access to the equipment. However, the composing aloud technique did make some students uncomfortable. It would have been beneficial to replicate the study with all the data collection techniques in place at the beginning of the school year. This would help further the perception of students that the data collection methods were a natural part of the class environment. They would be habituated to their presence and less likely to focus on that part of their environment alone.

REFERENCES

Alberta Department of Education. (1983). Computers in the school: Report of the Minister's Task Force on Computers in Schools. Edmonton: Alberta Education.

Balkema, S. J. (1984). The composing activities of computer literate wri. .s. University of Michigan.

Beach. R., & Bridwell, L. S. (Eds.). (1984). New directions in composition research. New York: The Guilford Press.

Bean, J. C. (1983). Computerized word-processing as an aid to revision. College Composition and Communication, 34(2), 146-148.

Becker, J. H. (1984). Computers in schools today: Some basic considerations. American Journal of Education, 93, 22-29.

Bissex, G. (1986). On becoming teacher experts: What's a teacher researcher. Language Arts, 63, 482-484.

Bogdan, R., & Taylor, S. (1975). Introduction to qualitative research methods. New York: Wiley.

Braddock, R., Lloyd-Jones, T., & Schoer, L. (1963). Research in written composition. Champaign, Illinois: National Council of Teachers of English.

Bridwell, L. S. (1980). Revising strategies of twelfth grade students' transactional writing. Research in the Teaching of English, 14, 197-222.

Bruce, B., Michaels, S., & Watson-Gegeo, K. (1985). How computers can change the writing process. Language Arts, 62(2), 143-149.

Calkins, L. M. (1980). Children's rewriting strategies. Research in the Teaching of English, 14, 331-341.

Chandler D. (1986). Computers and literacy. In Chandler, D. & Marcus, S. Computers and literacy (pp.1-11). Philadelphia: Open University Press.

Collier, R. M. (1983). The word processor and revision strategies. College Composition and Communication, 34(2), 149-155.

Daiute, C. (1985). Issues in using computers to socialize the writing process. ECTJ, 33(1), 41-50.

Daiute, C. (1986). Physical and cognitive factors in revising: Insights from studies with computers. Research in the Teaching of English, 20(2), 141-159.

Daiute, C. A. (1983). The computer as stylus and audience. College Composition and Communication, 34(2), 134-145.

Doise, W., Mugney, G., & Perret-Clermont, A.N. (1975). Social interaction and the development of logical operations. European Journal of Social Psychology, 5, 367-383.

Dudley-Marling, C. C. (1985). Microcomputers, reading, and writing: Alternatives to drill and practice. The Reading Teacher, 38, 388-391.

Elser, L. (1985). Can kids outgrow word processing programs? Classroom Computer Learning, 5, 52-55.

Emig, J. (1971). The composing processes of twelfth graders. Urbana, Illinois: National Council of Teachers of English.

Faigley, L., & Witte, S. (1981). Analyzing revision. College Composition and Communication, 32, 400-414.

Fisher, G. (1983). Word processing: Will it make kids love writing? Instructor, 92, 87-88.

Fletcher, B. (1985). Group and individual learning of Junior school children on a microcomputer-based task: Social or cognitive facilitation? Educational Review, 37, 251-261.

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. College Composition and Communication, 32, 365-387.

Flower, L., Hayes, J. R., Carey, L., Schiver, K., & Stratman, J. (1986). Detection, diagnosis, and the strategies of revision. College Composition and Communication, 37, 16-55.

Glazer, M. (1972). The research adventure: Promise and problems of fieldwork. New York: Random House.

Graves, D. (1973). Children's writing: Research directions and hypotheses based upon an examination of the writing processes of seven year old children (Doctoral dissertation, State University of New York at Buffalo, Dissertation Abstracts International, 34, 6255A: University microfilms No. 74-08373.

Graves, D. (1983). Writing: Teachers and children at work. Exeter, NH: Heineman.

Harris, J. (1985). Student writers and word processing: A preliminary evaluation. College Composition and Communication, 36, 323-330.

Heffron, K. (1986). Literacy with the computer. The Reading Teacher, 40, 152-155.

Hook, I. (1983). Using word processors with division I students. ATA Computer Council Newsletter, 2(1), 6-7.

King, M. L. (1978). Research in composition: A need for theory. Research in the Teaching of English, 12, 193-202.

Kirk, L. (Nov/Dec 1983). Word processing. G/C/T, 20-21.

Leonardi, E. B., & McDonald, J. L. (1986). Assessing our assumptions. The Computing Teacher, 13, 47-48.

Leonardi, E. B., and McDonald, J. L. (1987). The micro in the English classroom: Shifting the emphasis from processing words to processing ideas. Educational Technology, 27(2), 45-47.

Light, P. (1983). Social interaction and cognitive development: A review of post-Piagetian research. In Meadows, S. Developing thinking: Approaches to children's cognitive development. New York: Methuen.

Lisner, R. J. (1983). Appleworks, V1.1 [Computer program]. Apple Computer, Inc.

McConaghy, J. (1986). Literature-Literacy and young Children. Unpublished Master's thesis, University of Alberta.

McLuhan, M., & Fiore, Q. (1967). The meduium is the message. New York: Random House.

Mehan, H., Miller-Souviney, B., & Riel, M. M. (1984). Research currents: Knowledge of text editing and control of literacy skills. Language Arts, 61, 510-515.

Mittricker, M. L. (1983). Word processing and the writing process. The Leaflet, 82(3), 20-24.

Moorshead, H. (April, 1984). Word processing: An overview. Computers in Education, pp. 6-8.

Moran, C. (1983). Word-processing: A junkie reflects. The Leaflet, 82(3), 28-30.

Muldrow, E. (1986). On writing and word processing in a ninth grade classroom. English Journal, 75, 84-87.

Newman, J. M. (1984). Online: Reading, writing, and computers. Language Arts, 61, 758-763.

Nolan, F. M. (1978). Composing processes of grade 6 able writers. Unpublished doctoral dissertation, University of Alberta.

O'Brien, P. (1984). Using microcomputers in the writing class. The Computing Teacher, 7, 20-21.

Palmer, A., Dowd, T., & James, K. (1984). Changing teacher and student attitudes through word processing. The Computer Teacher, 7, 45-47.

Pearson, H., & Wilkinson, A. (1986). The use of the word processor in assisting children's writing development. Educational Review, 38, 169-187.

Perl, S. (1979). The composing processes of unskilled college writers. Research in the Teaching of English, 13, 317-336.

Phenix, J., & Hannan, E. (1984). Word processing in the grade one classroom. Language Arts, 61(8), 804-812.

Pianko, S. (1979). A description of the composing processes of college freshman writers. Research in the Teaching of English, 13, 5-22.

Piper, K. L. (Dec.-Jan. 1983-84). The eectronic writing machine: Using word processors with students. The Computing Teacher, 11(4), 82-83.

Roethlisberger, F.J., & Dickson, W.J. (1939). Management and the worker. Cambridge, Mass.: Howard University Press.

Rust, K. (1986). Word processing: The missing key for writing. The Reading Teacher, 39, 611-612.

Schwartz, H. J. (1984). Teaching writing with computer aids. College English, 46(3), 239-247.

Smith, F. (1982). Writing and the writer. New York: Holt, Rinehart, and Winston.

Solomon, G. (1986). Teaching writing with computers. Englewood Cliffs, New Jersey:Prentice-Hall.

Taylor, L. R. , Jr. (1986). Xenophobic word processing. Computers and Composition, 3(3), 56-59.

Vacc, N. N. (1985). Effects of an advanced word processing program on student's editing. Middle School Journal, 16, 25-27.

Wax, R. H. (1971). Doing fieldwork: Warnings and advice. Chicago: The University of Chicago Press.

Wetzel, K. (1985). Keyboarding skills: Elementary, my dear teacher? The Computing Teacher, 12, 15-18.

Wheeler, F. (1985). Can word processing help the writing process? Learning, 15, 54-57.

Whitney, T. (1983). Social reality in a grade four classroom. Unpublished Master's thesis, University of Alberta.

Windrim, D. (1985). Word processing for primary students. Presentation to the ATACC Conference 85, Calgary, Alberta.

APPENDICES

APPENDIX 1

HOLISTIC EVALUATION OF STUDENTS' WRITTEN WORK

HOLISTIC EVALUATION OF STUDENTS' WRITTEN WORK

The holistic scale used to evaluate students' written work was taken from the materials presented by Carol Anne Inglis, June McConaghy and Margaret Stevenson as part of a writing evaluation workshop in the fall of 1986.

What follows is an outline of their holistic scale and a specific set of descriptors for grade 4 writers. These were the bases upon which all compositions evaluated for the study were addressed.

HOLISTIC SCALE

(5) The paper reads smoothly.
The writing is appropriate for the form, purpose and audience.
The content is clear, well developed and imaginative.
The organization and style demonstrate unique qualities of the writer.
Mechanical errors are few.

(4) The paper reads smoothly.
The content is clear, well developed and well organized.
The intent of the writer is clear and he/she shows an awareness of the audience.
There is evidence of precise vocabulary and usage appropriate to the writing task.
Mechanical errors are few and do not interfere with the meaning intended by the writer.

(3) Paper reads smoothly but may contain a few awkward parts.
The content is somewhat clear and shows some organizational problems.
The writer shows some awareness of the reader.
There is some evidence of precise vocabulary but sometimes it may seem stilted or inappropriate to the task.
There may be some mechanical errors but these do not significantly interfere with the meaning.

(2) The paper reads unevenly.
The content is not clear, although there may be evidence that the writer knows what he/she means to say.
Vocabulary usage is correct but does not convey the author's meaning specifically.
Mechanical errors do interfere to some degree with the message.

(1) The paper is difficult to read but some understanding of the author's meaning can be deciphered.
The writer does not have an awareness of communicating meaning to a reader.
Mechanical errors and sentence problems interfere significantly with communication.

(o) The paper is not understandable.
The writer lacks the ability to communicate meaning or write sentences.

GRADE 4

REPORTING CATEGORY: CONTENT

(Selecting Details Appropriate to Purpose)

SCORE		DESCRIPTION OF PERFORMANCE
5	EXCEPTIONAL	Events are plausible and consistent within the context that is clearly established by the writer. Events and actions are connected implicitly to character motivation. Many precise and appropriate details establish character, events, and setting even though experiences may be of an everyday nature.
4	PROFICIENT	Most events are plausible within a context that is clearly established by the writer. Events and actions are usually connected to character motivation. Many appropriate details establish character, events and setting even though experiences may be of an everyday nature.
3	SATISFACTORY	Events are plausible. Appropriate details present a physical description of events, characters and setting. Some events are connected to character motivation. Experiences may be of an everyday nature.
2	LIMITED	Some events are plausible within a context that is vaguely established by the writer. Few appropriate details establish character and events.
1	POOR	Events may be plausible but a context is unclear. There is a lack of appropriate detail.
Ins.	INSUFFICIENT	Too little writing exists for a judgment to be formed.

GRADE 4

REPORTING CATEGORY: DEVELOPMENT

(Organizing Details into a Coherent Whole)

SCORE		DESCRIPTION OF PERFORMANCE
5	EXCEPTIONAL	Events have been placed in a coherent and recognizable sequence. The story's unity is strenghtened by details about character and actions. Digressive details, if present, do not interfere with the development of the story. The story's ending conveys an effective sense of closure.
4	PROFICIENT	Events have been placed in a coherent sequence. The story's unit is supported by some details about characters and actions. Digressive details, if present, do not interfere with the development of the story. Appropriate closure has been achieved.
3	SATISFACTORY	Events have been placed in a generally coherent sequence. Digressive details may interfere with the continuity of the story. Details describing character or events may not be supportive of the development. Closure is usually achieved.
2	LIMITED	A sequence of events can be detected but coherence is not achieved. Digressive details interfere with the unity of the story. Other details describing character and/or setting are not united with the story's action. Closure, if attempted, is unsuccessful.
1	POOR	No coherent sequence of events is apparent. Digressive details, if present, interfere greatly with the unity of the story. A sense of closure is missing.
Ins.	INSUFFICIENT	Too little writing exists for a judgement to be formed. Writing that has been given Ins. for CONTENT is insufficient

APPENDIX 2

FINAL VERSIONS OF THE INDIVIDUAL AND COLLABORATED STORIES COMPLETED AT THE WORD PROCESSOR BY THE END OF THE DATA COLLECTION PERIOD

SUBJECTS' COMPLETED COMPOSITIONS BEFORE EDITING

The following stories are the last versions handed in by the subjects involved in the study at the end of the three-week data collection period. The only changes are the addition of the authors' name where necessary and the printing of the story double spaced. Their presentation is alphabetical according to title.

Garbeg In To Gold

by

Tammy

Once a there was a girl named Sharon she was very kind . She was a made in a casle . She worked very hard .One day some person who made a living on liing came and said that Sharon made gold by having of stuff that you don't need . The king said all right if you can I'll reward you . If she can't you will die . Sharon was kind so she said she told him .So the king said that the man is free . The girl is on the line Sharon couldn't belive it . how could she say that she didn't even know him .She was scared so she just cried . She king loked her in her room and said you will halfed to have this done by night . Good luck said the king . She went in and sat and said I wish I never said what I said .She sang a song then a bird aperd it said you are so sweet you don't desurve to die . You just saved someones life a few hours a go the bird left . Sharon was mixed up she thought the bird said that she would help . Sharon piked up the scraps and they tured into gold . When she was done a letter aperd it said if I would of done it the king might of saw and and could havekilled you . The king came in and was so surprised that he ran to his treasure room and tuk a ring and a crown . Went back up and bagged will you marrie me .She said no because you were going to kill me if I didn't have the gold. so you just want to marrie me because of my talent . The

king was mad so he wanted to kill her . But shila ran as fast as she could shila even slammed the door in his so it tulk a wile to get the king up but soon he was back on his feet he ran fast .Sharon went to the sherif and told him .He said sorry but he is the king .He rules the world.I said well mabe we could trap him into killing him self with out even knowing.But how the sherif said.Sharon said to give him a tast of his owne medisine.The sherif said oh great that's realy going to help.How thow that's up to you.see you later the king is here .The sherif said howdie .The king asked if he saw Sharon he said no.Mean while Sharon was was traning the king's lion that he uses for killing people.Sharon trained it to hate the king so when the fed it the lion would atak.Mean while the king was going to the casle.He desided to feed the lion the lion ate the king and aron and the sherif got married and lived in the casle and they lived happily ever after.

THE

END

ME AND SHARON

ONE DAY WHEN ME AND SHARON WENT TO THE STORE WITH MY DOG MAGGIE BUT THEN A DOG CAME ALONG AND MAGGIE IS SO STRONG THAT SHARON HAD TO HELP ME KEEP MAGGIE BACK AND SHARON SKREAMED BUT INSTED A LITTLE DOG CAME AND SO I SKREAMED I SCARED THEM AWAY I JUST SKREAMED I DON'T KNOW HOW I SCARE THEM I JUST SKREAMED SO THEY RAN AWAY AND OFF WE WENT TO THE STORE WE GOT A SLERPE ,GUM,AND SOUES ON ARE WAY BACK WE LET MAGGIE GO AND WHEN WE WERE ON THE OTHER SIDE WE COULDN'T CATCH MAGGIE ME AND SHARON GOT MAD BUT I FINALLY COGHT MAGGIE AND WE WENT HOME T

H

END BY HILDA

mr.meats fast food store

by

Gail

Once upone a time there was a store and it was called mr meats fast food store.

One day at the store there was a celabraion for a little boy the boys name was Jeff. the celabraion was about Jeff having a contest and he won it so they decieded to celabrat so that ment that the place was going to be packed up.At 8 00 thats when it will be chamed.And now it is 8 00 and pepole are coming in and finialy the boy came it was so packed they had to have 11 cheifs working and 15 waiters going to tables and taking oreders. Next day there was a brithday and this time it was a grll having something to celabrait at mr. meats fast food store.But this time there was 6 cheifs and 9 waiters taking oreders at the table now the waiters are taking oreders at the girls table. Then the mother said to the grl do you want a hamburger and fries and the grl said no thanks I will just have have a pop and ice cream and thats all then the mother aksed what they wont to have to eat and then they all said what the brithday grl is having and the mother said pop and ice cream and the kides said YES and thats what they got in a fast slam bam good time they got so spoled that they had to leave the store so the cheifs got a break and the waiters did not cause they had to wash the dishes and they said gross me out

and the cheifs laughed.But then a herd of kides from a hockey teen and then the waiters laughed and said you have to cook now then then the cheifs said you have to take orederds and the waiters said woop then the coach yelld out 16 HAMBERGES and the cheifs went straight to work making hambergers and then they went and gave the hockey players there hambergers and then all the hockey players left and then the cheifs got a break but then no more peole game so they went home. Then the next day all the waiters and cheifs game and it was busy like it was yesterday and thats how it was named Mr Meats fast food store.

the end

nds

Once apon a time

by

Hilda

Once apon a time there wans was a little girl named Kelly.One day she had to go to her aunts but she didn't want to cause people say that house is haunted.So when ever she went there she stayed in the living room and played with her dolls or wachting.T.V.Then when she got home she ran to her best friend's house. She told her evrey thing that happened at her aunts.Jane and Kelly were best pals they told each other there secrets.Kelly and Jane lived beside each other.Beside Kellys house there was an empty house that looked even more fritening than her aunts house.Jane and Kelly wanted to explore that house.One day while Kelly should have been cleaning her room Jane poped up and said come on and lets explore that house we've wanted to o.k. said Kelly so she snuck out the window.When they got to the house both of them were scared to go in.Then Kelly just ran in and said I'm not going to be chicken she said Jane you can be chicken , but I'm not!and Kelly ran in.So Jane followed Kelly in shaking half to deth.Finlly Jane caught up to Kelly.When Jane and Kelly were side by side they found that they were holding hands.They snuk up a little farther they could hear the screeching sound of the old floor.They found a old stair way,at the top of the stair way they could see a yellow light...OoOoOooo They got a shock and just

stood there for a copple of seconds.And then Jane said lets get out of here,but then Kelly said NO! we're in vestagating together weather you like it or not.Jane didn't want to go up the stairs but she did't want Kelly to think she was a chicken.Sothey went up the stairs and turned the corner and there was a yellow room it was purfect it was what any kid would of dreamed of.And as soon as they saw the room they turned arounc and ran out SCREEMING!!!!!!!!!!!!!!!!
On Saturday morning they went back to the old manchin.When they got to the manchin they went back to that yellow room again and they saw a old lady but she looked like a teenager but she was a old grandma.She looked spooky.So they went to touch her,and see if she was a person but right when they reached out to touch her,the floor opened and they went for a ride.Cause the floor went PACUUUU and they fell.Right through the floor and they screamed REALLY really loud.And they fell into the basement.They both got up Kelly said are you o.k.?Jane said I'm fine,but are you o.k.ay.Kelly answered Yeh Ijust twisteamy wrist.Then they looked at each other and said How do we get out?I'm scard said Jane.Your all ways scaredsaid Kelly. Come on we'll find a way out of here,said Kelly. You all ways have an idea Kelly said Jane.No I don't said Kelly,yes you do Kelly said Jane well lets just forget about this and they both looked up and herd someone sceam and then the lady fell though the floor,curplunk then they relized the lady was alive because she got up and dusted her self off.And she looked like the

stangest spooky creature from up stairs in the yellow bedroom in the bed.The lady said how do we get out of here then Jane said we don't know yet.Kelly said why don't we try to get out of this spooky place because I am geting out of here so there! And she did !

Once a upone a time

by

Tammy and Gail

there was a lady she had triplits and they were boys. Then a few years went by and they grew up to became jean-yeass. One day they went out for a walk.And when they got back they found there mother gone and the house was a mess. They were very very worried so they packed there belonging and they set off to find there mother. They went house to house looking for there mother. Then they came to a house and found a very wise old lady. The lady ,said she saw there mom with these men. The lady was wise so she wanted to help. Of course the three boys wanted to hurry so they said no thanks.Then the old lady started saying PLEASE PLEASE so the boys saaid ok. When the old lady was walking with the boys she buped in to some of her bad frienas.They convinset the old lady to be bad to the boys . Then she showed them to the wrong entre the dandrece entrence. There were to men behind some bushes they grabed two of the boys because one of the boys ran away.He hid the men. So he coula get the key.The men took the two boys where the mom is.They locked the two boys up.Mean while the one boy that got away was sneeking the key .He got it and unlocked the place were there mother and two boys were.They quietly snuck out and

they moved away from where they used to live so the people wouldn't find them and they lived happily ever and they probaly still live there today.

THE END

The bueaty pagent

by

Tammy

Once upone a time there was a school named Queen Elizabth .They were going to have a beaty pagent and it was on March 8th. There was this ugly girl named Amy that wanted to enter the beaty pagent.The girl got entered in the contest.Then on the big day of the pagent she was scared to go because every body said she was ugly.The only reson they said she was ugly was because she wore rags and her face was dirtey and so was her hair.Then she went to her room and saw a bar of soup and a brush and a golden tub.She washed herself for the very first time.When she came out she didn't belive how pretty she was.She found some money too. She went to the store and bought some close.She went to the contest and no one recanised her .Any way she won and no one buged her again.The next day when she went to school everybody couldn't beleive that it was Amy was the winner because everybody thought she was a slob.

THE

END

the kids and the pasta pizza

by

Hilda and Sharon

One day there were two girls named Sharon and Hilda.They wanted too go for pizza.There mother said they were still too young to go on the bus so can you walk this time;And I will drive you next time.So they walked there,and when they got there they got in some BIG TRO' LE.....They got in trouble becuase they thought they h : there wallet so they had to do the dishes for the rest ' .e night.When they got home one of the mothers grouned her kid for two weeks.The other girls mother grounded her kid for two weeks too,and when the pals met each other at school in the morning Sharon asked Hilda if she got grounded and she said "YES AND FOR TWO WEEKS TOO!"don't complain Hilda I got grounded for two weeks too.Oh man we better bring our wallest next time!Ya I know because I have to do the dishes at home too and now I have dish pan hands.

'THE NEW CARE BEAR'

by

Tammy and Gail

One day Lots of love was playing'with tender heart. When tender heart threw the ball realy hard and it rolled up to a little baby panda bear. So they took the ball and the panda with them because it looked kind of sick so thats why they brought it home.When they got there the bell that ment trouble was on the way was ringing and then brave heart lion looked in he telescope and he saw that trouble was coming from care a lot.Grams bear took a look at the panda carefully she said that the bear was really a care bear but she has had a spell casted on her. So they set of to go to no hearts because he was the only person who would do it .In the meantime no heart was making another spell that ment caring to go. While the care bears were on thire way No heart sent beastly to spy on the care bears. Then finally beastly caught up to the bears with his disgusting bike glider.But he did not let them see him.But the new bear was sitting on a cloud because he felt left out because to sit so he would not get hurt.Then the new care bear over herd beastly saying the spell he herd it from no heart but it was not the no caring one.Mean while no heart was all most finished his spell that that ment caring to go and everybody would not care. Beastly saw the panda running to Grams bear so he went to tell no heart bu. when no heart was poring the spell it hit beastly insted of the

care bear.No heart started yelling beastly I'm going to get you next time. it didn t matter because he didn't care so it did not work. Mean while the panda yelling Grams bear what does this mean say it again and again you will become a care bear again because that was the magic spell that would change you back to a care bear .He said it over and over again and he was a red care bear and they a party and they gave a name and it was Lovable bear and from that day on they never said he couldn t help again.

T E

H N

E D

APPENDIX 3

A SAMPLE TRANSCRIPTION OF THE AUDIOVISUAL RECORDINGS

A SAMPLE TRANSCRIPTION OF THE AUDIOVISUAL RECORDINGS

The transcripts that follow (five pages) are from a story by Tammy and Gail. On the left is their dialogue: the typeface changes with the speaker (Gail is bold face). On the right is the keyboarding output. The bold face keyboarding output is Gail's.

then a few years the boys became very clever

clever? smart?

) and then a (U)(WI)few

(U)(WI)few years

and (AT)they grew to

be

to be--to

(looks at T[redacted] questionningly or quizzically)

No ---J

(laughter) grew up to be jello --(U)(laughter)

grew up to be jello'

Ok

They be--(U)came

No-no,no became is one word

Oops be-they be geniuses

They became

j

(U) jeaniuses (points to her jeans)

spell jean--(U)jean

.(giggles)

Then a few years went by and

they grew up to

be

jello

(T[redacted] deletes the word 'jello')

je

(G[redacted] deletes 'je')

(be)came

j

(j)

eaness

(G[redacted] deletes the last 's')

jeanes

(T[redacted] deletes the 'e' and the 'e')

(T[redacted] puts in a hyphen)

jean-

.What?
.They were very upset
.No,they were very, very worried
.No, just three 'very's.
.worried-no, that's not how you spell worried
.I know
.Oh, wrong way--'rr'
. i i d e d
.worried-w r i e d
.I think its spelt like that
.(laughs) Its different--oh yes, thats it
.worried -So
.No, no,no--worried
.No
.they were very, very worried so
.(laughs)
.packed up-no, cracked up
.they packed their stuff up
.So they packed up----p a c k e d
.p a t k e d
.belongings
.their belongings-thats--their be

(G[redacted] deletes 'irrd'and...) rr
id

(I[redacted] deletes the 'd' and...) ed

(G[redacted]deletes the period)
(I[redacted] retypes the period)
(G[redacted] deletes it and an 's' that I[redacted] is typing)
sothe
(G[redacted] deletes 'the'and puts in a space)
they

packed there

be

.Where are we ?
.They found
.Delete, delete
.No, d wo
.Not down (referring to t[redacted]'s use of the word
. delta)
.Go like this-just let me in
.(Hi-oh, who cares Now put the 'k' back on.)
.When they got back they found their mother- they found
.found their mother
.(WT)f o u n found [illegible] (WT)m o t h
.t h e mother
.They found their mother laying on the floor
.Ok
.and
.and the house
.(D)and--------h o u
.(Laughs)
.and the house was house and the house
.(D)and the h o u
. s e was a
.mess. Now I write the no I spellcue, friend.
.mess
.mess (U)(laughter)
.One day

(At line 1, column 1, Gwenn started typing)
they
(T[redacted]deletes the word) (G[redacted] pushes the down arrow twice)(T[redacted] pushes the down arrow key down to one row below 'bac', then moves it up to the line the word 'bac' is on.)

(T[redacted] moves the cursor with the arrow key over the 'i' and pushes the space bar)
bac k
(T[redacted]then backs up one space)
(Down arrow, up arrow, right arrow 3 times, delete space and 'k',left arrow, type 'k'
back they

found there sother

gone ans

(G[redacted] deletes the 's') d vthe hou

(G[redacted] deletes back to the space after 'and')

the hou
se was a mess
(T[redacted] hits the spacebar key and has to delete it and put in a period.)
mess.

APPENDIX 4

MODIFICATIONS TO THE FLOWER AND HAYES MODEL:

SOURCES AND DETAILS

Modifications to the Flower and Hayes Model: Sources and Details

Flower and Hayes' model provided a basic framework for analysis of the case study data. However, other research offered greater depth of perspective and specific behavioral observations of the elements in the Flower and Hayes' model. While the research was reviewed in Chapter 2, its specific role in each part of the Flower and Hayes' model is presented here.

Concerns

When the present study was first conceived, the purpose was to consider writing process and concerns of students as they wrote. The term 'concerns' was one coined by Nolan (1978). It was a reference to those aspects of the writing task which the writer was observed to attend to. Since the only sources of such concerns had to be the writer him or herself or the text environment, these two aspects of Flower and Hayes' model were subsumed under the category of 'concerns'.

One of the sources of concerns was the evolving text in the task environment. Bridwell (1980) identified seven levels of text addressed during revision which coincided with increasing size of meaningful units in the text. These levels in increasing size included surface features, lexical units, phrases, clauses (subordinate and independent), sentences, multi-sentences, and whole text.

Writing Processes

The planning process was expanded based on the works of Perl (1979), Pianko (1979), and Smith (1982). Perl differentiated planning into three observable operations. The first was general planning which involved organizational planning similar to Pianko's definition of pre-writing (1979). It involved all activities that occurred before any text was translated. Second was global planning, planning with a focus on the entire topic or direction of the text. The third was local planning with its focus on the specifics of expressing ideas at the point of text production. Local and global planning often would occur recursively and could be simultaneous. Flower and Hayes' planning sub-processes, generating, organizing and goal setting occurred in all three operations.

Smith (1982) described some observable behaviors which would help identify the sub-processes of planning. Idea generation was often associated with reading to get information, statements of personal knowledge, and questioning to clarify tasks. Idea organization could involve exploring the idea through verbal rehearsal, multiple text starts, and mental revision of rehearsed text. Two additional behaviors noted during the present study under this sub-process were metacognition and evaluation of ideas.

Smith (1982) also addressed the process of translation. He discussed the process as involving two tasks which must be achieved simultaneously. One was the production of text in which the writer rendered the meaning of ideas into language. The second was

transcription which was the effort to ensure that the language of production conforms to standard print conventions. Transcription involved surface features of the text similar to those described by Bridwell (1980) and noted earlier under concerns. Additions to these surface concerns arising from this study involved the use of the keyboard and the word processing functions.

Reviewing was a process that Flower, Hayes, Carey, Schiver, and Stratman (1986) elaborated on within Flower and Hayes' original model. They found that evaluation was achieved through reading the text and involved three different goals originating in planning. The first was comprehension or orientation. The writer read the text to understand what was written or to orient thinking for continuing translation. The second goal was to evaluate the effectiveness of the text to communicate intended ideas. The final goal occurred when evaluation detected a problem. The writer would read to define the problem. When a problem was detected and defined, the success of the defining process tended to dictate the nature of revision. If the problem was well-defined and the writer had a specific solution, revision was usually specific. If the problem definition was unclear, revision tended to involve rewriting of the text at the local level through paraphrasing or at the whole text level through redrafting.

Faigley and Witte (1981) considered the levels of revision that might be observed. They differentiated revision concerns along two dimensions. The first was between meaningful revisions and meaning-preserving revisions. Meaning-preserving revisions involved changes to the text which preserved the meaning in the text. These usually

involved surface features, lexical terms, and occasionally, short phrases. Meaningful revisions caused the idea expressed in the text to change. Faigley and Witte's second dimension was closely related to the differentiation of local and global planning. They saw revisions involving the microstructure level of the text (local) or the macrostructural level (global).

The Writing Model

The writing model is presented in overview in Figure 5. Specifics of each part of the model are discussed below.