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UNIVERSITY OF ALBERTA

COMPUTER SUPPORT FOR CHILDREN'S LITERACY LEARNING

BY

DIANE L. FERNET

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF EDUCATION

Department of Elementary Education

EDMONTON, ALBERTA

Spring, 1988

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The undersigned certify that they have read and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled: *Computer Support for Children's Literacy Learning* submitted by Diane L. Fernet in partial fulfillment for the degree of Master of Education in Elementary Education.

(Supervisor)

Date: March 28, 1988

ABSTRACT

A comparative case study was done with seven able Grade Six students to ascertain whether they could use tactical tool software in support of self-directed literacy learning. "Holly" was the focal case; six other students provided comparative and contrasting notes. Data consisted of recorded dialogue, an observation log, interviews with subjects and teachers, and student products.

Three research questions were explored: 1) *Could* the students use tactical tool software, without extensive training, in the course of literacy learning? 2) Given a choice, *would* the students use such software? 3) If they chose to use the software, *how* would they do so?

The study determined that:

1) The students were able to utilize multiple tactical tools in support of literacy learning activities, with little prior training or experience. Student accounts of their experiences reflected a high degree of metacognitive awareness and personal satisfaction.

2) The students perceived that computer usage could be either valuable or counterproductive—depending on the nature of the task. Lack of familiarity with specific software techniques was not a deterrent.

3) No identifiable pattern of tactical tool usage emerged from the study. Students employed differing strategies and software tools, depending on individual interpretations, aptitudes and preferences.

Additionally, several issues arose during the study:

4) To transfer control of learning and familiarize the students with software capabilities, the EX_5 Tactical Tools Learning Model was devised.

5) The students approached the acquisition of software techniques variously. Generally, they relied first upon trial-and-error, then upon teacher or peers. Printed directions were never consulted.

6) Lack of keyboarding skills was perceived as retardant to product quality. Generally, students elected to use the computer despite slow typing speeds. Perceived advantages were the ability to manipulate text, revise easily, spell-check, and produce neat copy.

Study recommendations include that: a) students have some keyboarding and word processing experience prior to multiple tactical tool usage; b) the study approach might apply to group settings; c) study findings might apply to upper elementary, junior high or gifted programs. Study findings are seen as compatible with current educational thought on language learning, critical thinking skills and computer literacy.

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Table of Contents

CHAPTER PAGE

I. THE PROBLEM

Preface 1

Introduction 3

Statement of the Questions 4
    Related Issues 5

Significance of the Study 6

Delimitations of the Study 7

Limitations of the Study 9

Definition of Terms 10
    Computer Literacy 10
    EX_5 Tactical Tools Learning Model 10
    Learner Control 10
    Literacy 11
    Literacy Learning Activity 11
    Tactical Tool Software 11

Overview of the Thesis 11

II. REVIEW OF RELATED LITERATURE

Preface 13

Language and Cognition 14

Language and Interactive Learning 15

Language Across the Curriculum 18

Language, Learning and Microcomputers 20

Literacy and Computer Literacy 28

Toward a Methodological Paradigm 30

Derivation of the EX_5 Tactical Tools Learning Model 33

CHAPTER PAGE

III. RESEARCH DESIGN AND METHODOLOGY

Preface 36

Description of the Site 37

Description of the Sample 37
    Holly 38
    Scott 39
    Nancy 40
    Todd 41
    Stewart 42
    Jayne 43
    Roy 44

Description of the Time Frame 45

Description of the Physical Setting 45

Description of the Software 45

Description of the EX_5 Tactical Tools Learning Model 47
    EX_1: Experience 49
    EX_2: Experiment 49
    EX_3: Explore 49
    EX_4: Expand 50
    EX_5: Execute 51

Implementation of the EX_5 Model in the Present Study 52
    EX_1: Experience 52
    EX_2: Experiment 54
    EX_3: Explore 55
    EX_4: Expand 55
    EX_5: Execute 57

Collection of the Data 58

Analysis of the Data 59

IV. ANALYSIS OF THE DATA

Preface 61

Analysis of the Data 62

CHAPTER PAGE

IV. ANALYSIS OF THE DATA Continued

Holly: A Case Study 63
    Information Session - Students 63
    Information Session - Parents 64
    Session 1 64
    Session 2 66
    Session 3 67
    Session 4 67
    Session 5 70
    Session 6 71
    Session 8 72
    Session 9 74
    Session 10 75
    Non-Scheduled Session 75
    Session 11 76
    Session 12 80
    Session 13 80
    Session 14 81
    Session 15 81
    Session 16 83
    Session 17 83
    Session 18 84
    Session 19 84
    Session 20 85
    Session 21 86
    Session 22 87
    Session 23 88
    Session 24 89
    Post-Session 1 89
    Post-Session 2 89

Comparative Notes 92
    Scott 92
    Nancy 95
    Todd 98
    Stewart 100
    Jayne 103
    Roy 106

Conclusion 109

CHAPTER PAGE

V. THE FINDINGS AND CONCLUSIONS

Preface 110

The Research Questions 110
  Could the Students Use Tactical Tool Software? 111
  Given a Choice, Would the Students Use Tactical Tool Software? 113
  If They Chose to Use the Software, How Would They Do So? 115

Related Issues 116
  Delivery System 116
  Strategies in Acquiring Software Techniques and Sequences 119
  Keyboarding 119

VI. SUMMARY, CONCLUSIONS AND IMPLICATIONS

Preface 121

Summary of the Study 122

Summary of Findings and Conclusions 123

Recommendations 126

Significance of the Study 127

Implications 128

Suggestions for Future Research 130

Commentary 131

SELECTED REFERENCES 133

CHAPTER PAGE

APPENDICES

Appendix A 140
Appendix B 148
Appendix C 161
Appendix D 186

LIST OF FIGURES

Figure Page

1 The Treffinger Teaching-Learning Model 34

2 Computer Support of Literacy Learning: A Single Strand 48

3 Computer Support of Literacy Learning: A Continuum 48

4 The EX_5 Tactical Tools Learning Model 52

CHAPTER I

THE PROBLEM

Preface

This study evolved from some moments spent musing in front of my personal computer. During the course of several hours, I had variously done a literature search of the ERIC database using a modem, created a set of bulletin board labels for a friend using a graphics package, revised parts of a paper using a word processor, and blocked in the rough draft of another using an outliner. Midpoint in a flush of self-congratulation at my expertise with the computer, the realization dawned that although I had access to a wide range of software and was using it with ease, there wasn't a single item that I knew thoroughly—that I had yet to work through the manual of any of them from cover to cover. With time being my most precious commodity, I had restricted myself to those applications that were directly relevant to my purposes. Whenever a new need presented itself, I simply addressed the appropriate technique or sequence of keys. I found reassurance in the thought that this, in fact, is the way in which computers are used by the business, academic and scientific communities.

In common parlance within computing circles, generic software such as word processors, data base management applications and the like are often termed "productivity tools". I had on a number of occasions thought that in light of the way in which I used these types of software, the word "productivity" lacked the connotation I sought—it lacked the dimension of **choice**. For many of my ventures, more than one option existed as to the type of software that would be productive—that was capable of conveying the information I wanted to present; it was a matter of which strategy or **tactic** I chose to use that best suited my intentions. I had come to think of these types of software as being **tactical tools**.

My thoughts drifted to the lessons that I have taught, over the past few years, in the name of computer literacy. At first, in keeping with curriculum conventions, I had centered instruction on computer origins and issues. It soon became clear that this particular approach was roughly analogous to my learning about the history, structure, functioning and social implications of my washing machine in order to do the laundry. I supplanted that course design with instruction in LOGO. There emerged a small core of LOGO enthusiasts, but the majority of students either found the concepts to be difficult, or they failed to perceive the activity as being important or useful to them. (This judgement I based on the numbers of students who voluntarily attended computer club.) Finally, my teaching was directed toward ~~awareness of the~~ different types of software available, with provision for hands-on experience. In the computer club context, students were given a choice of a number of software packages: LOGO, several CAI programs in game format, a word processor and a graphics program. I found that the percentage of students opting to attend increased greatly when there was a latitude of choice. On occasion, students even made use of optional computer time to complete or enhance classroom assignments.

I began to speculate about my own selective strategies in using the computer as a sort of tactical device—choosing the software that best suited the demands of the particular task and my chosen strategy for approaching that task. Could upper elementary school students manage a similar approach? Would they see a purpose in using the computer to facilitate their personal learning purposes? Further, if in fact they could contend with such a scheme, how would they go about learning to use the various software items? What effect would lack of keyboarding skills have on their use of the software? Which pieces of software would they prefer, and which would they deem inappropriate to their purposes? What sort of delivery system could be devised to furnish a smooth progression of knowledge and skill development? Within that delivery system, what should be the role of the teacher? To what extent could the students take control of their own learning? These questions seemed to be particularly relevant and timely, given current thought trends on learning and on computer usage at the elementary level.

Introduction

In reflecting on the "buzz-words" of the 1980's, it is apparent that one of the prevalent phrases in education is *computer literacy.* It is seen as an imperative for administrators, teachers and students at each grade level. In response, most school jurisdictions in this country are attempting to provide some type of computer literacy program.

There is considerable controversy as to what the exact parameters and content of such a program should be. Initially, at the elementary school level, Alberta Education devised a curriculum in which the computer as an object of inherent interest was central (Alberta Education; 1983). As available educational software has proliferated, educators have had choices of increasing latitude in their approaches to a computer literacy program. There are a number of these extant at present, including computer origins and issues, computer assisted instruction, simulations, programming and problem solving, and use of productivity tools.

Recent published surveys, with very low figures shown for use of productivity tool-type software likely do not reflect the current increasing use of word processing and data base software in elementary classrooms. However, use of this type of software, termed "tactical tools" in this study, is still quite limited. Much has been written about the use of word processors, speculating as to whether it facilitates and enhances the writing processes of children, but research has not yet yielded conclusive evidence one way or the other. Further, in many of the projects proposed in the literature, the learning activity is designed to support computer utilization; the objective is, in large part, mastery of computing techniques.

This study was designed to explore the converse: whether, in carrying out literacy learning activities, upper elementary students are able to utilize the computer as a tactical agent.

Statement of the Questions

The major issue explored in this study was the ability of able upper elementary school students to use the computer as a support for their own literacy learning. More specifically, an exploratory study was done with small group of able Grade Six students to determine whether they were capable of using tactical tool software, without extensive training, in the course of executing self-directed literacy learning activities. The question can be divided into three sub-aspects:

- ☐ *Could* the students use such software?
- ☐ Given a choice, *would* the students use such software?
- ☐ If they did so, *how* would they use the software?

Related Issues

Additionally, the following related issues were explored in the course of the study:

- ☐ What mode of delivery or teaching model might be effective in acquainting the students with tactical tool software and in enabling them to implement it in the course of their learning?
- ☐ Which tactical tool software products would upper elementary students find appropriate to their needs, and in what manner would they use them?
- ☐ What strategies would students exercise in attempting to acquire specific software routines and techniques in support of their learning activities?

Significance of the Study

While a good deal of literature exists on the literacy learning of children and its application to computing, much of it is speculative. This exploratory study attempted to make the transfer from theory to practice; it might prove illuminatory for theoreticians as to how a group of students in one specific set of circumstances responded.

There has been a burgeoning interest in the use of tactical tool software with elementary school students. However, in most of the reported projects, a single type of program has been used. Contiguously, current theory and research in literacy learning has focused on learner control. In the course of this inquiry, a number of tactical tool applications were available to the students, as was choice of how those options might be exercised. The findings of the study might provide insight to educators interested—in student capabilities and reflections in response to such a choice.

Recent literature reflects the necessity of purpose in children's learning. Many writers have stressed the futility of teaching isolated skills or facts. In order to avoid a disjointed or erratic progression for students unfamiliar with microcomputing and with tactical tool software, a delivery model was devised to acquaint students with software capabilities and to transfer control of their application from teacher to pupil. Educators contemplating a similar approach might find this methodology thought-provoking or useful.

Despite the remarkable profusion of writing that has appeared within a five-year interval on the subject of children and computing, there exists a marked scarcity of research studies exploring the application of tactical tool software to language and learning. It is hoped that this investigation will add to the knowledge in that sphere.

A final potential value of this study lies in its future replication at the elementary and/or junior high school level for purposes of noting whether, in fact, the model described in the study is effectual in delivering an alternate approach to the use of tactical tool software in support of literacy learning.

Delimitations of the Study

In establishing the parameters of the study, it was determined that the purposes and time frame could best be served if the investigator worked in the capacity of teacher-researcher with a small group of able upper elementary students.

The site for the study was a school of approximately 350 students of mixed socioeconomic background. The investigator had taught there for the previous six years. The school was chosen on the basis of computing experience on the part of the students, amount and type of hardware, adjacency of computing facilities to the library, and cooperation of the school administration, teachers, and librarian.

The sample for the study consisted of seven students of mixed socioeconomic origins drawn from two Grade Six classes by their classroom teachers. The students were selected on the basis of general academic ability and work habits; the criterion used was *average or above-average ability*. Four of the students were male; three were female. Four students had had less than ten hours hands-on computing experience; none of the students had had previous experience with any of the nine types of tactical tool software used in the study.

The time frame for the study extended from mid-March until late May; sessions consisted of three one-hour periods per week supplanting regular Language Arts instruction. A total of twenty-four sessions took place. Additionally, students were able on many occasions to access computers at noon break and for a limited time after regular classes.

The instructor for the study was the investigator, who acted in the capacity of teacher-researcher. Four of the seven students had been taught in Grade Three by the researcher.

The software used in the study was selected on the basis of cost, ease of use, and appropriateness under the designation "tactical tool". Items included an outlining facility, a word processor, a data base management package, a survey outliner, a spreadsheet, a spelling checker, a graphing tool, a graphics package, and a facility which incorporated graphics and text in a "storybook" format.

The locale for the study was a discrete "computer lab" classroom housing seven computers, adjacent to the school library.

Limitations of the Study

Epistemological and methodological considerations imposed certain constraints on the findings of this study:

a) Since the study was carried out by an individual acting in the capacity of teacher-researcher, student participant behaviours may not have been entirely typical of regular classroom demeanour.

b) The nature of the small sample size will not permit the findings to be generalized to a large-group setting.

c) Since the sample was composed of students characterized as "able", the findings can not be generalized to students whose academic performance is below average, or who have learning difficulties.

d) The study took place in a compressed time frame relative to the period such an endeavour would encompass in a regular classroom setting.

e) Since the data consisted of student journal entries and talk, observation, and examination of student work, interpretation is necessarily of a subjective nature.

f) Inferences drawn were dependent on the researcher's ability to reach meaningful conclusions from the accumulated data.

For the purposes of this study, certain terms have been defined as follows:

Computer Literacy - facility with software and techniques using a computer as a tactical agent *where appropriate* to process information in a manner compatible with the activity at hand.

EX_5 Tactical Tools Learning Model - derives its name from the five encompassed levels: **I. Experience, II. Experiment, III. Explore, IV. Expand,** and **V. Execute.** The EX_5 Model was formulated to exemplify a structured and sequential methodology. It has the express purposes of introducing tactical tool software to students, permitting hands-on exploration of tool capabilities, and providing opportunity for them to utilize those capabilities in support of their literacy learning. It is designed to facilitate the gradual assumption of control of learning by the student in exercising judgements, examining alternate cognitive strategies and deciding upon tactics that suit individual literacy learning purposes. Computer support may be utilized *if* and *when* the learner sees fit.

Learner Control - an instructional system whereby the learner can to some measure direct the flow of instruction provided by the system, thereby guiding it to respond to his or her own perceived needs and interests. This is in contrast to system control, in which the flow of instruction is determined by instructional sequencing based on a model of teaching which is responsive to the learner's immediately prior degree of success rather than the system who determines the nature of instructional adaptation considered to be most effective.

Literacy - the ability to read, write and process print information in a manner compatible with the language activity at hand.

Literacy Learning Activity - consists of a written or oral language product generated by a topic mutually agreeable to student and teacher-researcher.

Tactical Tool Software - comprises a mushrooming body of increasingly sophisticated computer software. This category includes generic programs such as word processing, data base management, "shell" programs, utilities such as spelling checkers, spreadsheet and statistical analysis, graphics and music applications. These software packages enable individuals to process information or ideas, and to present them in a variety of formats. For the purposes of this study, the term is intended to connote a group of computer-driven utilities and applications which can be used as tools to expedite or enhance a learner's purpose.

Overview of the Thesis

The report of this study of able Grade Six students' ability to utilize tactical tool software as support for their own literacy learning will consist of six chapters. This chapter has provided an introduction to the problem under study. As such, it has included a statement of the problems, definition of key terminology, and this overview.

Chapter II deals with the theoretical framework of the study, providing a review of related literature concerning language and literacy learning, and their relationship to microcomputer usage. As well, the derivation of the EX_5 Tactical Tools Learning Model will be traced.

Chapter III describes the research design, including: site, sample, time frame, physical setting, software used, the EX_5 Tactical Tools Learning Model, and the procedures employed in gathering the data.

Chapter IV describes the methodology used to analyze the data. It will furnish a case study description of one subject's experience and responses, followed by a comparative summation of the other six cases.

Chapter V includes a summary and discussion of the findings, including the three research questions and several related issues arising from the study.

Chapter VI reports the findings and conclusions of the study, as well as delineating some implications, recommendations and suggestions for further research.

REVIEW OF RELATED LITERATURE

Preface

I wanted to institute an exploratory study solidly grounded in those things I believe to be true about language and learning: that children acquire the skills of literacy primarily by manipulating and applying language within a meaningful framework toward the purpose of communication. I believe that children must actively engage the material they *are learning, and must make personal sense of it; that there is no* **one** *way to go about a learning task; and that exploring meaning through that personal language is necessary in all subjects across the curriculum. I had determined that in most situations where the computer is currently being used in conjunction with language, it was in the way of CAI, which is predisposed to be reductionist in nature; the focus is generally on grammatical form and surface features. In other words, CAI tends to emphasize* **how** *language is communicated rather than* **what** *is being communicated and* **why**; *it was the latter two areas that I wanted to explore. I wanted to establish an environment in which students would be encouraged to bring their personal experience and preferences to the learning situation, to experiment and hypothesize about what they were learning, and to develop metacognitive strategies, as they interacted with their peers.*

I sought in the literature a theoretical framework that pulled together the essence of current thought on language learning, and that would *encompass the use of microcomputers in the elementary school classroom—I wanted a framework that could merge* **literacy** *and* **computer literacy** *learning. Further, I hoped to derive an epistemological stance and methodological format that were appropriate to the nature and intent of my study.*

Language and Cognition

If one accepts that language and cognition are inextricably intertwined, then it follows that in language lies the very groundwork of education. As such, it is not possible to separate it from theories and delivery systems. It is the center of a child's school experience; King (1984) observes that it is ever-present, influencing the form and quality of that experience. Success or failure is bound up in the way a child creates and communicates meaning through language.

Shuy (1984) stresses that language is *constructivist* and *holistic* in nature—that the best way for children to learn is to start with an entire context, and to construct meaning actively with as many clues as the situation affords. The language, then, must be context-relevant. He further notes that it is a functional activity—that its purpose is to get things done, and that it must be self-generated for the learning activity to be meaningful. Britton (1970) points out that when other-generated language is adopted, that strategy works against the very learning it is attempting to promote. He likens it to causing children to limp around in someone else's shoes, in hopes that someday the language will fit. He underscores that each individual must engage the material on the basis of previous experience and make it his or her own.

Rumelhart (1980) states that humans actively create their own minds; that they assemble a "personal construction" of experience which becomes for them their *reality* of things, ideas, values and aspirations. He terms these constructs or "packets of information" *schemata*, and conjectures that these intuitive rules form the basis for an individual's goals, and for allocation of his or her resources. Rumelhart's schema theory explains the wide variation in student responses to a single learning experience taking place in a classroom.

It was part of the fabric of this study to create an environment in which student language was at the core. Student participants would be encouraged to talk aloud to themselves, to each other and to the teacher-researcher as they worked, constructing and reconstructing schemata in the course of their learning. No effort would be made to "correct" language that was technically "inappropriate".

Language and Interactive Learning

Papert (1980), in describing his studies with Piaget, tells of his dawning awareness that a child's learning is an active process, based on the social and cultural patterns he or she encounters:

> ...I came away impressed by his way of looking at children as the active builders of their own intellectual structures. To say that intellectual structures are built by the learner rather than taught by a teacher does not mean that they are built from nothing. Like other builders, children appropriate to their own use materials they find about them, most saliently the models and metaphors suggested by the surrounding culture.
>
> (p. 19)

Current theory views learning as a student's progress in gaining control over his or her environment. The learner must be involved in a community of other learners in which there is a purpose for the learning, and in which there is latitude for questioning and for trial and error (Boomer, 1983). Mayher and Lester (1983) bolster these ideas in asserting that material to be learned must be engaged and personalized on the basis of previous experience. This requires an interactive conception of learning as hypothesis testing taking place within the learner and in conjunction with other learners. Moll (1986) affirms that humans are social beings, and that all learning occurs in social and historical milieux. These environments play a critical role in an individual's learning and development—they are the primary mechanism through which humans create change in themselves and their world.

[illegible]sky (1978) suggests that these interactions with the environment are rarely direct; that humans use language tools (reading, writing, speaking and listening) to mediate these interactions with the physical and social environment. These language tools are used first to communicate with others, and later internally in the form of "self-talk". Jaynes (in Thaiss, 1986) believes that consciousness is not possible without verbalization, either internally or aloud; that words are the only way humans can merge the unfamiliar with the already-known. Any function in children's cultural development appears first on the social plane, and then on the psychological plane (Wertsch, 1983). In other words, children internalize the help and direction they receive from others, and come to use them as a means of inner guidance to conduct subsequent problem-solving. They must first effect appropriate behaviour to complete a task under someone else's guidance before they are able to complete it independently and competently. Vygotzky terms this connection between social interaction and individual action the *zone of proximal development*. For instruction to be effective, it must be directed at the child's *proximal level*.

The role of an effective teacher in teaching to this zone of proximal development has been described as *scaffolding*: providing a stable but flexible structure on which the learner can construct and reconstruct literacy concepts and skills (Applebee and Langer, 1983; Cazden, 1983). The learner is given appropriate support during the initial phases of instruction through interaction with the teacher and peers; the scaffold is gradually withdrawn as he or she moves toward mastery. Graves (in Giroux, 1987) sees the role of teacher in much the same way: one of legitimizing that construction and reconstruction, built around the central aspect of student experience. He notes that in doing so, the students can speak with their own "voices", rooted in their sense of history and place. His metaphor for a desirable teacher-pupil relationship is that of "master and apprentice": the child should be led through the learning, and provided with the opportunity to describe, express and personalize it. Graves' focus was that of writing; however, the metaphor can be extended effectively to encompass all language forms across all curricular areas.

Every effort was made to incorporate the *scaffolding* or *master-apprentice* format into this study. From personal experience it was known that students at the end of Grade Six are able to contend with the literacy learning activities introduced in the project. Since the students had previously received little instruction in the literacy skill areas addressed by the study and or in computing, the study was designed with the proximal zone in mind—just beyond their present level of knowledge. The EX_5 Instructional Model (discussed in Chapter III) was devised to avoid the traditional "teacher-lecture" type of instruction as much as possible. Rather, new concepts were introduced first by demonstration, and then by assisting the students as they carried out similar activities. At the final stage, students carried out the activity under their own direction, with advice and assistance provided where requested.

Language Across the Curriculum

As a learner works toward personal or social goals, language becomes the means to attain those ends. Knowledge of a subject or curricular area means knowledge of and control over the language of that subject (Adams, 1984; Postman, 1979). Language is the exposed edge of learning, and is the means by which a learner can restructure schemata, perceive reality in new ways, and redesign the tactical approach used to attack problems (Fillion, 1983; Klein, 1981). Bruner (1973) suggests that learners go beyond the information given; that they act upon it and change it to a practicable, personal structure of knowledge. It follows, then, that if a system or individual other than the learner structures the knowledge in a single "right" way, it of necessity precludes other possible structures or ways of knowing. Britton (1985) cautions that teaching "recipes" or explicit rules will only help the learner to reproduce aspects of the culture, and that true learning only takes place when the student registers internally a set of implicit rules. In that way, Stock (1986) urges, students will internalize and pattern after the use and forms of language that characterize the different subject areas. The phrase currently in vogue in language arts circles for this paradigm is *language across the curriculum*, and encompasses *writing across the curriculum, speaking across the curriculum* and so on (Styles and Cavanagh, 1983). Knobloch and Brannon (1983), by way of example, indicate that writing across the curriculum enables each student to engage in the subject matter being studied from his or her own point of view, and enables the teacher to see the connections that are being made between what is being studied and what the student knows.

Major research studies by Barnes and Graves (in Mayher and Lester, 1983) determined that most school time is spent encouraging the receptive modes of learning; that most students have little opportunity to engage the material they are learning in an active sense and to practise making personal sense of information being presented. Language production activities facilitate dynamic, personal learning because they require the learner to find the appropriate words for the concept being learned.

This study sought to provide the students with as much latitude as possible in the choice of language tasks open to them. Students were urged to choose their own subject material, to use their own language and to devise their own tactics for manipulating the information within the context of the activities. The point was made frequently that although subject matter ranged across History, Science, Literature, Creative Writing, Mathematics and Health, their emerging skills and strategies were universally appropriate and applicable. As literacy and computing techniques were refined in one context, students were encouraged to apply them to others.

Language, Learning and Microcomputers

In response to critics' assertions that the literary tradition is being supplanted by technology, Robinson (1985) counters that they are overlooking the contribution that existing mass media as well as the new media—videodisc, teletext, viewdata and microcomputer—make to the achievement of literacy: their motivating power. He points out:

> [The new media] make heavy use of verbally encoded material. In the classroom, in the home and in the place of employment the population will be faced increasingly with information retrieval and general communications systems which, far from diminishing the need for literacy, re-assert the primacy of the written word in the communication process .... If anything, the new media necessitate a newly enlarged—if not more exacting—degree of literacy. Beginning in the classroom and extending into the many spheres of adult life, the increasing intrusion of the new media demands that the teacher equips his [sic] pupils with the skills to use them efficiently and with optimum gain and satisfaction.
>
> (p. 43-44)

Pogrow (1986) reflects the view that contemporary children are much more acutely visual learners than in the past, as a result of their sustained exposure to the media. Further, he reports, research has shown (possibly as a consequence of that contiguity) that children have a positive view of computers initially. Baljathy (1986) posits that far from replacing language, the computer offers as much as it demands, insofar as these new instructional applications can make possible the achievement of many objectives that lack of time, motivation, accessibility or endurance once made impossible.

There is often an assumption that a new practice or technology will produce only beneficial results. Watson, et al. (1987) caution that the consequences of innovation depend on whether the changes are recognized and intended by the individual. There are paramount considerations inherent in the use of computers in the language arts. As Chandler (1984) warns, the power of the computer to motivate the user is hollow if there is no genuine purpose in doing so. Before teachers rush to implement computers in their classrooms, they must first come to grips with their view of language and learning. Salomon (1985) in describing the possibilities inherent in computing in the classroom, declares:

> A computer's unique potentials emanate from the kinds and varieties of four basic attributes that it offers: information, symbol systems, user activities and relations with user. These attributes may affect four corresponding cognitions—knowledge structures, internal modes of representation, mental operations and attitudes and perceptions respectively—by either activating, supplanting or short-circuiting them. Such effects could be obtained through "low road" learning, which is practice-intensive, leading to near automatic responses, or through "high road" learning, which is thinking-intensive (i.e., nonautomatic operations are mindfully employed). The high road is seen as the more feasible and promising road to conceptual learning of the kind computers can facilitate.
>
> (p. 207)

Maddox and Cummings (1986) made a similar distinction in describing computer use in education, designating them *Type I* and *Type II* approaches:

Type I

1. Its goal is often facilitation of rote learning.
2. It tends to be program-centered, with emphasis on what the commercial developer can make the computer do.
3. Learner input is often minimal and highly restricted in permissable variety.
4. It is characterized by relatively passive user involvement, with most of the interaction between the child and the computer predetermined by the developer...

Type II

1. Its goals are facilitation of more complex cognitive skills, such as problem-solving and language composition.

2. It tends to be learner-centered, with emphasis on what the child can be empowered to achieve.

3. Learner input is extensive, with many Type II applications, such as word processing or programming, providing little more than a blank slate and powerful structures for filling in the blanks.

4. It is characterized by relatively active involvement and most of the interaction between the [illegible] and the computer *controlled by the child.*

(p. 36-37)

When assessing the effectiveness of software programs in the language arts environment, one must consider the theoretical stance of the teacher in order to assess whether or not the program is successful. Several writers (Dudley-Marling and Owen, 1987; Rodrigues, 1985) stress that the most important criterion for software evaluation should be the response of individual teachers and students; that the key to using the computer astutely is to appraise it in the light of teacher and student goals and needs.

Hativa (1986) describes a survey by the American National School Boards Association in 1984 in which nearly 80% of school officials reported that computers had changed neither teaching methods nor course content. Canning and Switzer (1985) recount that in the majority of the schools they investigated, computers were being used by the teachers "peripherally to their instruction, as motivation or reward for students who completed assigned work ... many teachers were doing with the microcomputer what they did without it; i.e. workbook type drill and practice or word and number games" (p. 27-28).

For the teacher whose concern is language across the curriculum, great care must be taken in selection of software. Tucker (1983) proposes that computing offers enormous potential for augmenting learning and creativity; that the computer is capable of supporting complex interactions between a student and an information base. He recognizes that good software should have the ability to help students acquire a conceptual grasp of the material; to enable learners to pose and solve problems on their own in a particular domain—in ways that can't be done as well by other means. He recommends that elementary schools adopt approaches to computer use as an "intellectual tool" similar to those taken in the adult world; that they take "maximum advantage of information technologies to enhance productivity, flexibility and creativity" (p. 7). He further speculates that computing offers an "order of magnitude effect"— that a change of quantity makes possible a change in quality or type—that the computer can not only do certain things better, but can make possible new things across the curriculum that are currently impossible. Chandler (in Chandler and Marcus, 1985) conjectures:

> ...it is at least possible to use computers in ways which can extend the potential of all of us as learners. The critical factor is our attitude towards both technology and the nature of learning...that some hope may lie for the appropriate use of the computer as a liberating tool rather than a child-processor or a "purpose" for which children must be prepared.
>
> (p. 10-11)

Watson et al. (1987) echo these suppositions, noting that rather than being an additional subject area, the use of computers should be a means of students' achieving productive results in regular curricular areas. Van Horne (1986) notes that many applications of computers to learning have been ineffective because they have not addressed questions of intellectual productivity nor reorganized learning systems to include computers. Naiman (1987) observes that with the adaptation of business utilities to serve educational purposes, academic tools are taking on the techniques and ingenuity of the "real world", stimulated by the same requirements that led to the inception of computing in the first place. Schiffman (1986) enlarges on this thought, commenting that computers were first invented to make short work of tasks requiring manipulation of information. She advocates the use generic packages—word processors, data base managers, graphics packages and the like(termed tactical tools in this study)—which require learners to use appreciably different cognitive strategies in different subject areas. When such strategies have been learned, she points out, students are able to transfer them to other tasks where they are appropriate. Chandler (1984) calls this type of approach "computer-extended thinking", and asserted that computers can provide a supportive environment for students to consider alternate tactical approaches for the processing of information. Graves concurs, stipulating "I don't want to see students relying on the computer as a stimulus to thinking. I want to see the computer used as a facilitator of thought" (in Giroux, p. 23). Commenting on the importance of the development of these learning strategies for students in the twenty-first century, Cornish (1986) asserts:

> Educators thus face an extraordinary challenge. They must equip students with knowledge that will enable them to function successfully in a world which we can know little about, but which will be drastically different from our world today. And, learning how to learn will be the key to that future.
>
> (p. 17)

Most of the language arts software currently available is of the reductionist variety, which leaves the student little or no learner control.

With regard to current applications, Kinzer (1986) estimates that usage in the educational system at present can typically be broken up into:

Learning about [Origins and Issues]†	10%
Learning from [Computer Assisted Instruction]	60%
Learning with [Simulations]	20%
Learning about thinking with [Programming/Prob.Solving]	10%
Managing learning with [Tactical Tools]	0%

(p. 231)

† *bracketed terms appended by this writer*

Becker (1987), in reporting the results of a national survey commissioned by the United States Department of Education on instructional uses of computers, states that in Grade levels Four to Eight, a total of 7% of the time was spent on word processing. He further indicates that 7% of computing time was spent in Social Studies and Science (the subjects in which most other types of tactical tool software would likely be used). Given the recent interest in word processing and data base management at the elementary level, it is likely that these figures have changed somewhat. However, use of these tactical tools is still relatively limited (Schiffman, 1986).

Miller (1986) concludes that there are few software packages in which children are involved in active hypothesis testing, comprehension monitoring and writing as well as reading. He has synthesized the ideas of several authorities into a guide for effective software based on whole language theory:

(a) **Language arts software should be based on a learning theory that is clearly stated in the documentation.**

(b) **The program should help students develop effective strategies for understanding and producing language.**

(c) The program should encourage the expression of ideas, allowing time for reflection.

(d) Reading selections should be taken from, or be indicative of, quality children's literature.

(e) The program should allow teachers and students to enter original work or to customize the existing material.

(f) The program should be usable many times and remain interesting and worthwhile.

(g) Software packages should combine the talents of teachers with the capabilities of computers.

(p. 294)

In the opportunities it furnished for students to consider alternate cognitive strategies in dealing with subject matter, the collection of tactical tool software in this study, used in a *language across the curriculum* matrix, would seem to be compatible with Miller's criteria (excluding [a] and [d]). Chandler observes that in using computers to store, sort and retrieve large amounts of data, the user is freed to focus on the nature of the information to be processed, and on its meaning.

A number of writers recommend, in light of current language theory, that educators seek computer applications that could be characterized as being *high road* or *Type II* (Miller, 1986; Dudley-Marling, 1985; Grabe and Grabe, 1985). They urge the establishment of computer-learning situations that will allow children opportunities to discover the joy and utility of language—and that will ensure that it is enjoyable, purposeful and worthwhile. Dillon (1985) supports this interpretation when he observes that when students use software that allows them to regulate their own cognitive strategies, it "...seems to have potential for empowering learners, and for facilitating growth in authentic literacy" (p. 94).

This study was devised in such a way as to provide students with maximum opportunity to exercise judgement and make decisions concerning the use of tactical tools. They were made aware or reminded that several options were open to them, including bypassing the use of the computer altogether if it proved advantageous to do so. Students were actively encouraged to examine alternate cognitive strategies and to select the tactic that appeared to them to be most beneficial in view of their learning purpose.

Other writers have explored the spoken component of language in conjunction with computers. Liebling (1984) noted that incorporating the computer into the communicative context of the classroom need not alter underlying social, interactive principles. Jackson (1987) and Browne (1985) report that more task-related talk takes place around the computer than is usual in traditional classrooms. Since talk is a key language activity, she writes, this generation of oral language can only be positive. Fletcher (1985), investigating the task performance of students in group versus individual settings at the computer, recounts that in three of the four tasks, the groups performed more effectively. Daiute (1985) cautions that while computers can be used to change the communicative pattern in the classroom, students must be taught how to glean full advantage of this social learning context.

This study was designed to allow for and encourage student talk. The EX_5 Tactical Tool Learning Model (see Chapter III) allows students the option of working in groups. Provision was made for frequent feedback sessions which enabled students to recount to each other in their own words the discoveries they had encountered and the setbacks they had experienced.

The design in part was intended to facilitate peer consultation and discussion; to help students clarify and refine their insights and strategies.

Literacy and Computer Literacy

Following the discussion on language and learning, it is apparent that it is not enough that children merely learn to read and write. Students must learn to use the acceptable forms and formats of language inherent in different academic disciplines if they are to be termed "literate". In the words of James B. White:

> Literacy is not merely the capacity to understand the conceptual content of writings and utterances, but the ability to participate fully in a set of social and intellectual practices. It is not passive but active; not imitative but creative, for participation in the speaking and writing of language is participation in the activities it makes possible. Indeed it involves a perpetual remaking both of language and of practice.
>
> (in Stock, p. 99)

As noted earlier, computer usage makes heavy use of verbally encoded material, and reaffirms the primacy rather than diminishing the need for literacy (Robinson, 1985). Chandler deplores the tendency of teachers of computer literacy to focus on the computer and ignore the literacy. His definition of literacy, in part, describes it as "a fluent mastery of a medium, allowing one to use it as a tool" (p. 27). Tucker (1985) extends this view to computer literacy, in stating that real computer literacy denotes mastery over a powerful agent of intellectual and creative endeavour. The American Librarian of Congress, Daniel J. Boorstin, bristles at the term "computer literacy", declaring that literacy is literacy:

> Mastering a machine is no substitute for the ability to read, and computer competence itself depends on the ability to read. To keep our thinking straight and our culture alive and our people free, we must keep our definition of literacy sharp and clear. To use computers effectively requires a familiarity with books and a friendliness to books.
>
> (p. 21)

Heffron (1986) declares that the by integrating it into the learning environment the computer assumes credibility; that it becomes an integral part of the literacy process rather than as an adjunct or games component of the program. She conjectures that children are well able to use to computer as a tool to develop their literacy skills, foster creativity and control their learning environment. Jorde (1987) concurs, stating that the computer as an instructional aid has the potential to provide a new kind of interactive medium enabling teachers to manage instruction in more individualized ways, facilitating student learning. Papert (in Cox, 1987; p. 16) remarks, "You make connections everywhere. You develop in teachers not just something called computer literacy but a sense of how they can use the computer as an expressive medium for the ideas that are a normal part of their subject matter."

The issue of individual learner control, then, is central to the merging of literacy and computer literacy. As Dillon (1985) contends, one of the most potent means children have for *actively* shaping experience and structuring and reconstructing knowledge is personal language; it not only reflects learning, but causes it. It is the role of the teacher to assess their hypotheses and respond to what the learners are attempting to do. If the computer is to be added to the tools children use in achieving literacy, the attitude of the teacher toward language and learning is paramount.

Styles and Cavanagh (1983) recognize in the computer a powerful agent for implementing language-across-the-curriculum:

> ..Developing interdisciplinary skills in thinking, reading, writing, speaking, listening and viewing can provide an appropriate focus for using the computer in a language-across-the-curriculum context. Regardless of the subject matter, through exercise of the communication skills of reception and expression, students, in interacting with computers and one another, will be able to make the knowledge gleaned a meaningful part of their personal resources.
>
> (p. 21)

They point out that what has been lacking is an integrated conceptual framework combining the best approaches of experienced teachers with computer applications in the context of appropriate language-across-the-curriculum policies and practices. It would seem, in perusing many of the language- or literacy-oriented projects using tactical tool software proposed in the literature, (Boudrot, 1986; Joslin, 1986; Rodrigues, 1986; Ross-McBride & Glasthal, 1986), that many of these activities are designed to support computer utilization; the learning objective is primarily mastery of computing techniques. It was the intent of this study to explore an alternate approach to the use of tactical tools, where the literacy learning across the curriculum assumed primacy and the mastery of computing technique, while important, was secondary.

Toward a Methodological Paradigm

In seeking a research paradigm for a study focusing on context-embedded, holistic language, the approach recommended as being most suitable is qualitative in nature. Probably the most common form of qualitative research carried out in educational contexts is ethnography, an inquiry methodology borrowed from the field of anthropology. However, Fetterman (1982) stresses that the ethnography has very specific procedures, techniques and methods of analysis. He cautions that educational researchers transferring these techniques to their field must attend to the values as well:

> Phenomenology requires that investigators be guided by the insider's viewpoint, the emic perspective. The concept of holism commands our attention to the larger picture and to the interrelated nature of the minute to the whole cultural system. A non-judgmental orientation prevents the social scientist from making some of the more obvious value judgments made in research. Biases are made explicit to mitigate their unintended effects on research. Contextualization demands that we place the data in its own environment so as to provide a more accurate representation.
> (p. 18)

Ethnography studies culturally-shared, common-sense perceptions of everyday experiences—its task is to describe a particular culture through participant observation or an informant. A "good" ethnography describes a cultural reality. However, given the delimitations of the project site and circumstances, the "culture" in this study was artificially created. Again, as a consequence of situational constraints, the nature of the subject group was not microcosmic; it was not representative of a true classroom population. The teacher-researcher effects a structuring and delineation of the cultural reality, and has a decisive effect on the options and actions open to the subjects. Thus, a study such as this does not fit into the true ethnomethodological mold.

However, a quantitative or positivist approach to such a study virtually necessitates treating literacy learning in a reductionist fashion—antithetical in the light of this study's theoretical framework. The study generated no measurements or hard data; nor were the results compared to those of a control group. Once again, one is drawn back to ethnology as a more suitable paradigm for investigating language across the curriculum learning. Miles and Huberman (1984) observe:

> Qualitative data are attractive. They are a source of well-grounded, rich description and explanation of processes occurring in local contexts. With qualitative data, one can preserve chronological flow, assess local causality, and derive fruitful explanations. Serendipitous findings and new theoretical integrations can appear. Finally, qualitative findings have a certain undeniability that is often far more convincing to a reader than pages of numbers.
> (p. 21-22)

Although the research environment in this case was structured by the teacher-researcher, the approach taken differs quite radically from traditional empirical methodology. Through a naturalistic inquiry process, the investigative scope encompassed not only fact-finding, but also attitudes, feelings, interpretations and descriptions on the part of the subjects. As such, the data garnered is not restricted to objective, easily-acquired or surface subject matter; the process delves deeper in an attempt to get at what may be partially-formed attitudes and impressions. In sum, the nature of this study is ongoing and contextually dependent rather than static and objective.

In an epistemological sense, then, this study falls into neither the quantitative nor qualitative domain; rather, it belongs somewhere on the continuum between. In the study, a sample group of a *particular* type was put into an environment of a *particular* structure, and given assistance in carrying out *particular* learning tasks in the best way they saw fit. The research question, in effect, becomes one of *What would happen if...?* For that reason, this study could tentatively be termed *Exploratory Research.* Howe (1985) makes the point that a combination of the two epistemological approaches need not be avoided:

> The merit of a given piece of research depends on how it responds to the fallibility of the question at issue, the fallibilities of relevant background beliefs, the nature of the question, and the broad practical and ethical constraints under which the investigation must be conducted. Although it often makes sense to emphasize quantitative methods to the exclusion of qualitative methods or vice versa, there are no mechanical rules for making these decisions...no good reasons for avoiding combinations of methods. The only generally applicable criterion is whether, all things considered, there are good reasons to doubt what the researcher claims to have found.
>
> (p. 17)

Miles and Huberman observe that the majority of current educational research involves at least some blending of the two paradigms. The quest for epistemological purity is desirable and not to be dismissed lightly. Perhaps, though, at this juncture it is even more important that research in the area of computer support of literacy learning be brought to maturity. What this study *does* provide is a point of departure for further "purist" study in either of the epistemological modes.

Derivation of the EX5 Tactical Tools Learning Model

In devising a delivery system for realizing the envisioned literacy learning environment with the computer as support agent, it was crucial that such a scheme be congruous with the stated language and learning principles. It was requisite that student language be at the core, that there be a scaffolding effect, that it furnish opportunity for language across the curriculum, and that provision be built in for optimum learner control.

The Treffinger Teaching-Learning Model, designed for use with gifted students, most closely approximated the envisioned format and procedural plan; it was used as the point of inception. The model was designed to develop students who are motivated and capable of controlling the content, process and evaluation of their own learning. The ultimate goal is to develop learners who have the resources to approach problems confidently, and who are willing to try new solutions to them. At each of the three levels, there is an identification of the goals and processes, assessment of entering behaviour, identification and implementation of instructional procedures, and assessment of performance (Maker, 1982). Initially, there is a good deal of direction by the teacher, who controls the content, process, rate, product and evaluation. The students then progress through three steps or levels which progressively transfer control of learning and thinking from teacher to pupil:

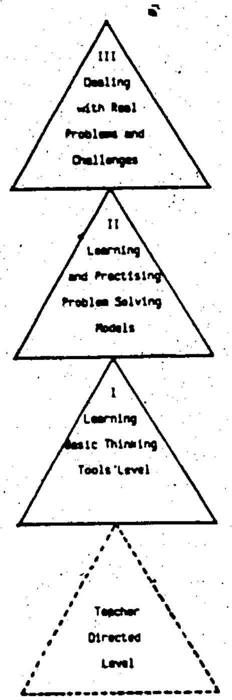
III
Dealing
with Real
Problems and
Challenges
II
Learning
and Practising
Problem Solving
Models
I
Learning
Basic Thinking
Tools Level
Teacher
Directed
Level

Figure 1 ♦ Treffinger's Self-Directed Learning Model

Treffinger's model is based upon the assumptions that children will learn more effectively if they are involved in their own learning, and that they will be more motivated if they are able to direct that learning in areas of their own choice.

For the purposes of the study, the Treffinger model provided a theoretical foundation and design that were compatible with the purposes of the researcher. While that particular blueprint was conceived for use with gifted students, there was nothing apparent that might prevent its use with students in the ability range encompassed by the study. From that point of inception, the EX_5 Tactical Tools Learning Model was devised (see exegesis in Chapter III). This new model attempted to incorporate the precepts and techniques advocated by Treffinger with a structured and sequential methodology in which students gradually could assume control in exercising judgments, examining alternate cognitive strategies and deciding upon tactics that suited their individual literacy learning purposes. To facilitate and enhance those purposes, computer support and tactical tool software could be utilized as the learners saw fit.

Based on these theoretical and epistemological constructs, the research design and methodology for this study were formulated. The ultimate goal was to incorporate the hypotheses, conjectures and recommendations from the literature into feasible and practicable study conditions: to explore the question of whether a designated group of students were capable of using tactical tool software, without extensive training, in the course of executing self-directed literacy learning activities. Chapter III will examine the research design and methodological format of the study.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Preface

Prior to my study leave, I had taught Grade Six at "Kipling" School, and had been assured of access to the school and its resources for a research study. There were a number of advantages inherent in so doing. Acquaintance with my teaching methods and study focus would expedite cooperation from the school and community. Six of the seven student subjects had known me in my teaching capacity; hence it would not be necessary for me to establish credibility in that role. Finally, I was familiar with the physical setting, and knew that hardware specifications and accessibility would satisfy study needs.

Given the constraints of the school year and timetable, there was limited time available, necessitating a more rapid progression through the model than might be the case in a regular classroom setting. As I could not confer with or assist students on a sustained basis, there was some degree of responsibility for task completion on their part. After consultation with the principal and classroom teachers, our considered opinion was that if we chose students of average or above-average academic ability and work habits, they likely would be able to contend more adroitly with these demands.

Since I was to be drawing the students out of class for an appreciable amount of time, it was necessary that I assume a role of **teacher-**

researcher to [illegible] that instructional time. That necessitated a selection of subject matter to be taught. In teaching Grade Six, one of my areas of focus had been on research skills as an important element of literacy learning. I knew that students at this grade level are capable of selecting a research topic based on interest, locating necessary information, eliciting pertinent facts, taking notes, organizing the information and presenting it in some fashion. Since these skills had not been emphasized in the current school year, and since they were compatible with the envisioned study, in consultation with the teachers I decided that research skills would form the basis of the students' Language Arts coursework.

Description of the Site

Kipling School is located in a neighbourhood of mixed socio-economic circumstance; student backgrounds range from the upper middle class to single-parent families living in low-rental subsidized housing. The school has been in operation for seven years, and currently has a student population of approximately 350. In system-wide tests administered in late May/early June by Edmonton Public Schools, the Grade Six classes collectively scored above the district mean in Language Arts, Mathematics and Science; at the system mean in Social Studies. The school fosters tolerance and acceptance of individual differences; this belief was reflected by staff and students alike.

Description of the Sample

The subjects for the study were chosen by the four teachers who shared instruction at the Grade Six level. Seven students ultimately were selected from a total of forty-four children in two classrooms. The initial request was for six students of average- or above-average in and work habits. Due to uneven distribution of sexes (only ten out of forty-four students were girls), the teachers selected five boys and one girl, all in the superior or high average ability range. An additional request was made that the sample be roughly equal in sex distribution. After further consultation, it was decided to include two more girls and to reduce the number of boys. The teachers indicated that one of the girls was new to the school, and that although she was of high-average ability, she was experiencing some adjustment problems. They noted that although she was still somewhat withdrawn, she was quite emphatic about her aversion toward tasks that involved extensive reading or writing. The researcher felt that her participation would provide valuable feedback regarding the reactions of a reluctant student. The teachers asked that four of the boys be included. The sample, then, ultimately consisted of seven students, four boys and three girls, all in their seventh year of school:

- Holly - was a girl of almost twelve, assessed by her teachers as being of average ability. This is substantiated by test results[1] which indicate that she would fall approximately within that range, being slightly higher in non-verbal than in verbal performance. In system tests[2], Holly scored below the district and class means in Language Arts; above both means in Social Studies, Science and Mathematics. Her report card characterizes her as being a hard worker, sensitive to others, and a good team worker.

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[1] *validation for all students' ability performance scores based on group-administered cognitive abilities tests.*

[2] *district test scores for all students based on results of Edmonton Public Schools system-wide examinations administered in late May/early June, 1987.*

Following the study, the four classroom teachers who shared responsibility for the Grade Six classes were interviewed, with a view to gaining descriptions of and insights into the nature of each of the students. The characterizations of Holly (and her peers) were selectively gleaned from the descriptions of the teachers. In their words:

> **Holly has a mind like concrete. An idea is poured in, it sets, and dynamite cannot move it. But socially she is more willing to look at two sides of things... she's the *kindest* person in our room. If there's a lame duck that has no partner, Holly will say "Oh, I'll take that one!" She's the most democratic kid I've ever met. [The other students] accept her 100 per cent...what's not to like? [Another student] was a lame duck—she's a bit of a social reject... and Holly chose to be her friend and help her out...she made a big difference in [that girl]'s life here... She's really resilient. She can really get lathered up about something, and five minutes later she boings right back into shape ...She's got good average ability, works very hard, keeps things done ... She has a single-minded kind of purposefulness. She'll be talking to you, and then if you're interrupted, she'll continue the conversation four days later... the same conversation, right from where she left off. That's why her work habits are so great. Although she's not as strong a student as some of the others, I knew she'd do fine in the computers project... because she can sustain whatever she starts.**

- Scott - was a boy of twelve, characterized by his teachers as being of high average ability. This is borne out by test scores which indicate that he is close to the superior range in the verbal and non-verbal areas. In system tests administered by Edmonton Public Schools, Scott's scores registered above both the school and the system means in all four of his core subjects, including a perfect score in Mathematics. His report card mentions that he is well-liked by his peers, that he does well in school, and that he has a pronounced facility with words and a flair for writing. It also indicates Scott is weak in organizational skills. In part, his teachers noted:

> **One of my joys in life! I made sure last year that I got him [as a student]. He's a brilliant thinker who appears to be a right-brain**

> thinker. Organizing Scott is like trying to herd Jello ... he takes sort of a holistic approach to things ... you'd get the same uniformity of approach to something if you fired a ping-pong ball into a closet! He can arrive at conclusions with no idea whatsoever as to how he got there, but they're correct, and tremendously creative ... He gets to where he's going in his own way ... The kids like him—they know he's *unconventional*—but they expect it of him and they respect that in him...It's okay for him to be [eccentric] because they know he's creative...He's anxious and nervous a lot. He tends to blurt things and stutter and stammer because he's never quite good enough in his own eyes... [He wants] to be an honours student this year—he's told me that fourteen times in the last two days. I can't help him out because he's not all A's, but he will be someday if he doesn't get screwed up between now and then ... He's got probably more potential than anybody else in there including [another student designated as gifted] ... *everybody* likes Scott ... He's one of the points of interest for tourists in our classroom ... He's very articulate, with a super-sharp sense of humour.

- Nancy - was a girl of twelve who was a recent arrival to Kipling School at the outset of the study. In the opinion of the teachers, she had high average ability; incomplete records did not permit confirmation with test scores. In system-wide achievement tests, Nancy's marks well-surpassed both the district and the school means in all subject areas. Her report card indicates that although there were some adjustment difficulties, she did experience fewer problems as the year progressed. One teacher noted that her effort was not consistent with her ability. It was also mentioned that she was skillful at drawing and artwork. Nancy was the only member of the sample group who had had formal instruction in computer literacy; at her previous school she had had hands-on experience working with LOGO. Because she was relatively new, her teachers indicated that their observations could not be made on as informed a basis as for the other students. In part, they noted:

> Nancy came here as a result of a [family situation], leaving her home town ... she had never been to any other school, and all of a sudden came to this one in the middle of the year ... where the number of girls is limited and the friendships were already well-established ... and which is in a city rather than a small town ... It

> was very hard for her—[it] would be for *anyone*. Academically [she is] very bright. Her report card was all A's when she came. It dropped drastically when she came here ... she just quit working. It took a shake-up at last report card before she started to apply herself ... On the school board tests it was marvelous—she beat the socks off some of the hotshots ... She's a very organized and methodical worker ... She's incredibly neat ... She's very much a loner, an independent worker. When she has something to do, she very quietly and efficiently *does* it. She's not the kind of kid who's up at your desk for Show and Tell every time she makes a mark on a piece of paper ... She has really come a long way in adjusting in the time she's been here—the computer [research project] was really helpful for her because she had a chance in the small group to let the others get to know her and see that she had lots to offer. Some of the boys especially were wowed by what she did, and they're not even the ones who have noticed that there's another sex besides theirs.

- Todd - was a boy of almost twelve, evaluated by his teachers as being of high average ability. This is supported by test scores, which indicate that his ability in the quantitative area is significantly higher than those in the verbal and the non-verbal sectors. All remarks on his report card are favourable, describing him as considerate, industrious and conscientious. In the system achievement tests, his marks in all four subject areas were above both district and school means. His teachers' reflections included:

> Todd's family is from Korea, although he was Canadian-born ... Todd is quite hard to get to know. The only time I really find out anything about him is in his stories. He doesn't talk about himself ... he doesn't talk about other people either, actually. He's a serious student. He's actually very competitive, but he never lets on to anybody. In my room he would be the top student. And he keeps asking ... "Are we having a quiz? Is there any homework? Is there a test?" When he's discussing anything in class, everything is very exacting and very formal ... He's different outside the classroom ... It's almost like "School is one thing, and that's academics and I have to be serious. But socially is completely different." ... He doesn't let [the teachers] get too close ... He's like your basic baby accountant. He plays his cards right close to his chest. He's very methodical. I think that he hides a lot, but he comes across as calm and cool ... The one time I had a chance to observe Todd [when he was] relaxed was backstage during the play. He had a crush on [a Grade Six girl]. The two of them sat there and talked to each other ... visited ...conversations, not giggling or

> poking or snorting or guffawing like they all do at that age. They just chatted, and he was very easy and loose ... Way back in the fall on the playground there was some ball-hoarding and roughhousing going on, and he got into some kind of tussle. He was very upset when he talked to me about it. But when we got to discussing the incident in the classroom, he was back in control. He stated his case very calmly, just like a lawyer. When some of the other kids said "Yeah Todd, but you did this..." He held his hand up and said, very calmly, "Just a minute. I haven't finished what I have to say yet." ... He's always very collected and polite, like the classroom is a very formal place.

- Stewart - was a boy who had just turned eleven. Stewart was born in Ireland, and began his education there. His teachers indicated that his ability falls into the superior range. This ~~is~~ confirmed by test scores. The school had received funding over a three year period for Stewart to participate in an Academic Challenge program. His report card characterizes him as being a superb student in all areas; the section reflecting effort is consistently "Excellent". Other teacher notations indicate that he is at times overly conscientious, that his work is invariably of high quality, and that he has a gift for writing. On system achievement tests, he scored well above both system and school means; in Language Arts and Mathematics, he achieved near-perfect marks. In characterizing Stewart, his teachers remarked in part:

> He's younger than the others because he was advanced a year when he came over from Ireland... He was put into Grade Three instead of Two. It was a mistake, but he's worked hard enough that he's covered it. He's starting to level out a bit, because he's just now starting to worry about social things as well as the academic. He's at the point where he's noticed girls, but he won't admit it yet ... it's hard for him, because he's used to being the top in *everything*. He doesn't realize that it's okay to stay around the top—that he doesn't have to be the very top in absolutely everything. He tends to feel that whatever he does, that maybe it would be better if he did some more... Like, he will get something in his head and just go and go and go. A good example is our "Opera Intramural", where everybody had to do one activity out of a number of them. Stewart did *every* activity, some of them two or three times. Whereas every other kid in the room got five points for their house, he got *forty*! ...He writes exceptionally well .. it's his biggest strength ... He's

> quite shy, but when he gets involved in what he's doing, the words just pour out. Also, his manners are beautiful ... impeccable. He believes in letting the other guy go first—not in a downtrodden way—he doesn't hesitate to stick up for himself. I mean he's just a really nice guy ... considerate of everybody else...And the kids respect and admire him.

- Jayne - was a girl of twelve, described by her teachers as being slightly above average in ability. This is reflected in her test scores, which indicate that the non-verbal area is her strongest. Report card observations indicate that she had put forth considerable effort during the final school term, and that her marks had risen accordingly. Several comments establish that she had improved at completing assignments punctually. In system achievement tests, Jayne scored slightly below city and school means in Social Studies; above both in the other subject areas. Her teachers' observations included:

> Academically she's got good ability. Jayne's slow and methodical with what she does. But she's got to be motivated, whether it be [from] home or school or somewhere else to turn her on ... she was letting a lot of assignments slip in the time just before the computers [research project] started. This last term ... the computer thing was the best thing that could have come along for her, because we told her that if she didn't keep up with her other work, she was *history*. And she brought up her marks considerably this last term ... She gets along really quite well with other kids. She has a lot of responsibility at home. She comes from quite a large family. I think maybe that's why she's so empathetic. She makes a point of making sure that everybody's included...she keeps a sharp eye out for lost souls. She can be very kind—not in a "Look at me being kind" way, but quietly ... She wasn't feeling very happy about herself at the time when the [study] started,and it brought her out of herself ... it's the best thing that could have happened to her. It made her realize she could do things that she didn't think she could do ... I really think that's the reason she did so well this term ... socially as well, because it gave her confidence. If you noticed her today, she had her shoulders back when she walked up to get those awards, and her head high ... She wasn't like that this winter ... So I think that was really good for her, that she could do all those [computer] things for herself, and solve those problems herself.

- **Roy** - was a boy of eleven and a half, designated by his teachers as superior in ability. Test scores indicate that he is close to that range. Roy attended a program for gifted students in Grade Four; in Grades Five and Six the school received funding that enabled Roy to participate in an Academic Challenge program. His report card comments on his intellectual ability and high achievement, on the excellence of his art work, and on his good sportsmanship and leadership qualities. There are several comments on his less than satisfactory organizational skills, and on some overexuberance in his behaviour at times. System test results reveal that Roy scored above the district and school means in all four core subjects, with a near-perfect mark in Mathematics. His teachers, in part, related:

> Roy is funded as an Academic Challenge child—gifted ... He and Stewart are the only two Grade Sixes who qualified. He is very bright ... his vocabulary and world, general knowledge isn't as broad as some of the other kids, but he makes up for that with a lot of ingenuity and by—as soon as he comes across a new concept or word—SNAP and he's got it. Socially, he's seen as being likeable but somewhat eccentric. The other kids like him and accept him. He has a lot of social contacts, but he doesn't really get close to the kids in his class. He and Stewart got together because of the Challenge program, and they're friends here at school, but they don't chum outside [the school environment] ... Roy has leadership qualities about him, like he [illegible]ows how to play fair. When they're playing out on the field, if there's an argument, he's the one who'll say, "Come on you guys...let's quit and get back to the game." ... The other kids respect him as a referee. They'd rather have him...than some other kids. He's pretty good in judgement. He goes in spurts. He does have ability in whatever he tries, but he has some problems getting his act together and sometimes finishing things ... he hasn't learned that as a value thing yet ... So in some ways he's still immature ... and in others he's way ahead. Like, he's not afraid to speak up and say what's on his mind. And when he senses an injustice, especially if it's against someone else ... I'd like to meet Roy when he's a man—he could be someone pretty special.

Description of the Time Frame

The time frame for this study extended from March 13 to May 25, 1987. Sessions consisted of three one-hour periods a week, the last hour of the school day, coinciding with regular classroom Language Arts instructional time. A total of twenty-four sessions took place; attendance was compulsory. Supplementary computer access time was arranged at noon break and after regular class hours, at the request of the students. Attendance at these extra sessions was strictly optional.

Description of the Physical Setting

The computers were housed in an unused classroom adjacent to the library. Hardware consisted of seven Apple Computers, four of which were 64K and three of which were 128K. Additional hardware included five green and two colour monitors, a Gemini printer, a joystick and two koala pads. The computers were grouped in two clusters to expedite taping of student dialogue.

Description of the Software

The tactical tool software packages used in the study were chosen on the basis of suitability to the grade level and task demands, ease of use and cost. Reviews from a number of evaluative publications (EPIE, Digest of Software Reviews, Alberta Education Computer Courseware Evaluations, Edmonton Public School Board Computer Software Evaluations) were cross-referenced, and a shortlist of the recommended packages that appeared to be most germane was drawn up. Copies of those programs were secured and assayed against the criteria that had been established. In cases where several programs were adjudged to be roughly co-equal in light of study intents, the less costly item was selected. The rationale was not one of personal expediency; rather, given the costly nature of many software packages and the budget restrictions of schools, the concern was to choose the best possible software at a reasonable cost. The list of software ultimately selected for the study is *not* intended to be definitive; rather, the list could as easily be generic—given that ease of management is appropriate.

A total of nine software packages were introduced and made available to the students as tactical tools in the course of their language activities. *Dazzle Draw* (Broderbund) is a graphics facility which can be operated with joystick, mouse, graphics tablet or koala pad peripherals. It has the capability of producing images or limited text on-screen or in hard copy. *Magic Slate* (Sunburst) is a word processor designed expressly for children. It includes a 20-, 40- and 80-column format. *Stuff and Fetch* (MECC) is a data base management application which arranges data in a file card configuration. *Think Tank* (Living Videotext) is an outliner which is capable of organizing information into tiered levels, and printing it out in several formats. *Appleworks Spreadsheet* (Apple Computer) is a utility designed primarily for use by adults. It allows the entry of data into a "ledger sheet" format, where calculations can be carried out. *Easy Graph* (Grolier) is a computer graphing tool which can formulate data into pictographs, bar graphs or pie charts. *Survey Taker* (Scholastic) is a tool which enables students to design and produce a survey, and to interpret results in table or bar graph format. Surveys can be printed out or completed at the computer. *Bank Street*

Storywriter (Mindscape) is a tool which requires a joystick or koala pad in addition to the keyboard. The format is that of a book, with pages that "turn". It has both graphic and text capabilities; images appear onscreen in the order in which they were executed. *Sensible Speller* (Sensible Software) is a program that proofreads word processing and offers the option of correcting spelling against a Random House dictionary.

Description of the EX_5 Tactical Tools Learning Model

It was necessary to devise a delivery system for implementing computer support of literacy learning in the study. Since the Treffinger Teaching-Learning Model (see Chapter II) most closely approximated the format and process that was envisioned, it was used as a point of inception for the **EX_5 Tactical Tools Learning Model** (or more simply the **EX_5 Model**). The name is derived from the five encompassed levels: **I. Experience, 'II. Experiment, III. Explore, IV. Expand,** and **V. Execute.** The EX_5 Model was formulated for the delivery of a structured and sequential methodology. It has the express purposes of introducing tactical tool software to students, permitting hands-on exploration of tool capabilities, and providing opportunity for them to utilize those capabilities in support of their literacy learning. It is designed to facilitate the gradual assumption of control by the student in exercising judgements, examining alternate cognitive strategies and choosing tactics that suit individual literacy learning purposes. Computer support may be utilized as the learner sees fit.

The objective of the model is language learning; the computer is seen as a tactical agent to support and enhance learning strategies. Together they form a single strand:

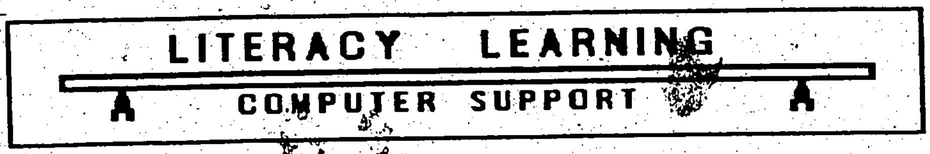
LITERACY LEARNING
COMPUTER SUPPORT

Figure 2 ♦ Computer Support of Literacy Learning: A Single Strand

The two purposes, then, are interlocked and non-discrete. Since in practice they are a continuum—they have no concrete beginning or ending points, they could be visually represented in a Mobius Strip configuration:

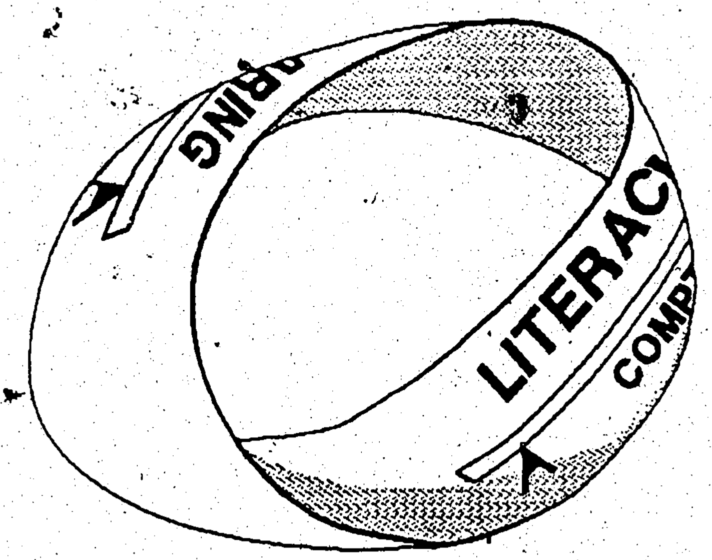
RNING
LITERACY
COMPU

Figure 3 ♦ Computer Support of Literacy Learning: A Continuum

There are five arbitrary stages in the EX$_5$ Model, shifting from teacher control of proceedings to individual learner control of decisions affecting the direction and format of the learning activity.

■ EX$_1$: EXPERIENCE

At the outset, the instructor retains the initiative for the type and pace of the learning that takes place. Examples of strategies employing tactical tool software are demonstrated in which data are organized and processed in formats that the students recognize and understand (see ensuing section). At this stage, then, students simply experience the capabilities of the different tactical tools, a[illegible] are encouraged to ask questions and discuss what they have seen. The children are assured that likely they will not want to use all of the applications, and that they will be able to master necessary techniques as they need them.

■ EX$_2$: EXPERIMENT

During this interval, [illegible] specific tasks are outlined. Students are allowed simply to dabble with the software tools, and to exercise trial procedures of their own devising. Students are free to request help from the teacher, to confer with each other, or to consult prepared *maps* (see ensuing section). The objective at this stage is simply for students to experiment with some of the new tools that they have seen demonstrated.

■ EX$_3$: EXPLORE

At this stage, small tasks (see ensuing section) are introduced consisting of a selection of brief exercises that the students are asked to carry out. As much as possible, these tasks are integrated with regular curricular material. The objective of this level is to allow students to **explore** some alternatives as far as what learning they will undertake, and what approach and tactical tools they will use in so doing.

■ EX$_4$: EXPAND

This is the only level at which there is direct instruction. The concepts to be taught are introduced and discussed in a group setting, in as succinct a fashion as possible. (In the case of this study, those concepts involved research skills—see ensuing section). Based on the resources available and student interests, consensus is reached on a topic for group research that is mutually acceptable. Students then choose a segment of the topic and collect the necessary resources. This can be done on an individual or small group basis. The students then instigate their individual strategies for amassing and organizing their data. They are free to make use of tactical tool software or not as they see fit. The aim of this level is to enable students to **expand** on their previous knowledge and to be actively involved in acquiring the designated concepts using their own language and approach. Within the specified boundaries, students are encouraged to take control of their own learning; the role of the teacher is that of collaborator and facilitator. Students may also use the maps, or to consult with their peers. The final product could be in a defined format, or, as in the case of this study, it could be left to the children to decide how their product will be presented.

■ EX_5 : EXECUTE

At this final stage, students assume control of the subject matter, direction and strategies they will employ in the course of the activity. Subject matter could be confined to one curricular area, or, as in the case of this study, left to the students to determine (see ensuing section). They are autonomous in the choice of the specific topic to be investigated, and in the strategies they will utilize in locating, collecting, organizing and presenting their data. At this level, as well, the activity could be carried out in a group or independent mode. Again, the role of the teacher is that of expediter and consultant. Students are free to confer with peers or refer to the materials previously mentioned. The intent of this level is to allow the learners to execute a literacy learning activity under their own aegis, employing the principles and skills they have gained and mastering new ones as they progress.

As noted, the stages are arbitrary. There is no specific intersection where, for example, experimentation stops and exploration commences, or when expansion ceases and execution is activated. During any stage, the teacher might demonstrate some software capability, allowing the student to experiment and apply it if he/she thinks it apropos. Nor is the outset the point at which all software need be introduced. Young learners would in all probability be confused by such an inundation of new information. Rather, as students become familiar with several pieces of tool software, the initial stages are repeated as more tactical tool software is presented, and the stages in effect become intertwined. Thus, the "Mobius Strip" representing language and computer representation of the EX_5 Model culminates in the configuration:

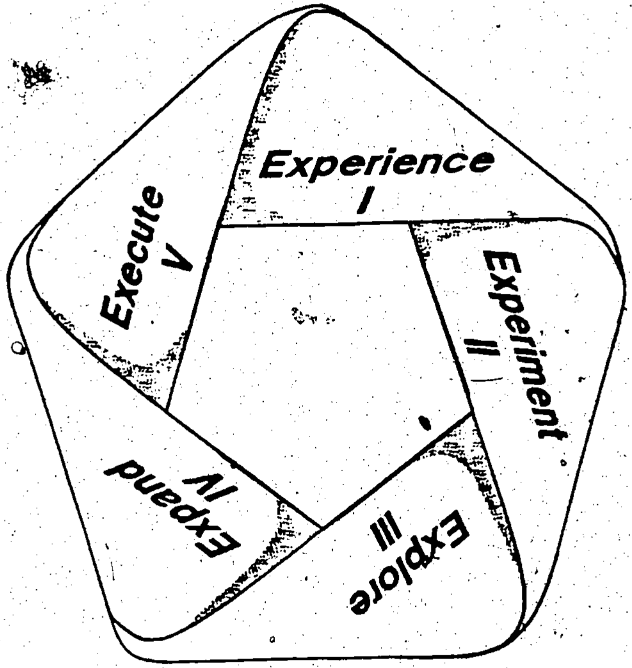
Experience
I
Experiment
II
Explore
III
Expand
IV
Execute
V

Figure 4 ♦ The EX_5 Tactical Tools Learning Model

Implementation of the EX_5 Model in the Study

■ EX_1 : EXPERIENCE

In demonstrating the various tactical tools, care was taken to use data which were familiar to the students or which drew on their personal preferences. Illustrations presented in this study included:

deities of the ancient Greeks;

- a story in progress on the word processor in which various changes were made in the text;
- identification and correction of spelling errors in that story with a spelling checker;
- a whimsical depiction of "Little Red Riding Hood" on the storybook tool;
- organization into various graph formats of data on the numbers of books read by fictitious students during a Book Week contest;
- a spreadsheet configuration tabulating weather data;
- a survey under construction about which "gross" food combinations the students preferred, based on student suggestions;
- demonstration of artistic and text capabilities in the graphics tool; and
- an outline featuring ratings of various entertainment forms, with several entries under the subject heading "Television Shows".

Emphasis was placed on the organization and manipulation of the data. As the students became acquainted with several of the tools, suggestions were elicited as to how different tactical tools could have been used to manage each data sample. Although correct technical terms were used by the teacher-researcher, these were kept to a minimum; student misnomers were not corrected.

As indicated, not all the tactical tools were introduced simultaneously. At the outset, the data base management, graphing and graphics package tactical tools were demonstrated. Students were then given the opportunity to experiment with one or several items that interested them. Next, the outlining, word processing and survey tools were introduced and students once more had the opportunity to choose any of the pieces they had seen thus far, for hands-on experimentation. The last tactical tools introduced in this fashion were the storybook, the spreadsheet and the spelling checker utilities. The students were assured that there would be time for them to try any or all of the software as the project progressed if they so wished; that there was no necessity for them to try every item before events proceeded.

Newman (1985) recommends the use of "cribsheets" delineating only the most essential commands to facilitate ease of software use by neophytes. In this study, these sheets were described to the students as "maps" which might provide assistance to them if they encountered difficulties. Since the purpose of the project was not to foster mastery of software, utilization of the maps was not stressed; they were merely offered as one option available when uncertainties arose.

Once the students had had some experience with the software, discussion took place as to what they had done, what had appealed to them, and so on. Difficulties encountered were also discussed, with feed-in from peers and instructor as to how the problem might have been solved.

A set of twenty-four task cards was placed in a central location, and students were informed that several sessions would be reserved for them to work at the literacy activities depicted on them. The cards simply designated specific tasks—no suggestion was made as to how the task could be carried out (see Appendix A). One of the cards gave students the opportunity to devise their own tasks. Use of any of the tactical tool software was optional; several of the tasks were deliberately designed so that use of the computer would be of hindrance rather than assistance. It was possible to carry out all of the tasks with pencil and paper. Students were given free choice as to which activities they would attempt, and there was no requisite quota. They were free to work independently or in conjunction with others. At the end of the stipulated time, group discussion took place in which students discussed the strategies and tactical tools they had employed to carry out their chosen tasks, as well as the difficulties they had encountered and how they had solved them. Others were encouraged to comment and make suggestions. Several of the tasks that had not been undertaken by any of the students were also discussed in light of what tactical tools or methods might have been used to carry out the activity.

■ EX_4 : EXPAND

One instructional session was held in which note-taking was discussed, and sample excerpts from reference sources were examined for key words or phrases. Also discussed were methods of organizing the information into headings and sub-headings. Students were encouraged to enumerate ways in which the tactical tool software might be employed to facilitate the activity. The notion of group research was introduced, and the participants were informed that it was necessary to determine a topic that was mutually agreeable. It was pointed out that important considerations included the amount of reference material available on that topic, and opportunity afforded for division into subtopics. The students explored the library for possible interest areas. At the next session, each student in turn brought up and discussed one or two suggestions, and each was examined in light of the criteria. The teacher-researcher suggested the Middle Ages as a potential topic, based largely on the resources available and the scope of the subject. Students were told that if their topic was not selected, they could pursue it during the EX_5 stage. At that point, two students withdrew their topics, reserving them for individual pursuit. The students voted unanimously for the medieval topic. Reference materials obtained from the library, and after some perusal, the discussion turned to subtopics. Each student selected a theme from those generated, determined a strategy, and gathered appropriate resources and software. At the next session, the instructor brought supplementary reference materials from an outside source. As students worked, a good deal of peer conferencing ensued, as well as assistance by the teacher-researcher. An effort was made to be as non-directive about strategies as possible. Students were given four sessions to proceed as far as they could, as well as the option to work at their activity during supplementary computer-access time. As a culmination, an evaluative discussion was held at which the students in turn presented their notes, explained their strategies and use of tactical tools, and described the difficulties they had encountered. The Principal was invited to sit in as a third party, and to pose questions from the point of view of a novice in the area of computing. This required that the students elaborate and verbalize more fully about *what* it was that they had done, and *how* and *why* they had done it. Discussion followed each presentation about possible formats, alternative strategies that might have been employed, and how difficulties might have been resolved. Finally, the issue of a bibliography was raised, a format was introduced; several of the resource books were referenced accordingly using the word processor. Each student was given a copy to use as a guide in his/her own research project.

■ EX_5: EXECUTE

At this final level, control of subject matter was turned over to the learners. The students were free to select a topic in any curricular area which interested them. They were informed that the method of gathering and organizing material was theirs to determine, as was the choice of presentation format. The selection of tactical tool software was made available if they wished to use them. They were asked to provide a bibliography along with their project. The teacher-researcher during this stage made every attempt to be as non-directive as possible; her role was that of counsellor and expeditor. The librarian made herself available for consultation on possible topics and approaches, as well as assisting in locating resource materials. Students were encouraged to seek reference materials from outside sources in topic areas where the library selection was limited. Ten sessions were allocated for this work; some supplementary computer-access time was provided outside of session hours. The classroom teachers additionally afforded opportunities for the students to access the computers as class schedules permitted. Students who finished their projects in less than the allotted time were given the option of returning to regular classes, assisting other students with their projects, or pursuing further task activities or experimentation with tactical tool software. Upon completion of the projects, a final discussion was held during which students explained their use of tactical tools to pursue their research, and again suggestions were elicited as to alternative strategies that would have been possible. Two [illegible] computing experts" were invited to take part in the session; one with an academic background, the other with a commercial orientation. The students were given the opportunity to present their results to their peers in Grade Six, along with explanations of how they had achieved their results. Further presentations were made to the Grade Five classes. Finally, family members were invited to an evening session, at which students described their participation in the research project and displayed their final products. At all presentation sessions, opportunity was provided for audience questions and comments; these were fielded by the students.

Collection of the Data

During all regular and optional supplemental sessions, the computers were situated in two groups of four and three respectively. Two tape recorders were placed in suitable locations, and all dialogue was recorded. Students were required to keep a personal diary or journal describing the actions they took, and their rationales for doing so. As well, they were asked to record any personal feelings or opinions they had about what they were doing. A entry for each session was compulsory, to be completed during the last few minutes of each session or as a take-home assignment. At the EX_3, EX_4 and EX_5 levels, hard copies of the final products were preserved by the researcher. Recordings were made of presentations to peers, to outside computing "experts", and to parents. Follow-up interviews were held with each student, with a view to eliciting impressions, attitudes and interpretations of his/her participation and achievement in the study. A group interview was held with the classroom teachers in which descriptions and characterizations of ability and aptitudes were sought for each of the subjects in the study. Permission was obtained to access student records and report cards. Parent feedback, on either a written or conversational basis, was noted. A set of detailed field notes were kept by the teacher-researcher and were submitted at regular intervals to an advisor, providing the basis for ongoing discussion.

Analysis of the Data

Recordings of the first ten sessions were transcribed *in toto*. During this interval, the research questions were narrowed and refined. Once the comparative case study format (see Preface, Chapter IV) had been selected, *all* succeeding recorded passages involving Holly were transcribed and subsequently coded. Additionally, for the other six subjects, transcription was done of student talk which touched on the research issues. For these latter fourteen sessions, the researcher audited the tapes for each in their entirety, making notations of relevant passages; these were then transcribed and coded. Transcriptions were made of student presentations to peers, computing "experts" and parents on the same basis. Journal entries and researcher field notes were also examined, coded and added to the data. Teacher characterizations of the individual subjects were transcribed in their entirety, and later edited with a view to selecting comments that were representative and reflective of those tendered.

Data were coded and reduced on the basis of methods suggested in Miles and Huberman (1984), and Bogdan and Biklen (1982). The coding categories were designed to incorporate the main research questions and each of the related issues. Data were then extracted and organized using capabilities and facilities built into a commercial word processor preparatory to final analysis.

Chapter IV consists of a detailed account of study proceedings and an analysis of the accumulated data.

CHAPTER IV

ANALYSIS OF THE DATA

Preface

In using a methodology that drew on multiple sources of data, I amassed a formidable volume of talk, writings, products and teacher-characterizations of each student. My original intent was to present seven case studies. In light of the scope and richness of the data base I concluded, due to space and time constraints, that the account of each student's experience at best could be treated only superficially. I opted instead for a comparative case study approach (Bogdan and Biklen, 1982), in which the data profiling one student were singled out for detailed examination. Comparative or contrasting notes were furnished by the data on the other children. This technique, I felt, would better convey an in-depth characterization of the student experience.

This comparative case study mode predicated a difficult choice. The experience of each child, to my view, had been unique and worthy of study. But some criterion had to be used. In scanning the data, Holly appeared to be closest to what is arbitrarily designated as the "average" range, based on standardized test results and teacher assessment of ability and independent study skills. For that reason, Holly was selected as the central case study. That her use of software and strategies was imaginative and diverse made her selection appealing, but was not a determining factor. Neither was gender a *criterion, although I viewed the fact that Holly happened to be a girl to be auspicious, in light of current questions in the literature about gender in computing (Chen, 1986; Becker, 1986; Sanders, 1985).*

I concluded, due to the developmental nature of the children's experience, that the data on Holly and her peers could best be presented in chronological sequence. Further, I decided that in reproducing students' journal entries, they would be depicted as written, without noting "[sic]" after each error.

Analysis of the Data

The data were examined, and those directly relevant to the research questions were gleaned (see description of methodology, Ch. III, p. 59). The excerpts were then divided into two subgroupings. One chronicled Holly's experience, the other pertained to the remaining six subjects. Guided by the research questions, Holly's use of tactical tool software in the course of her learning was examined. This chapter probes whether Holly was able to do so in a purposeful and productive manner, and reflects her attitudes about and perceptions of her experience. Following the focal case study, an overview is given of the other six children's synchronous strategies and products, furnishing some perspective on how different students responded at each level of the EX_5 Tactical Tool Model.

HOLLY: A CASE STUDY

° Information Session - Students

Initial contact took place with the seven prospective subjects in the library. The students were curious and a little apprehensive. Holly proved to be an energetic, slender, freckled sixth-grader, characteristically wide-eyed with anticipation. As the researcher had taught her in the third grade, Holly greeted her familiarly. Several students speculated about why they were there, and whether they might be in trouble. Holly declared:

> I don't think so. It's more probably—more likely because we're the students who keep up in class. If you'll be quiet, you guys, she'll probably *tell* us why she wants us!

It was apparent, right from the outset, that Holly was a young lady who did not hesitate to speak her mind. Her manner, which was relatively consistent throughout the study, was earnest, ingenuous and direct. She could be described as spirited, with a sunny disposition most of the time. While her moods could be mercurial, the researcher observed that after an upset, Holly swiftly regained her equanimity. She appeared to be a child who was sensitive to the needs and feelings of others; as such she was respected by teachers and peers alike (See teachers' characterization in Chapter III, pp. 38-39).

As the purpose and requirements of the project were explained, Holly's expression vacillated between delight and great seriousness. She had a number of questions, typical of those asked by all the students:

> When would it start? ... How much do we have to write in the diar—those journal things? ... How come you picked us? ... What will we be doing, exactly? ... What happens if our parents say no?

The students were assured that the particulars would be made clear as the project progressed. They were given a note inviting their parents to an evening meeting, and returned to their classrooms.

° Information Session - Parents

The project was explained to the parents in person rather than in a letter, allowing for questions and comments. Holly's mother proved to be familiar with the educational research process, and expressed enthusiasm at the proposed project. She was forthright in stating that in her view, the study offered the students a unique instructional and experiential opportunity. Other parents also voiced their support. A consent form was distributed in accordance with Edmonton Public School Board guidelines, and it was made clear that students could withdraw at any time from the project. Assurances were given that student and site identity would be safeguarded. The meeting concluded on a positive and optimistic note.

° Session 1

During the first session, it was determined that two children, including Holly, had access to home computers with tactical tool software. Both said that they seldom used the computer. Holly reported that she had not used theirs within the past year, and that she didn't know much about its operation. A third student mentioned that she used a home computer on occasion for rudimentary graphics programming.

The students were given a brief overview of the EX_5 Model and the activities at each level. Holly, like the others, had a great many questions:

> Are you recording this? ... *(With reference to independent research projects)* Will we do that after we know a lot about all this [software] stuff already? ... So, every week, we come here every Monday, Wednesday and Friday—we don't have to ask if we can come? ... Will you tell us our code names? ... Do we get to see what you write? ... How come we can't start on the computers today?

The students were encouraged to talk freely during the course of the project—both to their peers and aloud to themselves. The researcher told them that their talk would be recorded, and that she was very interested in what they had to say—with the afterthought that this was one case in which a grown-up *wanted* to hear what they thought. Holly remarked, "*That's* a switch. My Mom, you' tell her something ... and later on ... about ten minutes later she goes 'Were you saying something?'" Holly often made wry comments of that sort, to the delight of her peers.

As the first tactical tools were demonstrated, a great many questions and observations were generated. Holly was no exception:

> How'd that "X" get in there? ... It's a chart, right? ... This is big printing—how'd you do that? ... It would be fun to make the little pictures like your little smiley faces *(referring to printout of "Happy-Face" pictograph)* ... Are you going to show us that next? ... Will we get to make those?

The researcher answered only those questions which were non-technical and relevant to the EX_1 (Experience) level; this did not appear to dampen student enthusiasm. Holly showed keen interest, standing behind the researcher and watching the small computer monitor rather than the large television screen (affixed for clarity of image). Informed by another student that the screens were the same, she responded, "Yes, I know, but I want to watch what Ms. Fernet is doing, too!"

At the close of the first session, Holly's journal entry proved to be very specific about what had happened in class—a format that varied little during the course of the project, despite urgings by the researcher to include her thoughts and feelings:

> Today we learned how to do graphs on the computer. We watched Miss Fernet make a bar graph and a pie graph and we looked at a pictograph.

There was no reference to the data base management tool—Holly frequently omitted mention of events or activities. When asked about this, she responded, "Oh—well I only write about stuff I'm interested in or programs I think I can use."

Session 2

The second session unfolded in a manner similar to the first, with a demonstration of the outliner and the word processor. The outliner intrigued Holly; she was reluctant to have the demonstration concluded as not all the entries had been displayed. Time was then given for students to begin the EX_2 (Experiment) level. Holly and Jayne selected the outliner, working together for the stated purpose of reading the other demonstration entries. The researcher suggested that the girls generate some of their own. When the program proved to be more difficult than the girls had anticipated, Jayne characterized it as "dumb" and the girls elected to quit. Holly asked if they could get assistance with it at the next class, and was told that they could. Holly informed the others that her program had been "... hard ... but it was neat, though!" She stayed after class for the optional extra time, as did most of the students. (Holly took advantage of all optional computer access times save two during the project. Even when expressing frustration at events during class, she rarely failed to use this extra time). Holly's journal entry stated succinctly: "We looked at some more programs. We even tried some programs on the computer. I did some work on the computer with Jayne."

° Session 3

At the third session, the survey-taker, the graphics package and the storybook facility were demonstrated. Holly, like her peers, was enthusiastic, offering numerous comments and questions:

> That [mirror capability] would be good in Math for lines of symmetry! ... That one's neat—look at the shadows! ... Are you going to make a swirl that goes into the centre? ... Neat-o! ... How did you do that? It's sorta like where you did that background, and then you put in that black space ... and then you typed in it, right? ... Can we see some of the other stories? I want to see Riddles. Aw! ... Liver ripple ice cream. *(Laughing)* Aren't you going to pick liver ripple ice cream? Gross! ... Do I get a turn to pick? ... Can we make up some more yukky foods?

During the time given for experimentation, Holly chose the graphing tool that she had seen during the previous class. She made a pie chart of her projected activities for that evening, requesting considerable assistance:

> Now what do I do? It says "Can you compare eight activities?" on my chart. Can I just put five? ... It doesn't like me ... How can I put 4 o'clock on this? Just 4 PM? ... I can't put one hour ... How do I show minutes? ... Can I print my graph?

° Session 4

Holly reported in gratified tones that her parents had liked her pie chart done at the previous session (see Appendix B, p. 149). She added that her father had showed her how to operate *MacWrite*; she had used it to write her journal entry:

> **MY JOURNAL** H E
>
> **I was very interested in the Survey Taker and I'd like to be able to use it. We looked at some more different programs. I liked the story book program alot. The Dazzle Draw Program was very interesting but we have something like it at home though. It's called Macpaint alot of the names of our disks start with Mac because we have a Macintosh computer. I just worked worked on it as you can see. It's more fun than I thought. I haven't been on it for about a year or so. I sort of forgot about it but I won't be forgetting about it from now on I don't think.**

Her comments suggest that Holly was already experiencing transfer of what she was learning at school to the machine at home, and that she was beginning to view the computer as being a useful agent in achieving her own purposes. Holly's homeroom teacher later related that she began to complete the occasional classroom assignment with it at about this point. She continued to use the home computer occasionally throughout the study.

At the outset of the EX_3 (Expand) level, Holly was anxious to start on the task cards. During the preliminary explanation, she fidgeted a good deal; her impatience was reflected in her talk:

> Are we allowed to use the computers yet? ... Um, how many of these will we get each, and will we get to choose our own ones? ... Can I—can I have that one? ... Can we get them now? ... Okay? ... Okay, now?

When the students began their hands-on tasks, Holly opted to work alone. She chose a task card dealing with television show reviews (see Appendix A, Card 8). Recognizing that the task would fit into the existing demonstration format on the outliner, she asked if she could simply add to the sample entries. In this first attempt, Holly, like her peers, relied very heavily on teacher-assistance. She was more persistent than most; as she encountered difficulties, she asked for help regardless of whether the researcher was free or not:

> Miss Fernet? ... Miss Fernet, what is this? ... What does this mean? It says "System date is now March ..." Miss Fernet? ... Will it keep widening because I've got lots ... Do I just put, like, A. and then blah, blah, blah? ... Miss Fernet, how do you spell mystery? ... Is this going good so far? Miss Fernet? ... Miss Fernet, for this I forgot to put a space, so how do I go back there without erasing everything? ... Miss Fernet, I'm finished one. Come and see it ... Miss Fernet, see mine? Is that good?

Nancy responded to one question, suggesting that she push the Return key to see what would happen. Holly did so only after checking with the researcher. When she had added two entries, she expressed satisfaction with her product (see Appendix B, p. 150).

In considering Holly's language, quite typical of that used by all of the stu[illegible] the first stages of the project, it is important to note that it contained [illegible] requests for direction in the form of "*Can I...?*", and "*Do I...?*". [illegible]se stages, control still lay with the instructor; the students were reluctant to take the initiative or make decisions without prior corroboration by the researcher. Although Holly was heavily reliant upon teacher direction, she did not seem to be unduly frustrated by it. Her journal entry for the day noted:

> I got to work on the computer today. I had alot of fun. I had to pick out of a whole bunch of things. I picked one where you worked on the program called *Think Tank*. I made two reviews on my favorite T.V. shows. I'm looking forward to next class. Next class I might even get to go on *Dazzle Draw*. When I was working

Session 18

Holly brought in the tallies for her survey questions, and spent the first part of the period totalling them. She then selected the graphing tool, remarking "This'll be easy because I already did it." She realized shortly, however, that she was uncertain about how to formulate the graphing ratios. The researcher suggested an approach. Holly worked for a time, then asserted:

> Miss Fernet, we've done this wrong ... like comparing the students' knowledge to the number of students. They're in the wrong place ... You can only do six that way ... I was going to put the questions down and then the answers. The way you showed me doesn't work ... It would be maybe better to make a graph for each question, wouldn't it?

The researcher acknowledged the error, and pointed out to Holly that she was becoming quite knowledgeable about what she was doing, complimenting her on her insight. Holly noted to Jayne, "Did you hear that? Ms. Fernet was wrong and I was *right!*" She worked steadily for the remainder of the period and for nearly an hour after school, completing and printing out six graphs. She neglected to complete a journal entry for the day's activities.

Session 19

At the next class, Holly again worked on her graphs. Her language reflects satisfaction with her progress:

> Last time in the period I did six graphs. I was just getting used to the program. I expect to probably get a lot more done today ... I'm going to print this out now. I went back and changed that part that wasn't right ... Now they're going much faster, now that I know what I'm doing, sort of ... it's finished printing, so now I can go back and start another one. This is going more quicker!

Holly managed to complete the remaining ten graphs during the class and supplementary time. Her journal noted "Today I finished my graphs. I decided to do a report at home and the graphs and survey at school."

Holly's demeanour was one of increasing self-confidence and self-reliance. She was developing a stronger sense of purpose and more lucidly-defined goals, which were reflected in her language. She was still requesting assistance, but it was more in the sense of *"This is what I want to do. What would be the best way to go about it?"* From Holly's perspective, the instructor's role had become less one of supervision and more one of collaboration.

° Session 20

Holly brought in the first draft of the text to go with her survey results, saying:

> I stayed up until eleven last night finishing the [text] and my bibliograph—bibliographies ... Now I still have to add in the myths and the survey results into this and lots more of information. But I got this much done at home on my Macintosh. (see Appendix B, p. 153).

On being told that it was not necessary for her to put in such long hours at home, as she had plenty of time, Holly replied:

> Well yes, I know, but I want to get done in case I have a whole bunch of stuff I want to put in at the end. I'd rather get done ahead.

In conference, inconsistencies and missing information were discussed, as well as the need to re-organize her material so that myths and real information were separated. When several markings were made on her draft (see Appendix

B, p. 153), Holly expressed dismay. While she readily agreed that she would be printing a clean copy after her revisions were done, she nevertheless made her notations of intended changes on a separate piece of pape . Holly indicated that she had given some thought to what she would do next:

> I want to reserve Miss Fernet for after you, Roy ... If you're talking to [Roy] now, maybe I could start doing this. I brought a plain copy of the survey, and I could start cutting [the questions] out and fitting them on ... My Mom has had experience with this type of thing. She said this tape doesn't show up on the photocopier ... I'll just cut them out into squares and get a paper clip from [the librarian] .... I also have to go search down some books. The encyclopedia—I didn't get its bibliography ... and I still need some more information.

Holly worked at cutting out the questions, and then spent the remaining time in the library. Her journal noted:

> Today I edited my work that I did at home and talked to you. I also got some more bibliographys. I glued and taped my graphs at home and did a bibliography plus I started a report and printed everything out. Now I have to edit the report on the computer and I have to had in the myths and the survey results.

Session 21

Holly brought in her second draft, elated about the additional information she had found and the revisions she had made on her home computer. Roy corrected her inappropriate use of the word *bibliography*, pointing out that "the whole thing is one single bibliography". Holly readily applied her new understanding in her remarks:

> I went really quickly with [using the] *Cutting* and *Moving* ... and *Pasting* [facilities]. I didn't even do everything all over. Remember you said that this was just about vampire bats, so I went through and everywhere it said "bat" I put in "vampire" in front of it. I just inserted the new parts I added and *(makes whistling sound)* printed it out ... I showed it to my Mom last night ... She said it's

> looking good compared to what it looked like [before] ... I'm finished my whole bibliography already .... because all I had to do was add the python one. The other stuff was already done.

It appeared that she was transferring back and forth concepts acquired in the school and home settings, merging her perceptions and understanding of her experiences into one "computing" schema.

Holly checked her text for words that in her view did not look quite right, consulting with classmates as to the correct spellings of several words. In conference, the amended text was discussed, and final editing notations were made. Holly announced that there was little she could do on her project at school, and spent the remainder of the period talking to and assisting her classmates. When Todd requested help in moving a block of text, the researcher suggested that Holly work with him. She did so, beginning with, "Now, let me demonstrate. Watch what I do. Okay, now you just put the cursor here, and..." Her journal entry consisted of the single sentence "I helped the other kids today and talked."

Session 22

Holly came to the class saying that her report was all but complete, and that she had not yet printed out her final copy. Stewart remarked that what she had was very brief, and she replied, "I have to do it on two-space, though. It'll make it a lot longer." She considered possible additions:

> How about—for an ending, how about "People believe myths of things that aren't true about these animals, and they think they're gross, and they don't like them but it's really that there's nothing wrong with them." But I know, like one time I was at this place and it was so weird to watch bats, like sometimes they'd shoot right down at you and then curve up and you're just standing there and it just sent shivers down your spine, even though I *knew* they

> wouldn't hit me I was still quite scared. It just looked so weird ... Cats would attack you if they were mad, but a bat wouldn't.

She went on to relate that:

> Everybody's mad at me. Everybody says they remember the day I was all frustrated and they say now I'm the one all done ... They say it's not fair because I have the Macintosh at home, but *I'm* the one who did all the work!

For the balance of the period, Holly assisted Jayne in setting up her survey graphs in the same fashion as her own, and chatted with the other students. There were no journal entries required of the students that day.

Session 23

Holly arrived with her report in hand. She related that she had decided against making additions, and had simply printed out the final copy. When given a choice of a final consultation or leaving it the way it was, she opted for the latter, saying, "I think it's good the way it is." She observed that several others were preparing title pages, and decided that she would do one as well, using the graphics tool. She regarded her finished product with great satisfaction (see Appendix B, p. 154-60):

> It's all here. Now I can go and show it to my Mom and get all my congratulations. Like from that dental commercial, where she runs in and "Oh look, Mommy, Daddy, Look," and she shows them the card!

In the time remaining during the session, Holly covertly created a "thank-you card" using the graphics package (see Appendix B, p. 160). She said nothing about its existence, leaving it to be discovered by the researcher at a later date.

° Session 24

Holly made the decision that during this final session, as the others worked at finishing up, she would "... stay in the classroom and see what they've been up to." She did so with the researcher's consent.

° Post-Session 1

The students were given the opportunity to share with peers and teachers from the two Grade Five and two Six classrooms their experiences in the research project. The students gave brief descriptions of the various software tools' capabilities. Each participant then described the specific strategies and tactical tools they had used in the course of their work. Holly's account both times was relatively brief and straightforward. She interjected comments frequently as the others spoke, clarifying and adding detail when she thought it appropriate. As Nancy prepared to run her video scrapbook for her classmates, Holly informed the audience "You're really going to like this!"

She noted that one difficulty for her had been "...getting my information sorted out and organized in the right places." When asked how the study subjects had been selected, Holly's impish response was "Miss Fernet told us it was because we were the best looking!"

° Post-Session 2

At this session, two outside "experts"—an Education professor and a computer systems consultant—were invited to view and discuss the students' work with them. The format was similar to the previous session, with the exception that there was considerably more informal give-and-take, and more frequent comments interjected by the students. Holly volunteered [illegible] be the first to give her account. She recounted the strategies and tactical tools she had used in the EX_4 and EX_5 levels. In part:

> I made my title page ... I drew [the animals] myself ... I did the survey and I got the two Grade Six classes to take the survey ... I asked them first some feelings—how they felt about each animal, and then I asked them questions, like, myths about the animals to see how many people believed in the myths and how many didn't ... then I made them all into graphs ... and then I did my whole report at home because by the time I did my survey and graphs at school I didn't think I'd have time to do it here ... but what I ended up with is an introduction and then I told about the myths and what people believed about them and then I told the reality about each animal ... and then I did a bibliography with all the books I used ... what I did was, I'd get some information done, and like I'd come on Mondays and we'd edit it, and then I'd go home and work on it on Tuesday and then I'd come on Wednesday and edit it some more, and so it worked out pretty good ... I sort of had a plan, and sometimes I'd get confused and I wasn't sure what to do. And if I was stuck in corners when I came, Miss Fernet would help me out. Like, she gave me the idea of telling about the myths first, and then doing the reality ... that's basically what I did.

In Holly's account, her language evinces that she had established ownership of her product and her learning. Further, in describing what she had done, she used her own personal language, almost devoid of technical references. Her purpose was not to display technological expertise or familiarity with specific programs; her intent, rather, was to account for the personal strategies and tactical tools she had selected with an eye to carrying out her learning goals. When asked if she thought the computer had proved helpful and beneficial in her undertakings, she was most definite in her response, indicating that it had enabled her to do things that would have proved too time-consuming to do otherwise:

> ... Like we have title pages and bibliographies and Jayne and me, we have surveys and graphs in them and regular reports you wouldn't

> have them in them. The regular reports you'd just have writing and that's it.

Further, she noted that in her view there were other advantages as well:

> ... Then you didn't have to write everything over a thousand times. Like, when you made mistakes, you just added things in, or ... you could take paragraphs and move them around. You could take them from being in the middle to the start ... like with mine, for the Middle Ages thing.

The teaching objectives had been to familiarize the children with the research and reporting skills involved in note-taking, the gathering and organization of information, the presentation of it in some acceptable fashion, and the preparation of a bibliography. Holly, then, did indeed make use of certain of the tactical tools available to her to manipulate data, analyze it, organize it and present it. Of far more significance in light of learning theory, she did so in a manner that was meaningful to her. Unconstrained by the limitations of tedious survey and graphing techniques, she was able to pursue a topic of interest to her, in a manner that was personally meaningful to her. She had been able to engage actively in her own learning, and to exert growing control over how she went about it; the points at which she used certain tactical tools and the manner in which she employed them were determined by her perceived need. In talking and writing about her experience, Holly made it clear that she viewed it as having been valuable to her, with the computer playing only a supporting role:

> ..I feel happy that I achieved something. I had fun, and I learned more about the computer. And I learned about the [three] animals I did. And then I did a report. I've never really done a full report like this ... and I did [note-taking] on the computer, and then by hand. And I [learned] how to just do it by point form. I got used to that after a while ... I learned how to organize [information] instead of putting the myths and the animals in and out of the reality and all that. And I learned how to organize it on the

> computer with the medieval ages one ... but this way was way funner and more interesting for me.

Holly's perception that she was firmly in control of the situation can perhaps be summed up most succinctly in her comment to the visiting professor, who commented that she didn't think *she* could use the variety of software that the students had employed in the course of their projects. Holly proposed, in all seriousness, **"Maybe we could teach you!"**

COMPARATIVE NOTES

Holly had been provided with a variety of tools from which to choose; she selected those she thought would best serve her in achieving her particular learning goals. Through trial and error, she derived a strategy that she felt suited her purposes. But what of the other six students? What solutions had they derived in answer to *their* literacy learning goals? By way of comparison it might be productive, in a much briefer overview, to observe how six other students approached the same learning situation.

- Scott

Scott, like Holly, displayed great enthusiasm toward the tools available to him. He almost always took advantage of available supplementary time, often being the last to leave—and then under protest. His speech was colourful and imaginative; words spilled out, tumbling over each other when he became excited about what he was doing. His journal entries were generally quite positive in tone, characterized by phrases such as **"we learned some neat new stuff...", "..really cool...",** and **"...today was interesting like every** other day...". He viewed the study as being great fun, and referred to his classmates as being "those poor guys back there having to work." He worked more closely with other students than Holly had (particularly with Todd), and his talk generally was more peer-oriented.

In experimenting at the EX_2 level, Scott quickly became proficient with the graphics tool, and wrote a short story with the word processor. At the EX_3 level, working at task cards with Todd, he made notes about dinosaurs on data b[illegible]ile cards, created an advertisement for "Onionola Cola", and tried th[illegible]s One Plus Two" exercise (see Appendix A, Cards 25, 24 and 3). He also t[illegible]d out the storybook facility, but was frustrated by his inability to control it to his satisfaction. He remarked in his journal: "*Bank Street [Storybook]* is hard and only a precios few can work it so I'll stay [off] of it because it's a major bore."

Scott's choice at the EX_4 level was *Medieval Medicine*. He began with the word processor, but shortly rejected that strategy in favour of the data base management tool. In his journal he commented on his progress:

> I sorta think that if you put a series of cards that are all linked to middle age medicine like doctors, schools, separate diseases and thier cures all on the same card it's a mess so I'll make a bunch of separate cards ... I was going at a good pace when I learned how to shorten facts like *people killed king bad ruler* and it's easy to understand and it takes less time ... I learned point form and I also learned I can put everything on one topic under the same heading.

Scott produced a series of data files with notes that became increasingly concise as he gained experience (see Appendix C, p. 162). His definitive comment on the material he had covered was "Boy, if those types existed today, the courts would be full of malpractice suits!"

Scott made several false starts selecting a topic for his EX_5 level project, ultimately settling on the topic *The Unknown and Unexplained*. He wrote in his journal:

> I have an idea on how I'll do it too. I am doing it in a different way than I did for the [EX_4 level]. My outline is sorta the same but I am goin to do it like a book for a finished product.

He later described how he carried out his project (see Appendix C, p. 163-64):

> ...the first thing I started off on [was] *Stuff and Fetch* ... I just like wrote out a card on each one—whatever it was ... on the top I put headings ... like "Sea Creatures" for Loch Ness Monster and Kraken, and "Hairy Beasts" for Yeti and Abominable Snowman ... and then I printed them all out. And then I went over to *Magic Slate*, and read off all the facts, and then what I did was start writing ... in paragraphs with all sorts of information. But, like, my stuff ended up sounding pretty boring, because it was just fact after fact, right? ... So I went back and I started putting in big words and things like that and tried to make it a little more interesting. ... Then I went into spellcheck to check out my spelling ... then I went in and added a little more information ... then I went into *Dazzle Draw* and I made a picture for each one.

Scott's strategies and choice of tactical tools were quite different from Holly's; his product, however, was as personally satisfying as hers had been. His post-study remarks, in the same rhapsodic vein as his earlier comments had been, reflected his pride of ownership:

> It's like you made a big accomplishment ... it's like you get to do all that stuff on your own, and you feel like "Wow, I did this all by myself". I feel good ... like when you finish something really big and it turns out that it's good, or you get a really good mark on a test.

Nancy

Nancy was very much a loner when she began the study; she was standoffish and diffident toward the other students. At first, she was sometimes contentious with the researcher; this gave way to a cautiously positive bearing when she had determined that she was, in fact, able to make choices for herself. Initially, her classmates remained at a respectful distance. With the discovery that she had some knowledge about computers, however, she was consulted more frequently as time went on.

Nancy experimented with the graphing tool and with the word processor. At the EX_3 level she wrote a humourous letter to a fictitious aunt, again using the word processor (see Appendix A, Card 1). In approaching the task of writing a story for a young child (see Appendix A, Card 22), she then discovered what was to be her forte. Possessed of unusually dexterous eye-hand coordination, she was able to use the storybook tool proficiently. As none of the other students were able to use it with any degree of expertise, it gave Nancy considerable prestige within the group. She responded to the praise in an off-hand manner, but later returned to the same tool in carrying out her final product.

At the EX_4 level, Nancy chose the topic *Medieval Homes*. Like five other students, she began with the 40-column version of the word processor. When the others changed their strategies and substituted other tools, she persisted through their attempts to dissuade her. As well, she continued to write her notes in sentence form, despite the general consensus that note-taking in point form was appreciably faster. Although she was assured it was not necessary, Nancy asked permission to take reference materials home, saying "I didn't really get too much information down. I only got the manor house done." When the assignments were presented, she indicated that she had done some of her work by hand. On inspection, the addition proved to be notes on homes of the serfs, neatly hand-written—*in point-form* (see Appendix C, p. 165). During the evaluation session, she related ruefully:

> ...I did mine the hard way, and I started out writing everything in sentences and stuff ... I thought it would be a lot easier, but it turned out to be harder ... I wanted more information , but it took up all my time trying to put it into sentences. I really got pushed for time, and then I went home and wrote them [in point form] ...

In a post-study interview, when asked how she thought she had learned her note-taking skills, she replied:

> I guess that I just wanted to do it the way that I thought it was best. And I thought they could do it their way, and I'll do it mine [but then] other kids had written so many of them, and I just kind of took a glance to see what theirs were like and see what they had put down instead of me.

Nancy was less than enthusiastic at the prospect of doing the EX_5 level project, because as she phrased it "I hate reading and I hate writing even *more*!". She professed to have few topics in which she was interested. In response to the researcher's question about what type of book she chose when she *did* read, she responded "..fairy tales and folk-type myths ... because I like the happy endings and I like the monsters." At the suggestion that she might do research on those monsters, her interest was piqued. She was even more enthusiastic at the notion of producing a video scrapbook, designed for primary students, about some of these mythical creatures. Ultimately she focused on boggarts, trolls, goblins and oni.

form organization from the outset without outside prompting (see Appendix C, p. 166). As she related it:

> ... First of all I went into the library, and I found around six or seven books on mythological creatures and stuff, and then I went with *Stuff and Fetch* and I made a whole bunch of notes in point form, and I chose four out of something like five or six creatures, and I just went onto *[Bank Street] Storybook* and I started drawing them, and stuff. And that's about it.

Nancy translated many of the descriptive details she derived from accounts in the materials into visual format. For example, she read about how trolls often disguised themselves as trees and rocks; she represented that information in the pictures she drew (see Appendix C, p. 168). At times, she drew up her own scenarios. From a description of goblins' dim-wittedness and clumsiness, she devoted a page to a picture of a goblin walking into a wall (see Appendix C, p. 169). Her peers in the study were enchanted with her presentation; at one presentation of her product, their comments included:

Roy: It's really hard with that little joystick ... I like his shoulders.

Todd: Wait'll you see what she did ... She's the best.

Scott: Wait'll you see what she did with hers. She makes mine look sick! I love this thing ... I never get tired of this ... Those eyes are awesome.

Jayne: That one is cute.... I like the feet ... *(Reads)* "His voice sounds like mud squishing through your toes or chalk dust filtering through a crack." Neat!

Holly: I like the head, but not the hat ... This is the best one.

> Stewart: And all of the colours ... See? Neat-o!

At first Nancy did not share her classmates' enthusiasm. She appeared to feel quite genuinely that her product did not measure up to the quality of the others', and she was self-deprecating about it:

> I feel that Scott and Todd and Roy are basically the smart people, and I'm one of the lower class, and they seemed to have lots of writing and reading and research into theirs, and I didn't really put very much into mine ... I think that Holly and Jayne, they did so much work. Like they would, sit ... at home and they would just work, right? ... they had survey results and they got a report along with them, and I just wrote three page stories, four of them, like ... I probably wouldn't be able to sit down and write a story, like Stewart and everybody else ...

After several audiences reacted favourably to her work, Nancy came to view her product more favourably, indicating that:

> I think that it's a lot better than what I could sit down and use a pencil with. I don't know why, it just is ... at my old school, I could never draw anything. Like, the teacher would always hold up the class' best drawings, and mine was never hung up—*never*! ... I feel, I guess, pretty okay about what I did here. I don't think I could have done better.

In Nancy's case, strategies and tactical tools were employed that suited her unique capabilities. She did a considerable amount of reading despite her professed reluctance. The selection of tools available to her allowed her, to use an approach which fulfilled her learning goals, which she found satisfying, and which afforded her a success that she might not have had using traditional means.

- **Todd**

Todd shared the common opinion that computing was "fun". However, his journal reflected more conservative and practical considerations:

> Do we have to buy our own blank disks? And how much is a quality floppy disk? ... I could of used *Easy Graph* for my Science report ... I think *Dazzle Draw* is useless. I only like [it] for fun. But *Stuff and Fetch* is the most useful ... Are you going to teach us to type faster? ...

As previously noted, Todd worked with Scott at the EX_2 and EX_3 levels. He appeared to share Scott's views about the software they used, but fretted frequently about his lack of keyboarding skills. On one occasion, he sat and typed a single word over and over. Then he summoned his classmates to watch how fast he could type.

At the EX_4 level, Todd chose to do *Medieval Law and Punishments.* Along with Scott and Stewart, he decided to switch from the word processor to the data base management tool. Todd was absorbed when he worked at the computer, often mouthing the words aloud as he keyed them in. As he later described his strategies:

> ...I used *Stuff and Fetch* and that's just for, like, writing it down really fast, and you can store it. And this is not really meant for sentences, just for like, facts and notes, and you put it on a card ... You have to title them ... and then if you want to keep it, you store it away. And then there's another card, and you write on several cards. If you want to retrieve it ... it comes back ... you can't write it all in small letters, because then it won't recognize it ... It's sorta dumb.

Like Nancy, Todd was dissatisfied with the amount he accomplished in the allotted time; he too took reference materials home and added to his notes, even having his sister type the copy so it would "go with the stuff I did on the computer" (see Appendix C, p. 170).

At the EX_5 level, Todd determined that he wanted to do research on Korea, because it was his parents' country of origin. He began taking notes using the outlining tool. In discussion with the researcher, he decided to focus on a comparison of the daily life of a Korean boy with his own. This led him into a format involving an exchange of letters with an imaginary Korean pen-pal. As he described it:

> ... my whole report is about letters, like back-and-forth pen-pal letters, from Korea and Edmonton, but I made the person in Korea up ... so, like I would do both people. And I would put facts about Korea in the returning letter from the boy in Korea, and then I would put some facts about Edmonton and Canada in the letters from me to him, and go back and forth ... ...to get to *Magic Slate* I did trial and error. First I did *Think Tank*, and then I thought it wouldn't work. So then ... I went to *Stuff and Fetch*, and then I tried that, but then I didn't need all that, like I would only use selected information, so then I went to *Magic Slate* , and I started doing my rough copy there. And I used *Magic Slate* to do all the writing and then fixed it up for good copy.

Todd was pleased with his product (see Appendix C, p. 171-73), noting that "... It was different from everybody's, but I like it ... it's pretty good, actually!" He added that he felt that it could be improved, saying :

> ... I wish I could redo it from the beginning and I would change a few things :... more books, more information, and I would try to get more books than I did, because I think I only had four books.

Todd's methodology and the format for his final product differed significantly from those of his classmates. But like the others, through experimention and based on previous experience, Todd derived an approach and selected tactical tools which he found appropriate and expedient for the goals he had set for himself.

- Stewart

Stewart was open-minded and eager in his approach to computing. While characteristically soft-spoken and somewhat shy, he was articulate and voluble when he became enthused. He had often worked with Roy in his two years in the Academic Enrichment program, and they frequently consulted or worked together during the study. Initially, like the other students, Stewart requested assistance from the researcher fairly frequently. He was among the first, however, to direct his questions to peers whenever he could. He was precise and methodical in his approach to tasks, providing an effective foil for Roy, who tended to be more mercurial.

Stewart's journal entries were typically written as step-by-step accounts of the sessions:

> **...I looked at another task card and then set to work. This task card said that I had to make a newspaper article on "Pet Care". Well I had a great idea planned. I chose the disk called *Magic Slate*, and put in a new file called "Petcaresa". The "SA" at the end is my initials. Then I started typing...**

At the EX_2 and EX_3 levels, Stewart worked with Roy. They experimented with the word processor and the graphics tool. As their initial task, they selected the card stating "You think of one" (see Appendix A, Card 25) and chose the storybook tool. Finding the joystick difficult to control, they ultimately created an abstract design. They then attempted a survey, discovering in the process that it was necessary to word their questions carefully to avoid confusion (see Appendix A, Card 21). They created an advertisement for a pop called "Yo" (see Appendix A, Card 24). about which Stewart noted in his journal, "Next time I'm going to pick a harder task!".

Stewart proposed the topic *Ancient Egypt* to the group at the EX_4 level. Subsequently, he asked to reserve it for his major project. He was enthusiastic about the group theme, choosing *Medieval Entertainment* as his subtopic. He made his notes under the headings "What", "Who", and "Info" (see Appendix C, p. 174). As he described it:

> Mine was Entertainment. I did it sort of differently than the others because I wrote mine out mostly in sentences ... I got still quite a bit of information. With this *Stuff and Fetch* I could go and fetch stuff ... I started off with "What"—the thing I was ... writing down about, and "Who" it concerned, then my information ... like, if you wanted to put this all in one paragraph, you could just put "Children", and it would all come up.

Stewart had already decided on his topic for the EX_5 level. At first, he planned to do a report. However, on hearing some of the novel approaches being taken by his peers, he decided he wanted to do "... something that would be more creative, sort of...". In conference, he remarked, "One of the things I do best is writing stories." At the suggestion that he might combine his research with a story about ancient Egypt, he tackled the project eagerly. His approach was meticulous:

> Well, first I was going to do a report on Ancient Egypt, so I got all my information from the library, and then I decided to do a story with some of the information in it, so... first I went with *Think Tank* for my story plan ... sort of like the plan to the story. And I put in, like, ... the events that were going to happen, like you do in a story plan, and then I opened up those little paragraphs under each heading, and then ... I was putting [in] information about Ancient Egypt so later I could put it into my story so it could sound realistic ... like, I took real information about Ancient Egypt and then ... sort of blended it into my story.

While Stewart's plot outline was quite short and straightforward, he gathered a large number of facts about ancient Egyptian lifestyle—which proved to be time-consuming. As he composed his story based on the outline, he embroidered as he went, adding incidents freely. Consequently, at the expiry of the designated study timeframe, his story was only partially completed. He requested extra time, citing his lack of keyboarding skills as being the problem. Several people suggested that he shorten the story by omitting part of the plot outline; Stewart was insistent that his story be completed as planned. The researcher then offered to help him key it in. Several extra sessions were added, at each of which Stewart produced numerous hand-written sheets. Despite his father's urgings that he terminate the story, Stewart was still adamant that he finish. The final product was twenty-seven pages long (see Appendix C, p. 175-78). Time did not permit him to make revisions or include a bibliography.

Despite the pressure in finishing his project, Stewart expressed pride and satisfaction:

> **I like it! I think it's pretty good ... it's long, but it has lots of details in it ... I liked doing that stuff about Egypt. It's really interesting ... It would be better, though, if there were more time, because I'd like to make changes and all that.**

He was aware that copies of each student's work were being put into the school library, and he inquired several times when his story would be available for his classmates to read. On being asked if he would continue on in another computing project if it were possible, he was emphatic in saying "Oh yeah! This stuff is fun!".

- **Jayne**

Jayne was gratified at being selected to take part in the study. She had been chosen by her classroom teachers with the proviso that she stay current with her regular assignments; she made a concerted effort to do so. At first, she was somewhat tentative, and rarely spoke out on her own initiative. She made use of supplementary time almost consistently, on one occasion being the only student who worked through a noon hour. She was steadily positive in her attitude and enthusiasm toward computing. Her journal entries often ended with an anticipatory mention of the next session:

> I'm having a real good time working with these computers. On Friday I'd like to work with ... I can't wait until Wednesday to try ... I can't wait til after Spring Break to get back to the computers.

At the EX_2 level, Jayne worked with Holly using the outliner and with Nancy using the graphics tool. She then tried the word processor on her own. At the EX_3 level, she again chose to work alone, using the graphics tool and word processor. In choosing a card that required that the same letter be written to three people (see Appendix A, Card 18), Jayne deduced that she could use the word processor, simply changing the headings for each successive letter. Several classmates had dismissed the task as being too time-consuming, and they complimented her on her insight. Jayne seemed heartened by her success; subsequently she became bolder in discussions and in making decisions about her work.

At the EX_4 level, Jayne proposed *Snakes* and *The Royal Family* as topics for the group project. Once the medieval theme had been adopted, she settled on *The Medieval Church* as her subtopic. She found making notes to be difficult. At one point, using a reference book written in narrative form, she intermingled story plot with factual information. After some assistance, she began again, and things went much better for her. In her words:

> Well, I used *Magic Slate* ... it's a word processor that that's really easy to work ... You can do almost anything on it. I just chose it because it's the easiest. I went through and I just put it in point form, and did *(laughs)* three different copies of the same thing ... When you're trying to put down information, I find it easier to do it in point form. It doesn't take so long if I just put down key words ... If you just put, like "very religious" and stuff like that, it

> [doesn't] take as long, and I could get more information ... I think next time I might use *Stuff and Fetch* , like [Todd used the headings] "Who, Why, What, Where, When" I could just use, like, "Abbot", and then "Archbishops" and so on.

Jayne carried the exercise further, and asked her father to show her how to use their home word processor. She then reworked her notes into report format before she submitted them (see Appendix C, p. 179).

In collaboration with the librarian, Jayne chose the topic *Heroic Canadians*, ultimately deciding to do six profiles. She tried to select individuals who were as widely disparate as possible. She created a data file for her notes on each person. Noting Holly's use of surveys, Jayne decided to carry out a similar procedure. Like Holly, she used her session time to do her note-taking, survey and graphs. She composed her text on her home computer (see Appendix C, p. 180-82). In her words:

> Okay, for my report, I did "Canadian Heroes and Heroines". And I got some books from the library and some other books from Miss Fernet, and I got information, and I used *Stuff and Fetch*, and I put [my notes] on the cards there, and every time I pulled up "Men", because I had three men and three women ... I'd get all the women also, because it has "men" at the end of the word. So I was getting sort of frustrated when I went to do that, so I was just about to change the topic, but I didn't. And I did a survey and asked if the people in the class had heard of the person, and then if they knew what they were famous for, and ... All except for about three people knew ... what Laura Secord did, and the rest of them thought she was a chocolate maker! ... And the only reason she got her face on the chocolate box was because she risked her life for Canada ... And [the librarian] said it isn't [really] her face on the chocolate box, because they wanted someone pretty and young, and she was quite an old bag... And then I did my report and my title page at home on my computer, and for the program we have that does this, like, you can put different borders, or you can make signs or cards or banners or calendars ... and I found pictures of all the people in the books, and I photocopied them onto paper so I've got Nellie McClung, Emily Carr and *all* her pets... and Laura Secord and then I did Norman Bethune, Billy Bishop, and then in the newspaper [there was an article on] Rick Hansen, so I got a picture of him, and there was a map, and then I got him with his fiance ... and

> then I did the surveys, ... And then for my survey results I used *Easy Graph*, I put the questions on the graph and then I photocopied it, and then that's it!

Jayne stated her intention to make use of her home computer for regular assignments in the near future, commenting:

> Well, now that I'm getting used to the typing, it's almost getting faster to do that than to write it out. I'm going to ask [the French teacher], like, we have to hand in our French books at the end of the year to get them marked, and I'm going to ask her if I can put all my notes on the computer, because I doodle all over my notes, and I don't want to write them all over. I'd rather do them on the computer.

Her classroom teachers reported that she subsequently did so on occasion.

Jayne had selected from the tactical tools available those which she felt suited her unique needs, using them to carry out her individual learning goals. In so doing she experienced personal success. Like her peers, she was proud of what she'd accomplished: "I think it's pretty good! If I had more time, I could of got more information ....[My classmates] said 'Pretty good!' I think they really liked what we'd done."

- **Roy** :

Roy was earnest and zealous in his approach to the project. He had had previous experience with *LOGO* in the Academic Challenge program. He indicated that while he had *no* desire to engage in more programming, he was eager to work with the tactical tool software. When a new undertaking was being explained, Roy was often impatient during the subsequent discussion—he was anxious to get started at once. Like Stewart, Roy had extracurricular responsibilities that precluded most of the after-hours sessions. He frequently voiced regrets at not being able to attend them.

As previously noted, Roy worked with Stewart at the EX_2 and EX_3 levels. Roy generally acted as the instigator of proposed strategies, with Stewart providing the precision that characterized their products. The boys turned most frequently to each other for assistance; failing that, Roy did not hesitate to seek help from other sources.

Roy had an avid interest in the Second World War, and proposed it as a possible topic at the EX_4 level. On learning that he could reserve the topic for his major project, he did so at once. He then lobbied for the medieval theme, touting it as the "second most-interesting". Choosing *Knights and Armour* as his subtopic, he used the outliner to formulate his notes. His product was lengthy, and it elicited much admiration from his peers (see Appendix C, p. 183). As he described it:

> My subject was knights and armour. Mind you, I mostly did it on knights. I didn't really get into siege warfare and that. I used *Think Tank*, and I first of all started it off with an outline, just using one book, and then added in more [headings] in my outline, and then ... I just found different points, and then put them in an outline ... It's really good for doing a report—putting outlines, and then being able to put little paragraphs. That's what I did here. It's the best program ... because you can print it out the way you did it on the computer, and also if you want, you can move your cursor over a certain amount so it'll go like "One" and then "a" and then "b"...Yeah, and then I started doing more research, and started putting in more headers ... and then I went in and put in paragraphs under the subheadings or headings that I had. And then it was done.

At the EX_5 level, Roy had not narrowed his topic beyond his initial concept of the Second World War. Consulting with the librarian, he decided on *Victoria Cross Winners*. Discovering that reference material was scarce, he changed his topic to *D-Day*. He began making notes using the data base management tool, experiencing difficulties sorting his material. After he had worked with it for several sessions, he remarked to the researcher:

> This isn't working out very well. It would be way better doing it on *Think Tank*, because on *Stuff and Fetch* I don't know where to stop one card and then begin a new one. There's not enough time to start over now ... next time I'm going to plan out which [tool] would be better, depending on what I write about.

Roy's descriptive account of the D-Day landings product was done on the word processor (see Appendix C, p. 184-85). As he later described it:

> I started out ... on *Stuff and Fetch*, keeping some information on those little electronic file cards ... I had that printed out, ... so I'd have a copy of that as I worked and then I started on *Magic Slate* and wrote it out ... my rough copy, and then I made corrections, and it became my good copy ... for my report I used *Magic Slate* 80-column, and for my title page I used *Magic Slate* 20-column ... And there were a couple pictures out of this book that fit real good, like a picture of the Atlantic Walls, ... and I had to put in a map because I was telling about all these places, but nobody really knows until they see the map what I'm talking about.

Roy was pleased with what he had done, although he had reservations:

> I like it. It's one of my better reports ... I think I did better on the Middle Ages because I was all organized and had my topic and everything, and this one I just didn't get organized ... Next time I'll have a better idea of what I'm doing at the start, I hope ... I don't know if I'd change this one, because it was still pretty good.

Roy, then, had used approaches to his particular goals that differed from those of his classmates in a number of respects. He was able to see that more than one strategy existed for approaching his topic. His experience told him that the nature of his subject and strategies should dictate the tactical tools that would be most effective.

Conclusion

This chapter has sketched the reactions of seven children to a specific methodological approach delivered in a defined research setting. It has attempted, through selective citation of talk, performance and product to depict how these students responded in pursuit of their individual learning goals. A number of generalizations have been advanced. In Chapter V, the research questions, generalizations and related issues will be synthesized.

CHAPTER V

FINDINGS AND CONCLUSIONS

Preface

At the outset, even working with a small group of students and tracking attentively the minutiae of their experience, I could not foresee what generalizations might be derived from the study. I was working with seven disparate beings, each bringing his or her own distinct fund of knowledge and experience to the study. I was according them almost unlimited latitude of choice in subject matter, and I was proposing to turn over to them control of what [illegible] *learned and how they learned it.*

I was reasonably certain that sixth grade students **could** *use the tactical tool software, but I was not at all sure whether they* **would** *do so, given a choice. And if the students* **did** *choose to use the tools, I couldn't predict* **how** *they might do so.*

As the project unfolded, however, it became increasingly apparent that several common threads could be discerned.

The Research Questions

The major issue in this study centered on the ability of a small group of able Grade Six students to use tactical tool software, without extensive training, in the course of executing self-directed literacy learning activities. The inquiry bore three facets:

a) *Could* the students use such software?

b) Given a choice, *would* the students use such software?

c) If they did so, *how* would they use the software?

Several related issues emerged from the study:

d) The EX_5 Tactical Tools Learning Model was devised to meet the study need for a delivery system.

e) The students used a variety of strategies in acquiring the techniques necessary to use the software.

f) Lack of keyboarding skills was a significant factor in the expressed opinion of the students.

a) Could the Students Use Tactical Tool Software?

The pattern that emerges from these accounts is that all seven students who took part in the study could indeed utilize tactical tool software in the course of their self-directed learning. Further, they were able to do so with a high degree of metacognitive awareness. All expressed a degree of satisfaction and felt they were successful in realizing their goals. Several students were able to see in hindsight that perhaps alternative tactical tools might have expedited their work to a greater extent, and noted that in future undertakings those considerations would be taken into account. The students were unanimous and emphatic in their belief that their learning had been facilitated and enhanced by computer support. While some of the tasks for which the software was employed could have been executed manually, all seven students affirmed that they would not have accomplished their goals to the same degree of perceived excellence had they used traditional means.

Chandler (1984) cites Piaget in *The Grasp of Consciousness*, in which he argues that awareness in humans tends to develop when a circumstance causes us to stop and reflect upon the possibilities before acting. Chandler comments that this, to him, is one potentially valuable contribution of the computer: that it can create an environment that causes children to consider *possibilities*. That circumstance arose frequently in the course of the study: in Holly's contemplation of question formats for her survey, in Scott's determination that the data base management tool better suited his needs than the word processor, in Nancy's adoption of note-taking practices that experience told her were most efficacious, in Todd's trial-and-error approach to a design for his product, in Jayne's decision that Holly's format could be adapted to her own purposes, in Roy's decision to employ the outliner as the best approach to his note-taking task on *Knights*, in Stewart's use of that outliner in a totally different way, and in innumerable other instances—students encountered opportunities to consider alternative solutions, and to make conscious decisions about specific strategies. In many of these situations, it was a variety of tactical tool alternatives that furnished them with those options.

Perhaps the most striking commonality that emerges from these accounts lies within the very *differences* in the strategies and tools used, and in the products generated by the students. The teaching objectives had been to familiarize the children with research and reporting techniques involved in gathering, organizing and presenting information. Each of the students grasped the prescribed concepts, each researched a topic of individual interest and presented a product in an acceptable fashion. Each made personal sense of the literacy learning that he or she did. And each grasped one of the significant points arising from this study: that in having a variety of tactical tools available to support that learning, there was no single *correct* method or technique for achieving learning goals. With computer support, every individual was able to tailor an approach and a product that accommodated personal aptitudes and learning styles. That they did so brings the discussion back to one of the initial precepts of the study. When these seven children had the opportunity to experience, experiment, explore and expand skills and to execute learning tasks with the aid of tactical tool software, they reached the same conclusion as many adult users—that computers can provide more speed and flexibility of approach and presentation, handle quantities of data more efficiently, and produce a better quality product than was possible using traditional means.

b) Given a Choice, Would the Students Use Tactical Tool Software?

At all five levels of the EX_5 model, students were given unfettered choice as to whether or not they would use the computer in the execution of their tasks. It was made clear that they were not *expected* to use the computer—in fact, it was stressed that the researcher was interested in the decisions they would make about when they would use the computer and when they would employ other means. Students were encouraged to consider the alternatives, and to make decisions based on the dictates of practicality. At the initial levels of the model, students consciously avoided choosing tasks that alternatives, and to make decisions based on the dictates of practicality. At the initial levels of the model, students consciously avoided choosing tasks that precluded the use of the computer; they were anxious to capitalize on this novel opportunity. As the study progressed, however, the children became more closely attuned to their own particular learning goals, and practical considerations superceded the desire to use the computer simply because they had access to it. Based on these considerations, in most cases the students perceived that the tactical tool software provided a valuable and functional alternative to pencil-and-paper manipulation of data. Jayne, for example, was quick to see that a single letter could be altered and re-printed rather than re-drafting it three times. Scott used the capabilities of the word processor to write his report, then went back and elaborated, inserting "big words" and descriptions. Holly was able to create an "official"-looking survey, and to convert her results to graphs in just a few minutes. These decisions were made despite the strong deterrent effect caused by lack of keyboarding skills. The students had specific and personal rationalizations for choosing to use particular tactical tools, despite this drawback (see subsequent section).

That is not to say that the students consistently employed strategies that required computer use. There were notable exceptions, such as, for example, when Holly opted to make notes by hand from her tapes as she felt it was too cumbersome to do so at the computer, or when Todd fed facts directly from his reference books into his letters. Four students, in a post-session interview, stated that computers were not *always* superior to traditional methods of handling information in all situations. Scott noted that the user must "decide at the time", and Nancy indicated that "it depends on what you want to do." However, the students unanimously voiced the opinion that the not hesitate to use the computer in a similar manner for future academic ventures, were the tactical tool software available to them.

One must view the enthusiasm of the students with some caution, given the potential in the research situation for the "Hawthorne effect". It would be virtually impossible to structure a research design for a study of this nature which would avoid it. However, there is some indication that the value of computer use as perceived by the children was not restricted solely to the study milieu. As noted in the previous chapter, both Holly and Jayne, who had access to home computers, began to use them on occasion to produce regular classroom assignments where they had not done so previously. They continued to do so after the study had been completed.

c) If They Chose to Use the Software, How Would They Do So?

No identifiable pattern of usage emerged from the children's selections of tactical tool software. In approaching the note-taking task, for example, several students opted for the word-processor, several chose to create data base files, and one selected an outliner. There was a similar range in note-taking strategies at the EX_5 level. In presenting their final products, there was as great a disparity of software applications as there was among the students themselves. Therein lies one of the essential points that emerged from the study: when a variety of tactical tool software was available to students, they were able to make conscious choices about the strategies they would employ to accomplish their literacy learning aims. The students were keenly aware that there was no *one single correct way* to go about their tasks. Rather, they were enabled to select the approach that best suited their individual aptitudes and inclinations. In short, Holly and her peers were tasks. Rather, they were enabled to select the approach that best suited their individual aptitudes and inclinations. In short, Holly and her peers were furnished with the opportunity to interact with the material they were learning, and to make personal sense out of it in the manner that most suited them. When they were provided with the opportunity to use their own strategies in exploring meaning, they went about it in distinctly different ways. The computer, together with the tactical tool software, provided the means and support for them to do so.

Related Issues

d) Delivery System

In an attempt to devise a methodological approach which would facilitate the transfer of control from teacher to learner, the EX_5 Tactical Tools Learning Model was formulated. As this study was guided by the model, an overview of events at each of the five levels of the model might be useful.

EX_1 : EXPERIENCE - At this level, the students were given a demonstration of the various capabilities of the tactical tool software. Students had latitude to ask questions and make comments, but the instructor retained the initiative for the type and pace of the learning that took place.

EX_2 : EXPERIMENT - During this interval, no specific tasks were required. The students were simply allowed to "play" or experiment with various pieces of software, and to exercise trial procedures of their own devising. In every case, the students devised a task of their own, or asked the instructor to suggest one; none of the students simply struck keys or until it had been completed to his/her satisfaction. It was inferred from this that they viewed the computer as an agent for meaningful work.

EX_3 : **EXPLORE** - At this stage, brief tasks were introduced in the form of 'task cards; students were free to choose from them or to devise tasks of their own. The tasks were controlled by the teacher; the strategies were controlled by the learners. Use of the computer and the tactical tool software was optional. The students chose a wide variety of tasks, choosing to do those which required the use of the computer, with one exception. In circumstances in which more than one student chose to do the same task, the strategy and tactical tool used tended to be the same. At the end of the exercise, students recounted and evaluated what they had done and discussed possible alternate strategies.

EX_4 : **EXPAND** - At this level, the students were given instruction in reporting skills such as locating information, note-taking and organizing of data. The aim of this activity was to practise those skills; students carried out the preparatory stages but stopped short of a final polished product. A mutually agreeable topic (the Middle Ages) was chosen, and students each chose a sub-topic on which to gather information. The instructor exercised minimal control over the choice of subject matter; students were free to devise their own strategies and to use any of the tactical tools if and as they wished. Three students chose to use the data base management tool, three chose the word processor, and one chose the outlining tool. At the end of the exercise, students recounted and evaluated what they had done in a group discussion.

EX_5 : EXECUTE - At this final stage, the students were autonomous in their choice of subject matter, strategies and product format in executing a project of their own design. They were encouraged to use the principles and skills they had garnered during the previous levels. The seven students used widely disparate strategies. Holly chose to make notes by hand and to use the survey and graphing tools, the graphics package and a word processor. Scott used the data base management and graphics tools, and the word processor. Nancy used the data base management tool to formulate notes, and presented her material in the form of a video storybook. Todd made notes by hand, presenting his data in the form of a series of letters done on the word processor. Stewart used the outlining tool to generate a story outline, adding notes from his research under the incident headings. Jayne used the survey, graphic and data base management tools and the word processor. Roy employed the data base management tool and the word processor. The role played by the teacher-researcher was that of collaborator and facilitator.

On being questioned about how they would change the model if they were able to do so, three students noted that they would make no changes. Two students recommended spending more time at the EX_3 (Expand) level, working on task cards. The seventh indicated that he would eliminate the EX_3 level altogether, as he preferred to learn "on the job". All students agreed that they would prefer the EX_5 methodology over separate prior instruction on each software tool. Several students commented that in their view the latter would have been time-consuming and largely non-productive.

In sum, in the course of the study, the EX_5 Tactical Tools [illegible] Model proved to be productive in effecting the transfer of control from teacher to learner in the course of literacy learning and in introducing the students to a variety of tactical tool software.

e) Strategies in Acquiring Software Techniques and Sequences

The students differed somewhat in how they approached the acquisition of new software techniques. In the early stages of the study, all students employed a similar method—they requested the assistance of the teacher. As confidence and experience grew, there was more diversity. One student indicated his first strategy was to "push buttons until something happens". Two students mentioned that they read the instructions on the screen. The rest said that they asked another classmate or the teacher. Of the first three, each listed "ask another student" as their second strategy. For all, asking the instructor came next. Only two ventured that they might look at the "maps" (as the abbreviated direction sheets were called) as an alternative to asking the instructor. When queried, all seven students indicated that they had not used these maps at any point, although they were prominently displayed throughout the study. This was perhaps due to the fact that the group size was so small that it was simply more convenient to ask the instructor. With a larger group, or with instructions to look at the maps before asking for help, perhaps they would have been utilized. In general, as the students became more proficient at using the software, they tended to rely on themselves or their peers for assistance in acquiring new techniques; failing that, they turned to the teacher for help.

f) Keyboarding

As noted previously, the students taking part in the study had had little or no previous computing experience. In response to questioning, all seven children articulated that they had experienced difficulties keying in text due to their lack of keyboarding skills. Two students indicated that their products would have been more comprehensive had they been more adept at keyboarding. Three students expressed pleasure at the progress they had made in that area, and five listed keyboarding as one of the things they had learned as a result of the study.

Throughout the project, students were free to use traditional pencil-and-paper means in carrying out their tasks. In most cases, students elected to use the computer despite the retardant effect of slow typing speed. Perceived advantages cited were ability to move text around, ability to revise easily, ability to use a spelling-checker program, and neatness of copy. In the situations in which students did use traditional transcription methods, they articulated that they would have preferred to use the computer, but found it too time-consuming. In response to questioning, all students agreed that keyboarding training and/or practice prior to their experience with the model would have served to augment their ability to make efficacious use of software and computer-access time.

This chapter has discussed and summarized the findings of the study, and has addressed three secondary issues that emerged during its course. In the final chapter, study methodology and findings will be re-stated briefly, suggestions for further research will be offered, and indications of the potential usefulness of the study will be given.

CHAPTER VI

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Preface

During the course of the study and the writing of this thesis, I had occasion to describe what had transpired to a number of educators. As I recounted the events, listener response generally took one of two forms.

In the first case, the respondents were usually somewhat skeptical about the value of the exercise. Their reaction, stated or implied, seemed to be that the children could have done most or all of the exercises using traditional means, and that the time spent familiarizing the students with computing techniques and the software tools might better have been otherwise spent. Several commented that in their experience, students at that grade level were able to generate products of comparable quality, without having to incur the expense of computers and tactical tool software.

The second group focused their questions and comments on the children's strategies and decision-making. While they admired the quality of the products, they were more interested in the process the children underwent in order to generate those products, and in the critical thinking skills that were fostered as a result.

The question raised is a familiar one—the essence being whether one evaluates the success of a learning experience in terms of **product** *or*

process. *The purpose and intent of this study fall explicitly into the latter category. While all seven children generated quality products, my focus was the process involved in their creation of those products. It is from that perspective that I have derived the ensuing conclusions and implications.*

Summary of the Study

The major purpose of this study was to investigate the ability of upper elementary school students to use the computer as support for their own literacy learning. Specifically, an exploratory study was done with a small group of upper elementary school students to ascertain whether they were capable of using tactical tool software, without extensive training, in implementing self-directed learning activities. Seven able sixth grade students, who had had limited or no previous computing experience, worked with a teacher-researcher three times weekly for a period of approximately two-and-a-half months. The delivery system, the EX_5 Tactical Tools Learning Model, was specifically designed to incorporate certain principles of language learning and to transfer control of learning gradually from teacher to student. Students were given the freedom to use either the computer or traditional means in the course of their learning, as they saw fit. A variety of tactical tool software was made available throughout the study.

Comparative case study was used as the format for presentation of the data. One student, code-named Holly, was chosen as the focal case on the basis that her ability and work habits most closely approximated the "average" range. Data in the form of recorded verbal exchanges and self-talk, interviews with the subjects and their teachers, students' written products, and researcher-observations were examined for evidence of Holly's ability to use tactical tool software in the course of self-directed learning. Also sought was evidence of transfer of control from teacher to student, and student strategies in acquiring computing techniques. Data pertaining to the other six students served to provide comparative and contrasting notes.

The research question was comprised of three sub-questions: 1) *Could* the students use tactical tool software, without extensive training, in the course of their literacy learning? 2) When given a choice, *would* the students use such software? 3) If the students did choose to use the software, *how* would they do so?

Summary of Findings and Conclusions

1. The study determined that seven able Grade Six students were able to utilize tactical tool software in the course of their literacy learning. They did so with little training or prior computing experience. A considerable degree of metacognitive awareness was evident in student accounts of what they had done. All seven students expressed the view that their learning had been facilitated and enhanced by computer support, and that they would not have been able to achieve their goals to the same degree of perceived success using traditional means. Written products and teacher observations tended to support this conclusion.

2. When given a choice of using tactical tool software or traditional pencil-and-paper means to effect learning tasks, the students perceived that the computer provided a valuable and viable alternative to traditional methods

in carrying out particular strategies. When tactical tools were used, students furnished specific and personal rationales. The view was expressed that for some tasks, use of the computer would be counterproductive. All seven students noted that tactical tool usage would not be universally appropriate in task situations, but that such implementation would depend on the nature of the task. In certain other tasks in which students resorted to manual transcription of data, lack of keyboarding skills was cited as the prohibiting factor. Lack of familiarity with specific software techniques did not seem to be a deterrent. There was some evidence of transference of learning from the study milieu to individual students' customary environments.

3. No identifiable pattern of tactical tool usage emerged from the children's selections of software. In approaching literacy learning activities, the students responded in disparate ways; each used different strategies and implemented different software tools. These choices appeared [illegible] depend on individual interpretations, aptitudes and preferences. All seven students evinced awareness that there was no single *correct* way of carrying out the tasks. Each student expressed some degree of satisfaction with his or her chosen format and product. The strategies used and the products generated by the children were dissimilar to varying degrees, although each incorporated the elements prescribed by the teacher-researcher.

Additionally, several issues arose during the course of the study. These included the formulation and implementation of the EX_5 Tactical Tools Learning Model in response to the study need for a delivery system, the strategies employed by students in acquiring needed software techniques, and the effect of deficient student keyboarding skills.

4. To effect transfer of control from teacher to student, and to incorporate a means of gradually familiarizing the students with the capabilities of the selected software, a delivery system was devised. It consisted of five stages or levels: EX_1 (Experience), EX_2 (Experiment), EX_3 (Explore), EX_4 (Expand) and EX_5 (Execute). Designated the EX_5 Tactical Tools Learning Model, the system proved to be effective in fulfilling the purposes for which it was formulated. The students expressed satisfaction with the model format and progression, and recommended little in the way of changes.

5. The students employed a number of approaches to the acquisition of software techniques with which they were unfamiliar. Generally, they relied at first upon their own initiative, reading instructions from the screen or trying key sequences that had been successful in other situations. As well, they called upon peers or the teacher for assistance. During the course of the study, none of the students consulted available "maps", possibly because other forms of assistance were readily available.

6. All seven children indicated that they had experienced difficulties due to their lack of keyboarding skills and that their products would have been more comprehensive had they more adept. In most cases, students elected to use the computer despite the retardant effect of slow typing speed. Perceived advantages were the ability to move text around, to revise easily, to use a spelling-checker program, and neatness of copy. In the situations in which students did use manual transcription methods, they articulated that they would have preferred to use the computer, but found it too time-consuming or awkward. All students agreed that keyboarding training and/or practice prior

to their experience with the model would have augmented their ability to make efficient use of software and computer-access time.

Recommendations

1. Based on the study experience, it would be the recommendation of this researcher that students have some training and experience with keyboarding prior to implementing an approach such as the $_EX_5$ Tactical Tools Learning Model, to ensure the most efficacious use of software and computer-access time.

2. To the same end, as the word processor was the most widely used of the tactical tools, it would be advantageous for students to have had at least some experience with the basic word processing commands: *Insert, Delete, Load, Save* and the like.

3. This study was done on a small-group basis, and was time- and teacher-intensive. Further, the students taking part in the study were characterized as "able". In a regular classroom setting, the EX_5 Tactical Tools Model would likely best be implemented over a greatly expanded time frame. One possible approach might be to implement the model over several years at the Division II level, with the number of tactical tools and the complexity of the activities increasing through the grade levels.

4. Pupil response was varied with regard to whether the approach used in the study would be more effective with students working individually or in small groups. Based on observation of the nature and outcome of student interaction, the researcher concluded that students would gain much from the

small group setting. Accordingly, it is recommended that students work in groups of two or three, with two being the optimum number. In the case of students with special needs, it might be more productive for them to work independently, at the discretion of the teacher.

5. The students evinced considerable transfer from one software package to the next. In attempting to access a particular function on a new piece of software, they would frequently try out commands from other packages with which they were familiar. In creating software for children, ease of use would be greatly facilitated if manufacturers were to adopt a standard set of commands.

Significance of the Study

The issues that were raised and the data that emerged from this study might prove to be of value to others in the field:

1. As noted in the first chapter, much has been written about computer applications in children's literacy learning. The majority of it is speculative in nature. This study attempted to put several of these theoretical premises into practice. The account of how seven students responded in one particular situation might prove illuminatory to those who have addressed the issue on a theoretical level.

2. There has been increasing interest shown in the use of tactical tool software with elementary school students. However, in most of the reported projects, a single type of software program has been used. Contiguously,

current theory and research in literacy learning has focused on learner control. In the course of this inquiry, a number of tactical tool applications were available to the students, as was choice of how those options might be exercised. The findings of the study might provide insight to educators interested in student capabilities and reflections in response to such a choice.

3. Current theory stresses the necessity of purpose in children's learning. Many writers have stressed the futility of teaching isolated skills or facts. In order to provide a cohesive progression for students unfamiliar with microcomputing and with tactical tool software, the EX_5 Tactical Tools Learning Model was devised. Its purpose was to acquaint students with tactical tool software capabilities and to transfer control of their application from teacher to pupil. Educators contemplating a similar approach might find this approach and method of delivery thought-provoking or useful.

4. Although a relatively large body of literature has emerged on the subject of children and computing, there exists a relative scarcity of research studies exploring the application of tactical tool software to language and learning. It is hoped that this study will add to the knowledge in that sphere.

5. Conceivably, one value of this study lies in its potential for replication at the elementary and/or junior high school level for purposes of ascertaining whether the model is, in fact, a viable approach to the use of tactical tool software in support of literacy learning.

Implications

The findings and conclusions of this study suggest the following implications:

1. As noted in the *Limitations*, the study was done with able Grade Six students. No factors emerged from study which would preclude the use of multiple tactical tools or the EX_5 Tactical Tools Learning Model with students of less than average ability, or even at a lower grade level within Division II. The proviso is made that complexity of tasks, number of tools available and teacher expectations be appropriate to the grade and ability level of the students. As well, the study approach and model might prove effective at the Junior High School level as well.

2. Based on a problem-solving approach, and offering students the opportunity to take control of their own learning, the EX_5 Tactical Tools model lends itself to use with students in academic enrichment or gifted programs. It would be feasible to incorporate it with gifted models such as those devised by Treffinger (1986), Renzulli (1981), Parnes (in Maker, 1982), and Taylor (1985).

3. In a directional paper recently released by Alberta Education (1986), emphasis on computer applications in the classroom setting is paramount. The EX_5 Tactical Tools Learning Model dovetails neatly with this emphasis, and the findings of this study support the feasibility of such an approach.

4. Several writers in the sphere of educational computing have called for changes in school curricula, in order to implement or facilitate the use of computers. The approach delineated in this study requires no changes to the existing curriculum. On examining the chart prepared by Alberta Education enumerating essential communication and critical thinking skills in the four core academic curricula (see Appendix D, p. 187), it is apparent that the EX_5 Model would readily support the Thinking Skills in Science, Social Studies and Language Arts. As determined in this study, students at the upper Elementary School level are able to make use of computer support in organizing and processing data, in devising strategies and making decisions involving tactical tool software, and in synthesizing and presenting their material. This implication would likely apply at the Junior High level as well.

Suggestions for Future Research

During the course of the study, a number of questions arose which were outside the delimitations set for this investigation. These might furnish fertile ground for future inquiry:

1. The ways in which students acquainted themselves with software capabilities and acquired software techniques were noted in the data, but were not quantified or explored in depth. An investigation into this area would be of significant value in formulating an effective methodology for introducing computers in the classroom.

2. A number of difficulties were encountered by the study subjects as result of unfamiliarity with keyboarding technique. Student strategies in a number of cases were altered to accommodate this deficiency. A replication of

this study done with students who have some keyboarding proficiency might provide further illumination into the efficacy of the approach and the model devised for the study.

3. The study was carried out using able students in a small group setting. Further investigation must be done with larger groups of students, and with students of varying ability and skill levels before generalized conclusions may be stated.

4. No attempt was made to evaluate the quality of student products. No comparison was made to products that might be generated if the students were to employ traditional means. Such investigations would furnish needed illumination in an area that to date is largely speculative.

Commentary

Computer literacy does not require the introduction of computing as a separate and additional curricular area. Echoing Chandler's caveat, the power of the computer to motivate is hollow if there is no genuine purpose to the exercise.

Naisbett (1984) observed that society is "drowning in information, but starved for knowledge" (p. 17). It follows that in preparing for the 21st century, our mandate as educators is to teach "survival skills"—skills that will enable our students to pinpoint, organize and draw out meaning from the vast sea of information that engulfs them. In short, they need critical thinking skills. They must be able to anticipate and predict, to weigh alternatives, to *devise and adapt strategies, and to think not only deductively, but laterally and holistically.*

The computer can be an effective agent in the teaching of critical thinking skills. In this study, tactical tool software was used as a means of facilitating the interaction between student and information base. It became the support for literacy learning across the curriculum, and for learning how to learn.

It is not my intention here to formulate broad generalizations from a small-scale case study based on a sample of seven children. While the study situation cannot be equated to the regular classroom setting, the findings offer a clear view of what children at the sixth grade level are **capable** *of doing. That is one of the fundamental goals of research—to determine what is* **possible.**

The essence of this study's findings is that upper elementary school students are **able** *to utilize multiple tactical tools in the course of their literacy learning. Further, they are able* **a)** *to do so with a high degree of metacognitive awareness,* **b)** *to make frequent use of critical thinking skills,* **c)** *to employ diverse strategies that are in keeping with their personal preferences and aptitudes, and* **d)** *to derive personal satisfaction and pride from the experience. The computer and the tactical tool software described here afforded a latitude and a means that would not otherwise have been available to the children—the same rationale that has led to widespread acceptance and use of computers in the adult world.*

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APPENDIX – A

Exp. Task Cards

1

Write a letter to a relative thanking them for a gift. It could be a real gift, or a fantasy one.

2

Make up an outline for a report on the Solar System. Just put in the headings and subheadings in the order in which you might do them. You are free to go to the library for reference books.

3

With a classmate, play "MINUS ONE, PLUS TWO", and save the result: e.g.

The bell rang.

1. Take one word away...

The bell ---

2. Now add two words...

The morning bell clanged.

3. Now take one word away...

The --- bell clanged.

4. Now add two words...

The fire bell clanged loudly.

Etc.....

See how far you can get!

4

Write a brief article for the school or community newsletter, describing the Computers in Language Arts Project.

5

Write a note to your best friend asking if he or she can come to your house after school.

6

Put your favourite recipe on a blank file card. It can be real or made up. You are free to go to the library for reference books.

7

Make up a graph showing how you spent your time last night after you got home from school.

8

Make up a series of reviews of your favourite T.V. shows (about 5). Include information about:

- *Name of show*
- *Type of show (mystery, comedy, nature, etc.)*
- *Stars*
- *Brief description of show*
- *How you would "rate" it*
- *Include your name under "Reviewed By:"*

NOW - have a friend add 2 more to the set of reviews.

9

Explain to a stranger how to get from your house to Southgate shopping centre.

10

Write a "character sketch" of a teacher you know. Tell all about them, describe their appearance, and tell about some of their habits.

11

Write a column for a newspaper describing how to care for a pet (your choice). You are free to go to the library for reference books.

12

Get the book Dogs Working for People from the reserve table in the library. Find a way to make notes on the dog pictures on pages 11, 16, and 22 plus two more of your choice.

Include information on:

- *Breed*
- *Size*
- *Colour*
- *Type of Tail*
- *Description of coat*
- *Other characteristics noted*

13

Find out 10 facts about a famous person you admire. Present it any way you choose. You are free to go to the library for reference books.

14

Make notes on Pygmy (or any other culture) children as though you were doing a project or report on how children of other cultures are raised. You are free to go to the library for reference books.

15

Make notes as though you were doing a project or report on Poisonous Snakes. Choose at least five snakes that you think would be appropriate. You are free to go to the library for reference books.

16

Make notes on the history of one or two spices as though you were doing a project or report. You are free to go to the library for reference books.

17

Make a list of all your homework assignments so far this week.

18

Write letters to the principal, your parents, and Ms. Fernet asking permission to stay after school until 4:15 on Mondays and Fridays.

19

Make up a logo or crest for your School House League team, or for your Community League team.

20

You have a favourite poem that you wish to share with some friends. How might you do it?

21

Make up a survey of several questions about how people spent their Saturdays. Give the survey to more than three people, and tabulate the results.

22

Make up or retell a story so that a Primary student could read it. Remember that young students love illustrations!

23

ADD-A-BIT

Do this with a classmate, each adding a sentence in turn:

Complete a story, using one of the following story stems, or making up one of your own. After you have finished, conference with a third person for suggestions to improve the story. Then produce a good copy, and give the story a title.

Possible Story Stems:

1. *The park was dark and silent, but it was ...*

23 Continued ...

2. *I've seen some silly things in my day, but this one was the real topper!*
3. *We were alone in that dark blue sky with the stars twinkling around us.*
4. *It was a nightmare, and it just wouldn't quit.*
5. *I felt very nervous about this trip.*
6. *The night before, it seemed that tomorrow would never come.*

24

Design a magazine advertisement for a new product such as a soft drink, snack, deodorant, or whatever....

- *Make sure the product has a name.*

Remember--an ad should be eye-catching and informative.

25

You think of one!!!

APPENDIX - B

Ex_2 Product Structure: Holly

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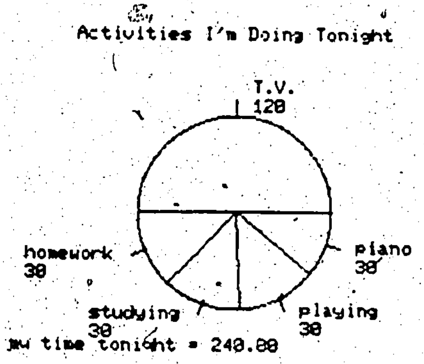

Ex$_3$ Product Structure: Holly

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Page 1

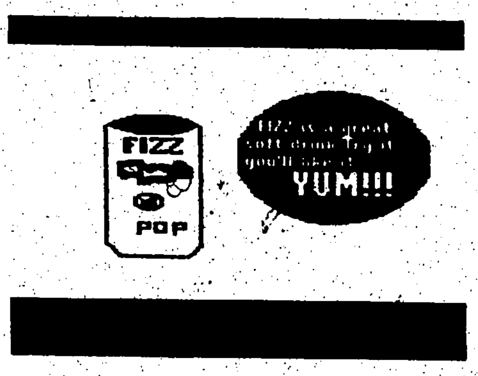
.HEAD 2 + 4.Hart to Hart
(a) Hart to Hart is an murder mistery show.
(b) It is an very interesting show.
(c) The stars are Robert Waggner and Stephenie Powers.
(d) Out of a one to ten rating I say it is a nine.

Reviewed By
H E

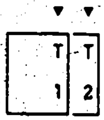
.HEAD 2 + 5.Murder She Wrote
(a) Murder She Wrote is a Murder Mistery show.
(b) One of the stars on Murder She Wrote is Angela Lanzberg.
(c) Murder She Wrote is a very interesting show and I like it.
(d) I rate Murder She Wrote out of one to ten a nine.

Reviewed By
H E

Page 2


FIZZ
POP
FIZZ is a great soft drink Try it you'll like it
YUM!!!

Ex_4 Product Structure: Holly



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Page 1

Life in a Norman castle probable wasn't very pleasant. People today who are used to electric lights and central heating, would have definitely found it very cold and dark. A castle served as many purposes. It might be a fortress, a place of refuge for nearby villagers, or even be used as a prison.

CONSTRUCTION

Stuff About the Walls

The walls might be from 10 to 20 feet (three to six metres) thick. Small rooms were often built into the walls.

Stuff About the Well

The well was very important for, without a water supply, the people in the castle could not withstand the a siege for long.

Stuff About Staircases

Some staircases are circular and they go through the towers.

Stuff About The Cistern

A cistern, into which rain drained, was a means of obtaining water.

Stuff About Towers

Some towers of a keep were square; others were round.

How They Defended The Castle

Castle could be defended by quite a small force of men. Soldiers kept a lookout from the battlements.

Page 2

Stuff About Chapels

There was a chapel in most castels where the lord and his family came to hear mass.

Stuff About Solar

he solar,where people are bathing in a wooden tub.

Stuff About the Great Hall

The great hall was the center of life in the castle.

Stuff About the Store-room

The store-room was kept well stocked with flour, salt, meat, wine and other foods.

Stuff About Dungeons

Some castles had a dungeon which was used to house prisoners who were awaiting ransom or sentencing.

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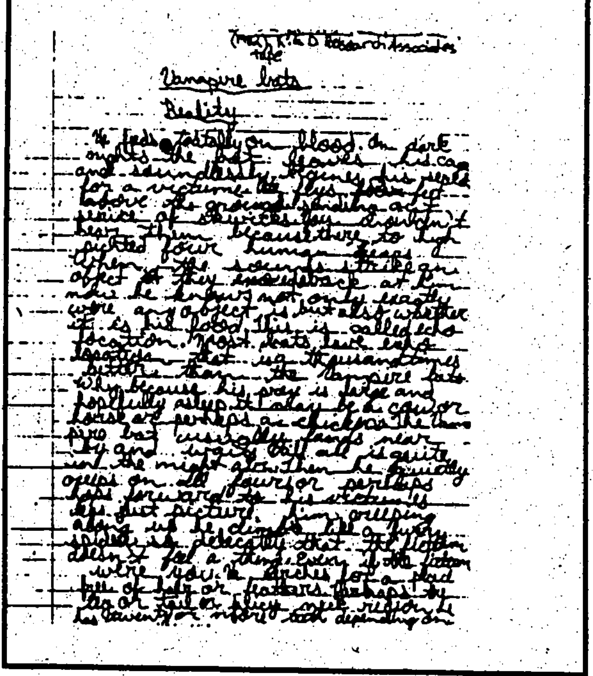
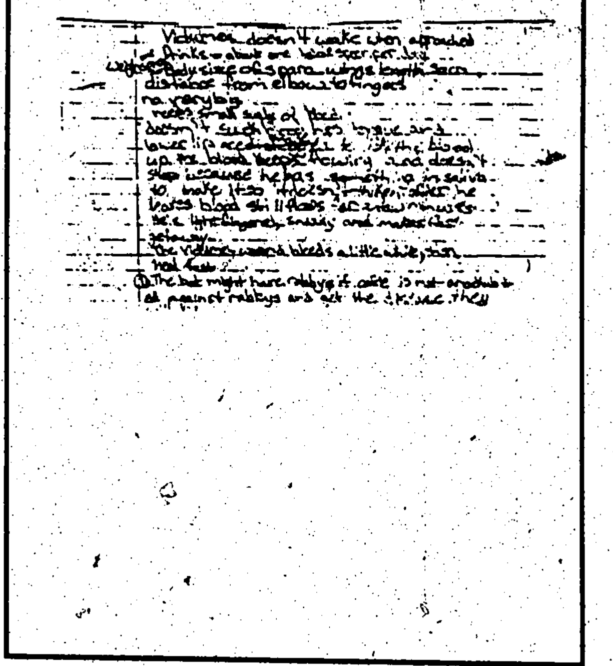


Vampire bats

Reality

Page 2



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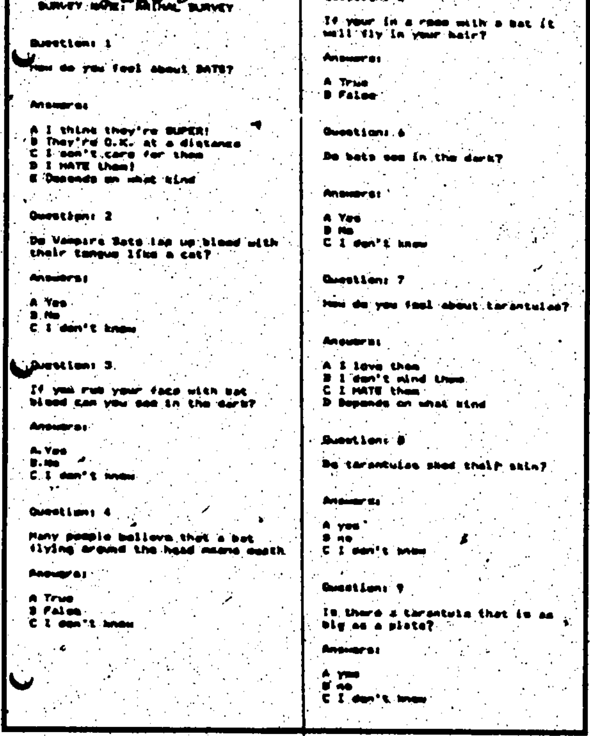


SURVEY NAME: ANIMAL SURVEY

Question: 1

How do you feel about BATS?

Answers:

A I think they're SUPER!
B They're O.K. at a distance
C I don't care for them
D I HATE them!
E Depends on what kind

Question: 2

Do Vampire Bats lap up blood with their tongue like a cat?

Answers:

A Yes
B No
C I don't know

Question: 3

If you rub your face with bat blood can you see in the dark?

Answers:

A. Yes
B. No
C I don't know

Question: 4

Many people believe that a bat flying around the head means death

Answers:

A True
B False
C I don't know

Question: 5

If your in a room with a bat it will fly in your hair?

Answers:

A True
B False

Question: 6

Do bats see in the dark?

Answers:

A Yes
B No
C I don't know

Question: 7

How do you feel about tarantulas?

Answers:

A I love them
B I don't mind them
C I HATE them
D Depends on what kind

Question: 8

Do tarantulas shed their skin?

Answers:

A yes
B no
C I don't know

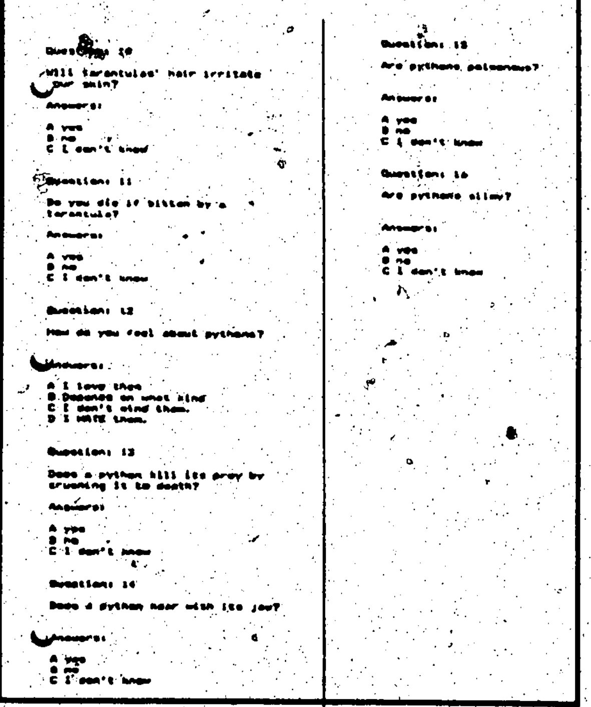
Question: 9

Is there a tarantula that is as big as a plate?

Answers:

A yes
B no
C I don't know

Page 4



Question: 10

Will tarantulas' hair irritate your skin?

Answers:

A yes
B no
C I don't know

Question: 11

Do you die if bitten by a tarantula?

Answers:

A yes
B no
C I don't know

Question: 12

How do you feel about pythons?

Answers:

A I love them
B Depends on what kind
C I don't mind them.
D I HATE them.

Question: 13

Does a python kill its prey by crushing it to death?

Answers:

A yes
B no
C I don't know

Question: 14

Does a python hear with its jaw?

Answers:

A yes
B no
C I don't know

Question: 15

Are pythons poisonous?

Answers:

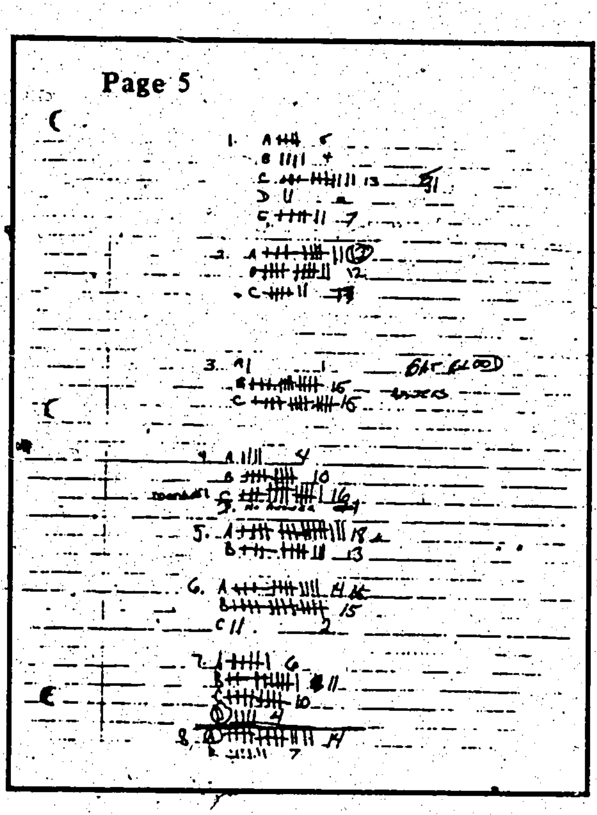
A yes
B no
C I don't know

Question: 16

Are pythons slimy?

Answers:

A yes
B no
C I don't know



Page 5

1. A 5
B 4
C 13 — 31
D 2
E 7

2. A 12
B 12
C 7

3. A 1 1 — BAT BLOOD
B 15 — INSECTS
C 16

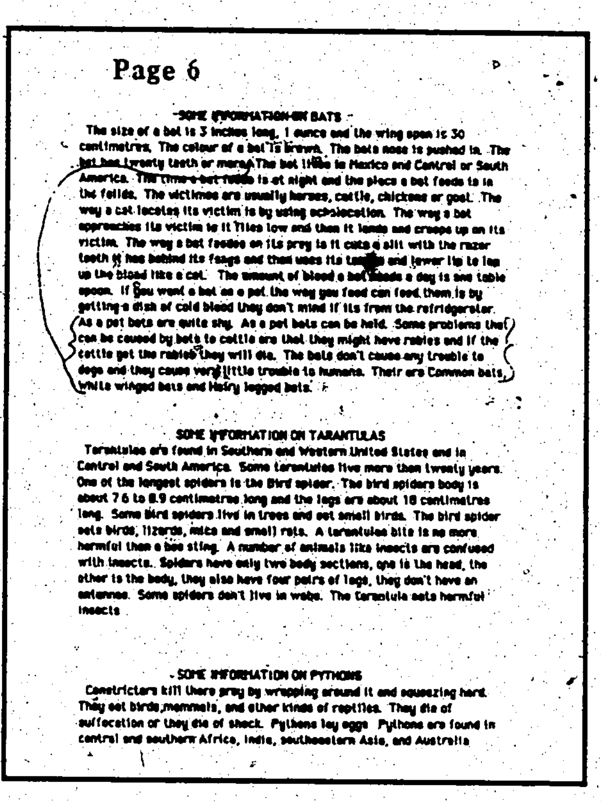
4. A 4
B 10
C 16

5. A 18
B 13

6. A 14
B 15
C 2

7. A 6
B 11
C 10
D 4

8. A 14
B 7



Page 6

-SOME INFORMATION ON BATS -

The size of a bat is 3 inches long, 1 ounce and the wing span is 30 centimetres. The colour of a bat is brown. The bats nose is pushed in. The ~~bat has twenty teeth or more~~. The bat lives in Mexico and Central or South America. ~~The time a bat feeds~~ is at night and the place a bat feeds is in the feilds. The victimes are usually horses, cattle, chickens or goat. The way a cat locates its victim is by using echolocation. The way a bat approaches its victim is it flies low and then it lands and creeps up on its victim. The way a bat feedes on its prey is it cuts a slit with the razor teeth it has behind its fangs and then uses its tongue and lower lip to lap up the blood like a cat. The amount of blood a bat needs a day is one table spoon. If you want a bat as a pet the way you feed can feed them is by getting a dish of cold blood they don't mind if its from the refridgerator. As a pet bats are quite shy. As a pet bats can be held. Some problems that can be caused by bats to cattle are that they might have rabies and if the cattle get the rabies they will die. The bats don't cause any trouble to dogs and they cause very little trouble to humans. Their are Common bats, white winged bats and Hairy legged bats.

SOME INFORMATION ON TARANTULAS

Tarantulas are found in Southern and Western United States and in Central and South America. Some tarantulas live more than twenty years. One of the longest spiders is the Bird spider. The bird spiders body is about 7.6 to 8.9 centimetres long and the legs are about 18 centimetres long. Some bird spiders live in trees and eat small birds. The bird spider eats birds, lizards, mice and small rats. A tarantulas bite is no more harmful than a bee sting. A number of animals like insects are confused with insects. Spiders have only two body sections, one is the head, the other is the body, they also have four pairs of legs, they don't have an antennae. Some spiders don't live in webs. The tarantula eats harmful insects

- SOME INFORMATION ON PYTHONS

Constrictors kill there prey by wrapping around it and squeezing hard. They eat birds, mammals, and other kinds of reptiles. They die of suffocation or they die of shock. Pythons lay eggs Pythons are found in central and southern Africa, India, southeastern Asia, and Australia

Ex$_5$ Product Structure: Holly

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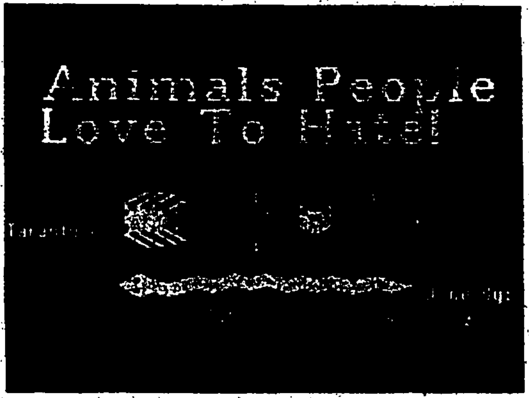

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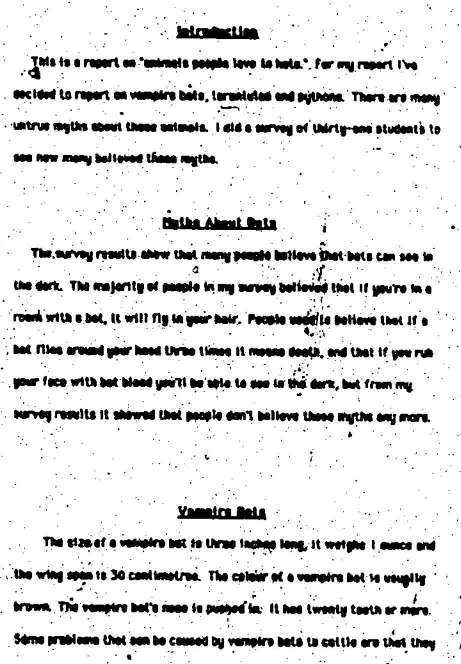


Introduction

This is a report on "animals people love to hate." For my report I've decided to report on vampire bats, tarantulas and pythons. There are many untrue myths about these animals. I did a survey of thirty-one students to see how many believed these myths.

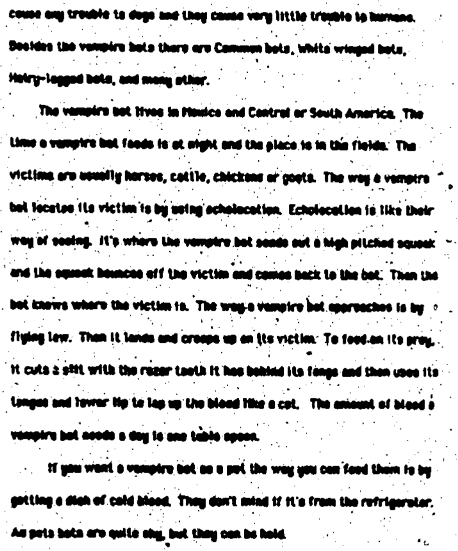
Myths About Bats

The survey results show that many people believe that bats can see in the dark. The majority of people in my survey believed that if you're in a room with a bat, it will fly in your hair. People used to believe that if a bat flies around your head three times it means death, and that if you rub your face with bat blood you'll be able to see in the dark, but from my survey results it showed that people don't believe these myths any more.

Vampire Bats

The size of a vampire bat is three inches long, it weighs 1 ounce and the wing span is 30 centimetres. The colour of a vampire bat is usually brown. The vampire bat's nose is pushed in. It has twenty teeth or more. Some problems that can be caused by vampire bats to cattle are that they

Page 2

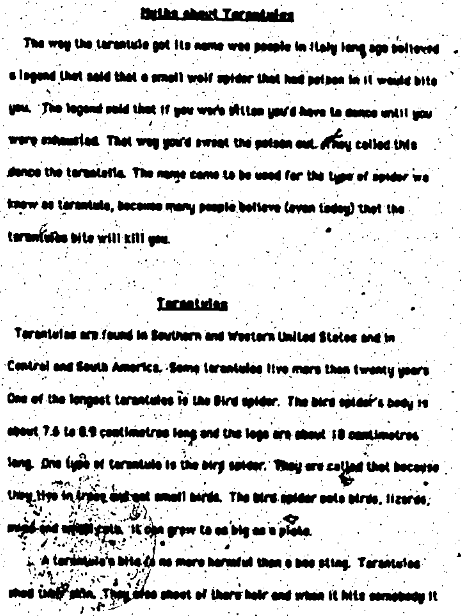


might have rabies and if the cattle get the rabies they will die. They don't cause any trouble to dogs and they cause very little trouble to humans. Besides the vampire bats there are Common bats, White winged bats, Hairy-legged bats, and many other.

The vampire bat lives in Mexico and Central or South America. The time a vampire bat feeds is at night and the place is in the fields. The victims are usually horses, cattle, chickens or goats. The way a vampire bat locates its victim is by using echolocation. Echolocation is like their way of seeing. It's where the vampire bat sends out a high pitched squeak and the squeak bounces off the victim and comes back to the bat. Then the bat knows where the victim is. The way a vampire bat approaches is by flying low. Then it lands and creeps up on its victim. To feed on its prey, it cuts a slit with the razor teeth it has behind its fangs and then uses its tongue and lower lip to lap up the blood like a cat. The amount of blood a vampire bat needs a day is one table spoon.

If you want a vampire bat as a pet the way you can feed them is by getting a dish of cold blood. They don't mind if it's from the refrigerator. As pets bats are quite shy, but they can be held.

Page 3



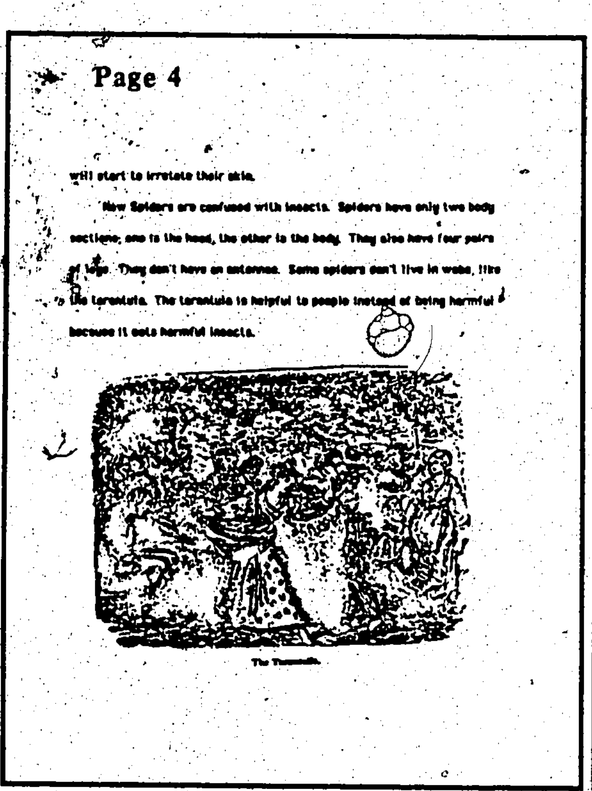
Myths about Tarantulas

The way the tarantula got its name was people in Italy long ago believed a legend that said that a small wolf spider that had poison in it would bite you. The legend said that if you were bitten you'd have to dance until you were exhausted. That way you'd sweat the poison out. They called this dance the tarantella. The name came to be used for the type of spider we know as tarantula, because many people believe (even today) that the tarantula's bite will kill you.

Tarantulas

Tarantulas are found in Southern and Western United States and in Central and South America. Some tarantulas live more than twenty years. One of the longest tarantulas is the Bird spider. The bird spider's body is about 7.6 to 8.9 centimetres long and the legs are about 18 centimetres long. One type of tarantula is the bird spider. They are called that because they live in trees and eat small birds. The bird spider eats birds, lizards, mice and small rats. It can grow to as big as a plate.

A tarantula's bite is no more harmful than a bee sting. Tarantulas shed their skin. They also shoot of there hair and when it hits somebody it

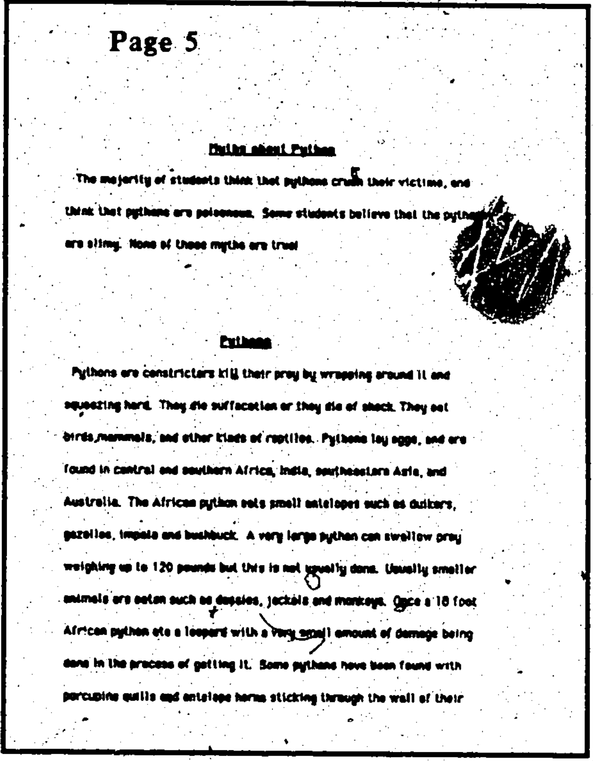


Page 4

will start to irritate their skin.

New Spiders are confused with insects. Spiders have only two body sections; one is the head, the other is the body. They also have four pairs of legs. They don't have an antennae. Some spiders don't live in webs, like the tarantula. The tarantula is helpful to people instead of being harmful because it eats harmful insects.

The Tarantula.



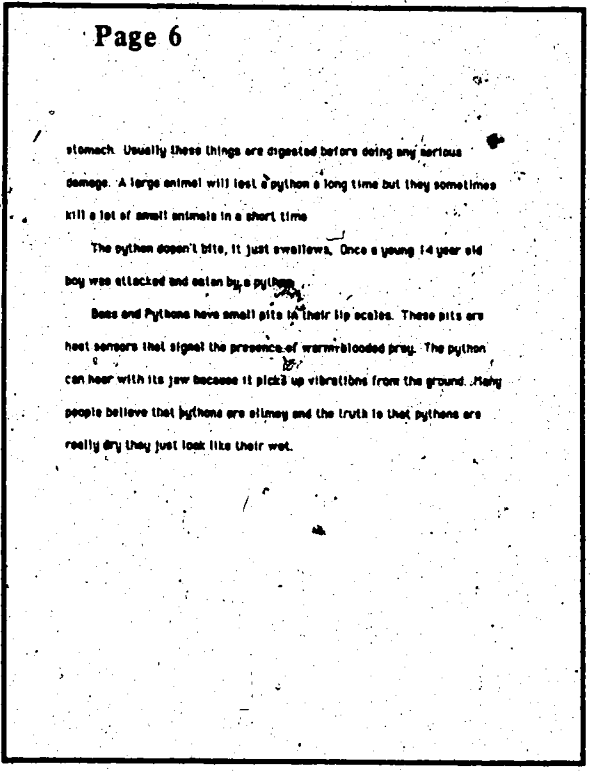
Page 5

Myths about Python

The majority of students think that pythons crush their victims, and think that pythons are poisonous. Some students believe that the pyth[illegible] are slimy. None of these myths are true!

Pythons

Pythons are constrictors kill their prey by wrapping around it and squeezing hard. They die suffocation or they die of shock. They eat birds,mammals, and other kinds of reptiles. Pythons lay eggs, and are found in central and southern Africa, India, southeastern Asia, and Australia. The African python eats small antelopes such as duikers, gazelles, impala and bushbuck. A very large python can swallow prey weighing up to 120 pounds but this is not usually done. Usually smaller animals are eaten such as dassies, jackals and monkeys. Once a 18 foot African python ate a leopard with a very small amount of damage being done in the process of getting it. Some pythons have been found with porcupine quills and antelope horns sticking through the wall of their

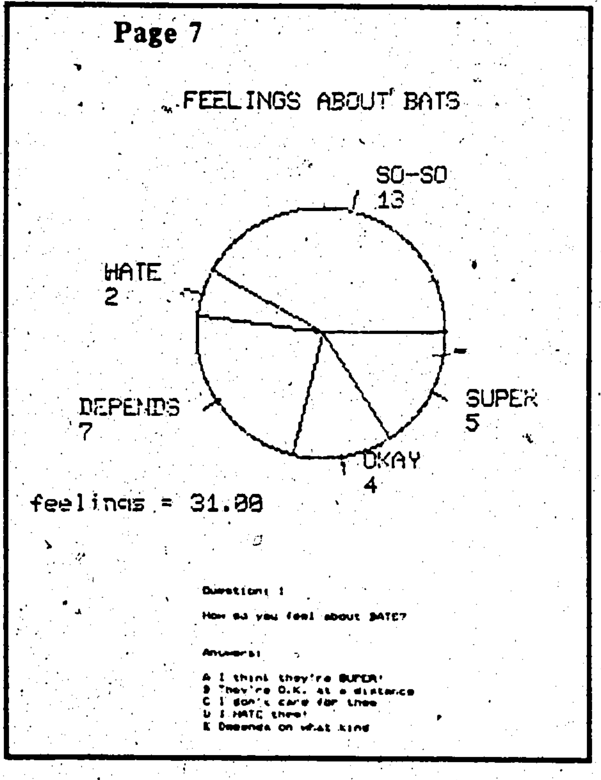


Page 6

stomach. Usually these things are digested before doing any serious damage. A large animal will last a python a long time but they sometimes kill a lot of small animals in a short time

The python doesn't bite, it just swallows. Once a young 14 year old boy was attacked and eaten by a python.

Boas and Pythons have small pits in their lip scales. These pits are heat sensors that signal the presence of warm-blooded prey. The python can hear with its jaw because it picks up vibrations from the ground. Many people believe that pythons are slimey and the truth is that pythons are really dry they just look like their wet.



Page 7

feelings = 31.00

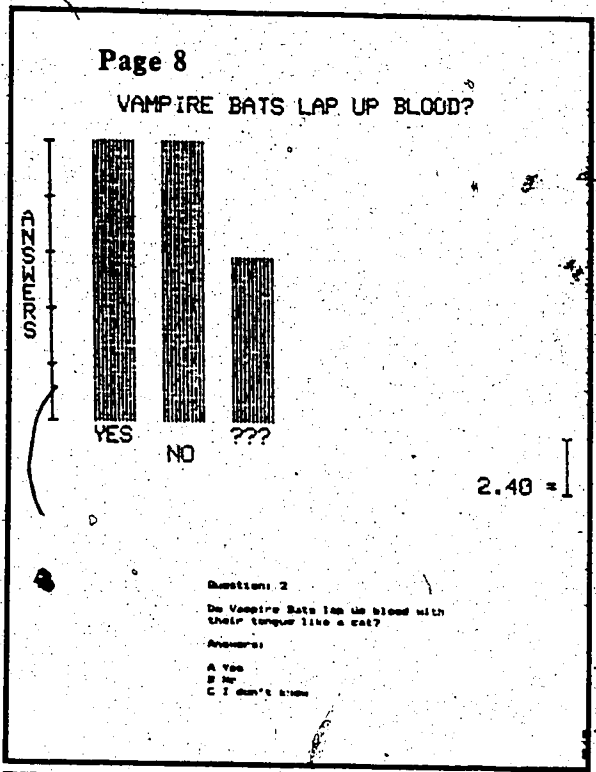
Question: 1

How do you feel about BATS?

Answers:

A I think they're SUPER!
B They're O.K. at a distance
C I don't care for them
D I HATE them!
E Depends on what kind

Page 8



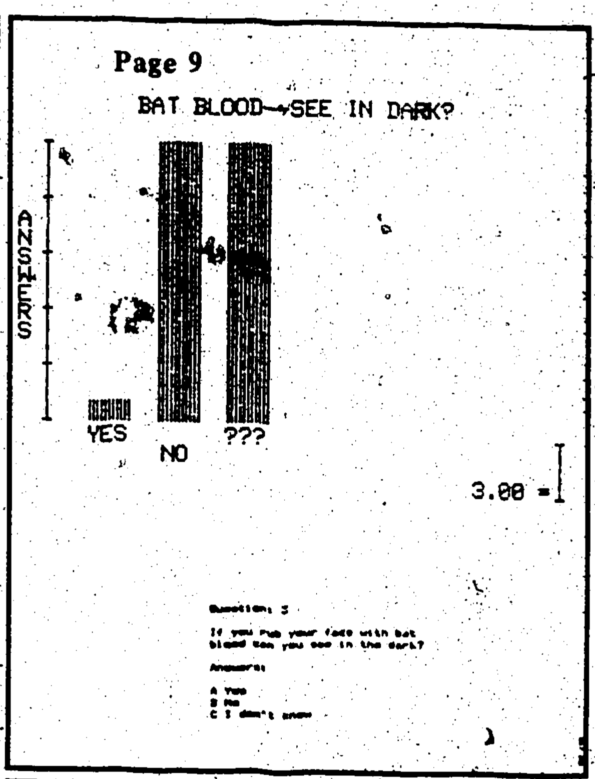
Question: 2

Do Vampire Bats lap up blood with their tongue like a cat?

Answers:

A Yes
B No
C I don't know

Page 9



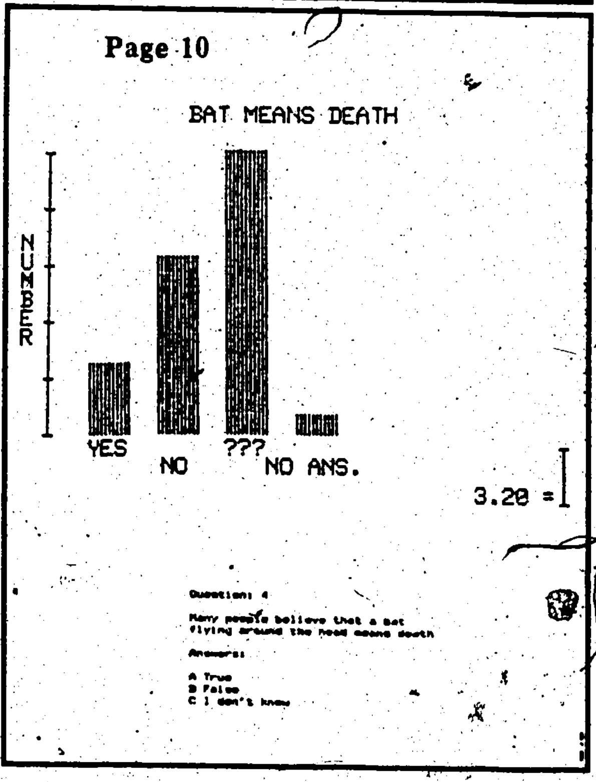
Question: 3

If you rub your face with bat blood can you see in the dark?

Answers:

A Yes
B No
C I don't know

Page 10



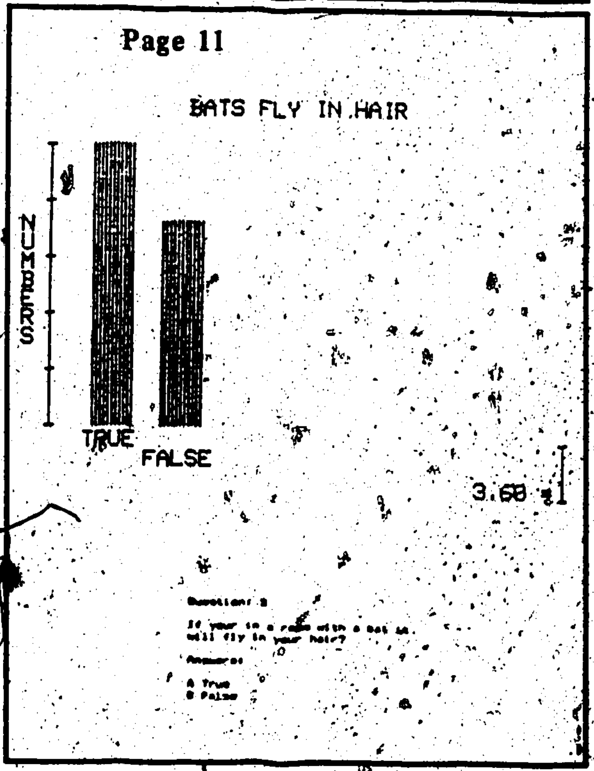
Question: 4

Many people believe that a bat flying around the head means death

Answers:

A True
B False
C I don't know

Page 11



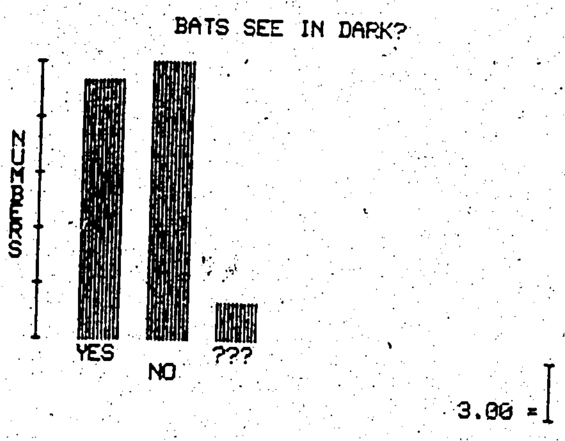
Question: 5

If your in a room with a bat it will fly in your hair?

Answers:

A True
B False

Page 12



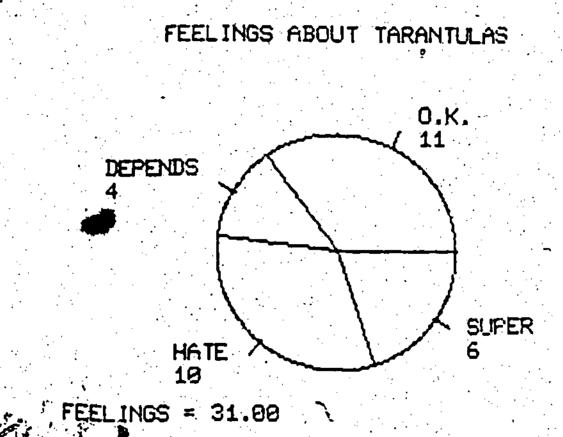
Question: 6

Do bats see in the dark?

Answers:

A Yes
B No
C I don't know

Page 13



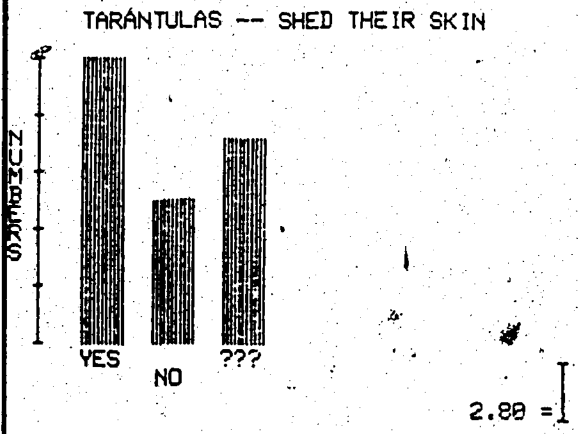
Question: 7

How do you feel about tarantulas?

Answers:

A I love them
B I don't mind them
C I HATE them
D Depends on what kind

Page 14



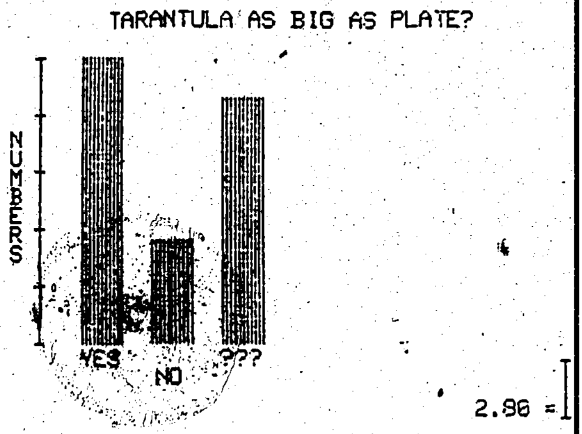
Question: 8

Do tarantulas shed their skin?

Answers:

A yes
B no
C I don't know

Page 15



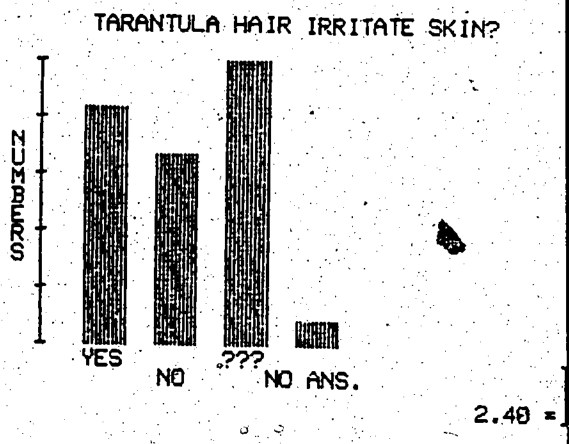
Question: 9

Is there a tarantula that is as big as a plate?

Answers:

A yes
B no
C I don't know

Page 16



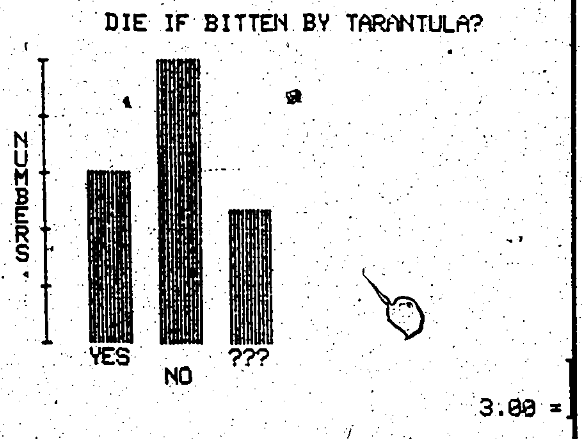
Question: 10

Will tarantulas' hair irritate your skin?

Answers:

A yes
B no
C I don't know

Page 17



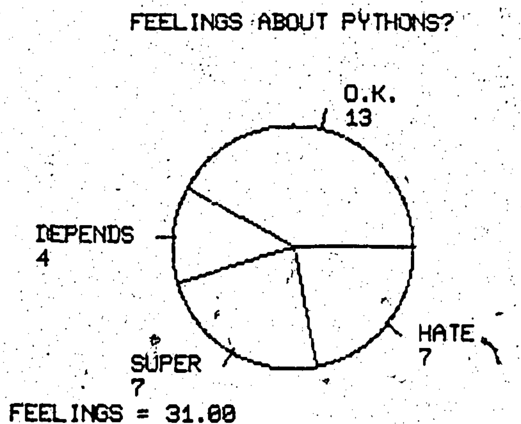
Question: 11

Do you die if bitten by a tarantula?

Answers:

A yes
B no
C I don't know

Page 18



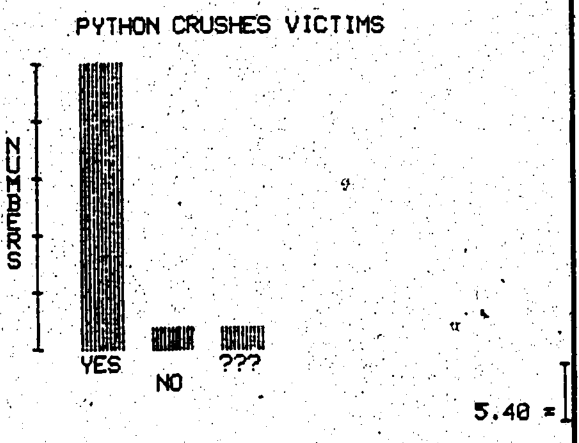
Question: 12

How do you feel about pythons?

Answers:

A I love them
B Depends on what kind
C I don't mind them.
D I HATE them.

Page 19



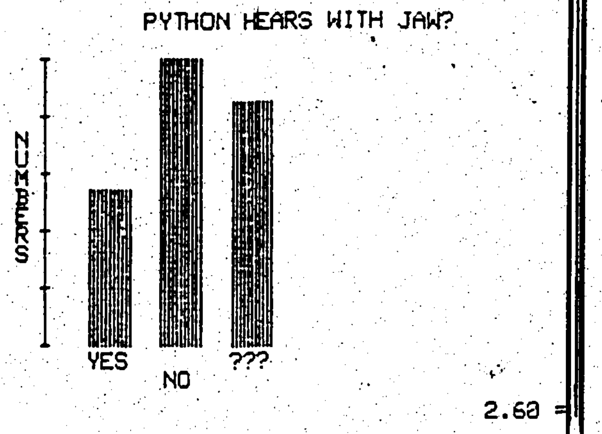
Question: 13

Does a python kill its prey by crushing it to death?

Answers:

A yes
B no
C I don't know

Page 20



Question: 14

Does a python hear with its jaw?

Answers:

A yes
B no
C I don't know

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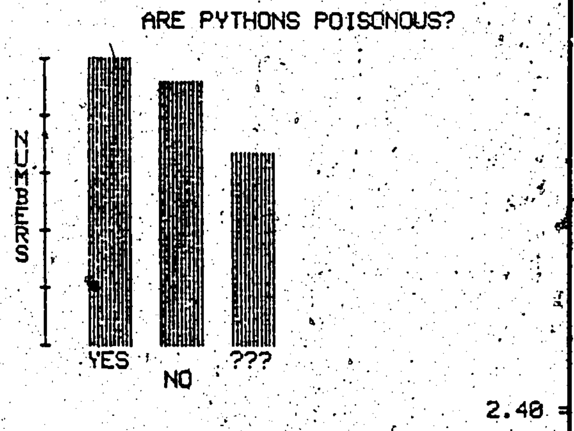

Question: 15

Are pythons poisonous?

Answers:

A yes
B no
C I don't know

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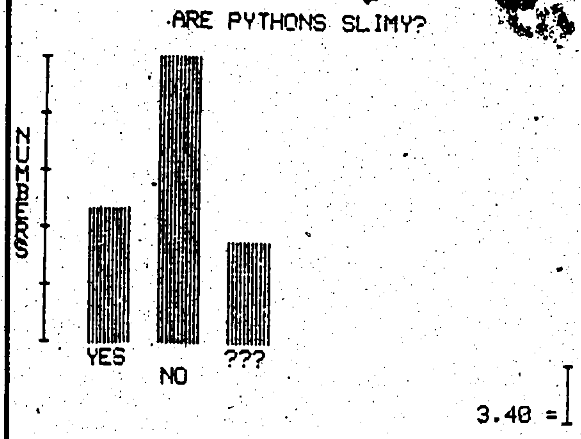

Question: 16

Are pythons slimy?

Answers:

A yes
B no
C I don't know

Page 23

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Post-script: Holly

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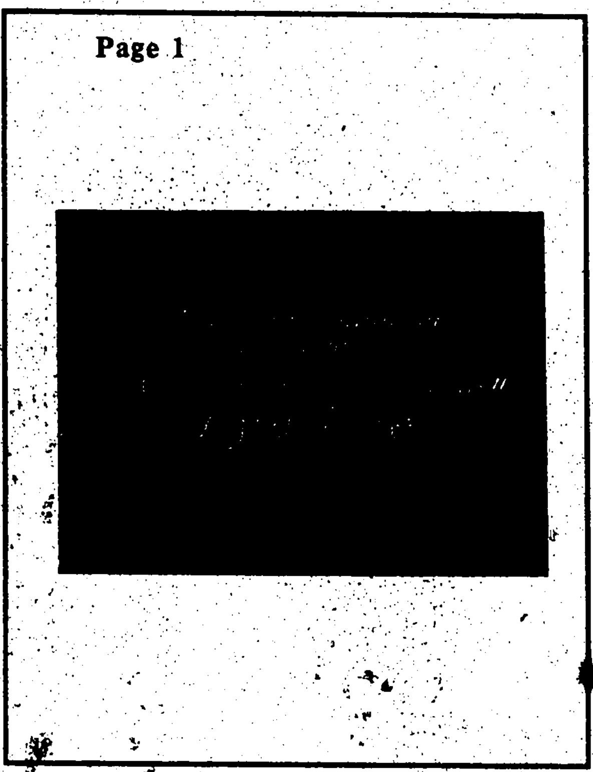
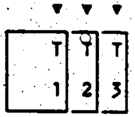


APPENDIX - C -

Ex$_4$ Product Structure [illegible] Scott



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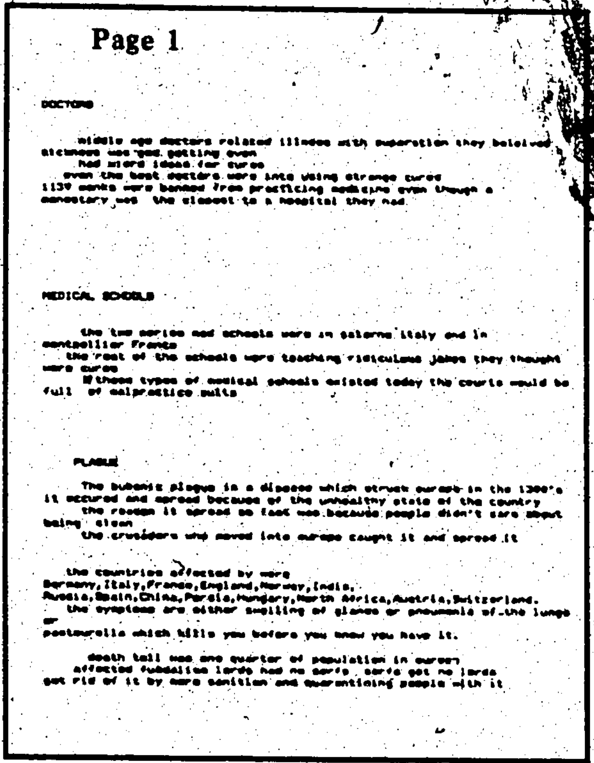


Page 1

DOCTORS

middle age doctors related illness with superstion they beleived sickness was god getting even
had wierd ideas for cures
even the best doctors were into using strange cures
1139 monks were banned from practicing medicine even though a monastery was the closest to a hospital they had

MEDICAL SCHOOLS

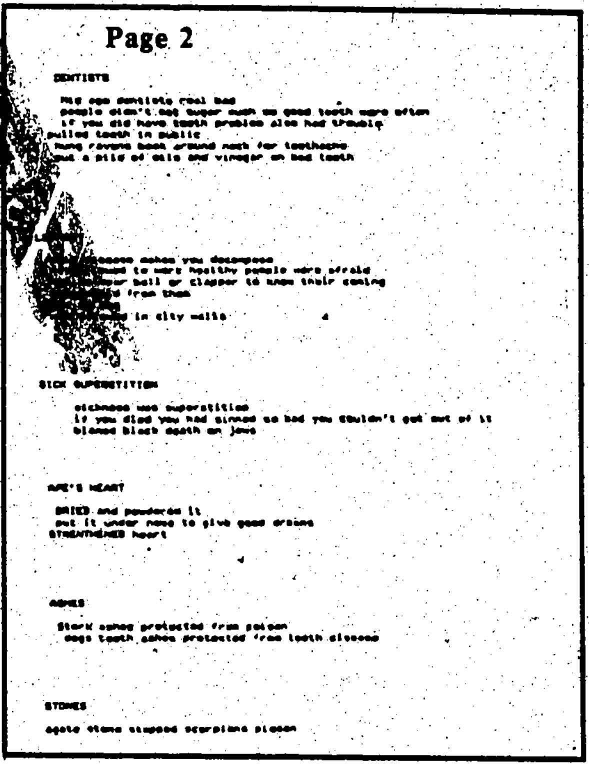
the two [illegible] med schools were in salerno italy and in montpellier France
the rest of the schools were teaching ridiculous jokes they thought were cures
If these types of medical schools existed today the courts would be full of malpractice suits

PLAGUE

The bubonic plague is a disease which struck europe in the 1300's
it occured and spread because of the unhealthy state of the country
the reason it spread so fast was because people didn't care about being clean
the crusaders who moved into europe caught it and spread it

the countries affected by were
Germany,Italy,France,England,Norway,India,
Russia,Spain,China,Persia,Hungary,North Africa,Austria,Switzerland.
the symptoms are either swelling of glands or pneumonia of the lungs or
pasteurella which kills you before you know you have it.

death toll was one quarter of population in europe
affected fuedalism lords had no serfs , serfs got no lords
got rid of it by more sanition and quarantining people with it



Page 2

DENTISTS

Mid age dentists real bad
people didn't eat sugar much so good teeth were often
if you did have teeth problem also had trouble
pulled teeth in public
hung ravens beak around neck for toothache
put a pile of oils and vinegar on bad teeth

[illegible] makes you decompose
[illegible] to ward healthy people were afraid
[illegible] bell or clapper to know their coming
[illegible] from them
[illegible]
[illegible] in city walls

SICK SUPERSTITION

sickness was superstition
if you died you had sinned so bad you couldn't get out of it
blamed black death on jews

APE'S HEART

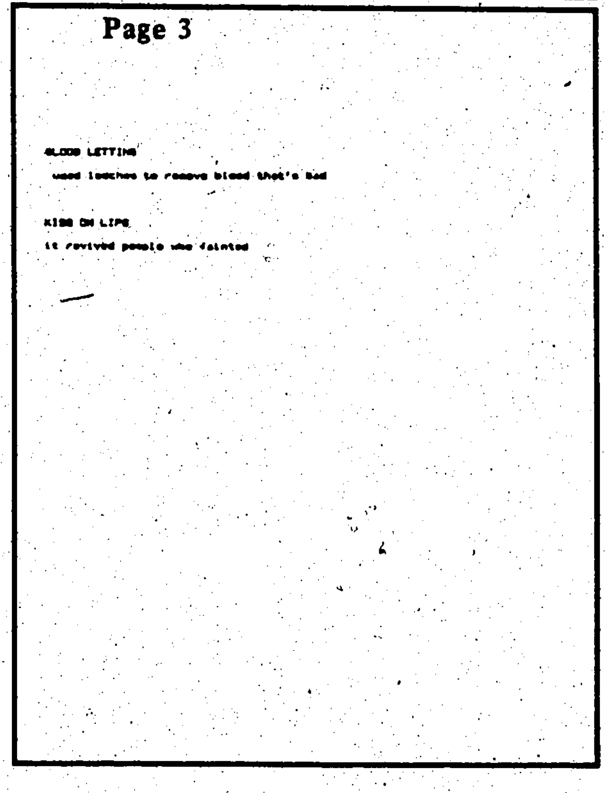
DRIED and powdered it
put it under nose to give good dreams
STRENGTHENED heart

ASHES

Stork ashes protected from poison
dogs teeth ashes protected from teeth disease

STONES

agate stone stopped scorpions poison



Page 3

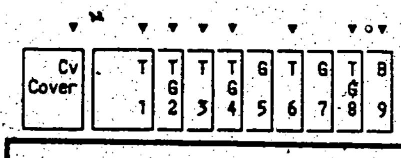
BLOOD LETTING

used leeches to remove blood that's bad

KISS ON LIPS

it revived people who fainted

Ex_5 Product Structure: Scott



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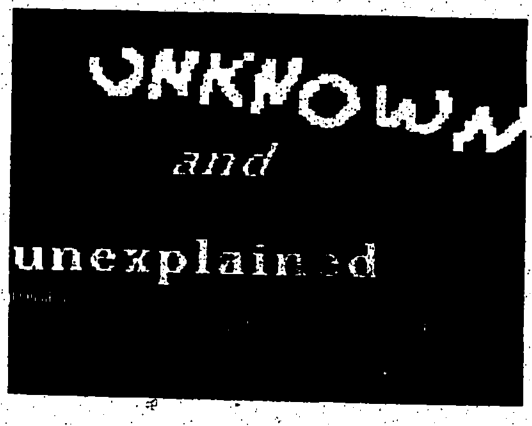

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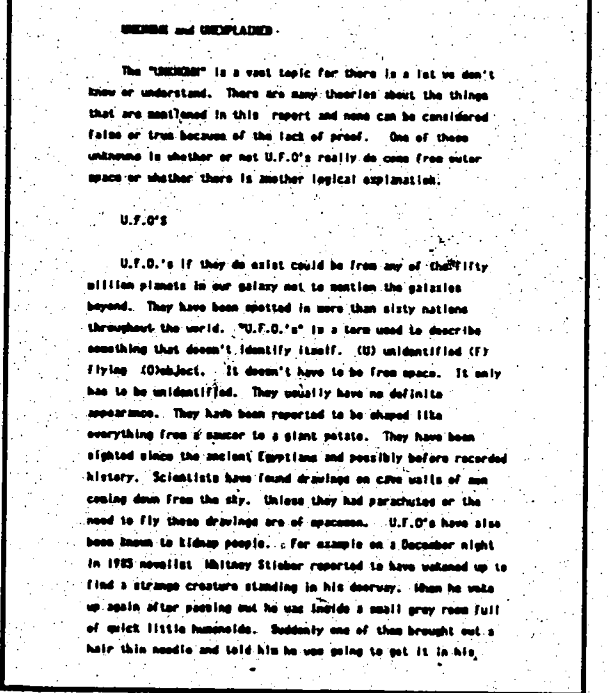


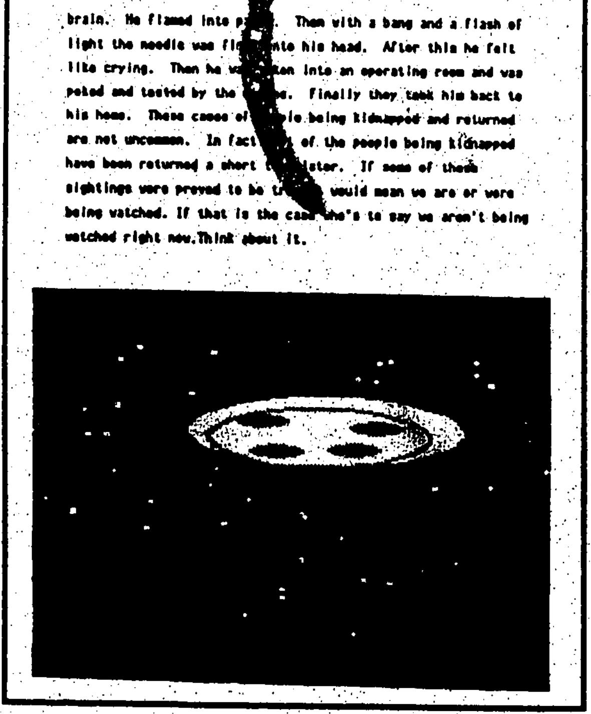
UNKNOWN and UNEXPLAINED

The "UNKNOWN" is a vast topic for there is a lot we don't know or understand. There are many theories about the things that are mentioned in this report and none can be considered false or true because of the lack of proof. One of these unknowns is whether or not U.F.O's really do come from outer space or whether there is another logical explanation.

U.F.O'S

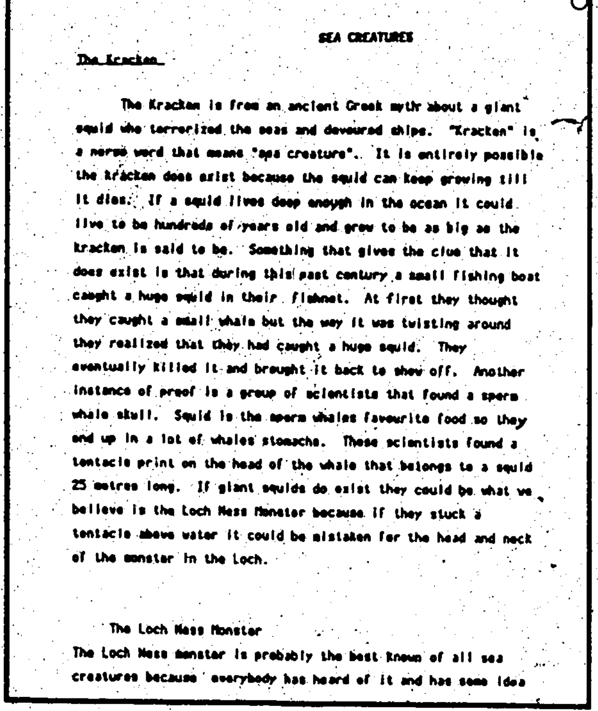
U.F.O.'s if they do exist could be from any of the fifty million planets in our galaxy not to mention the galaxies beyond. They have been spotted in more than sixty nations throughout the world. "U.F.O.'s" is a term used to describe something that doesn't identify itself. (U) unidentified (F) flying (O)object. It doesn't have to be from space. It only has to be unidentified. They usually have no definite appearance. They have been reported to be shaped like everything from a saucer to a giant potato. They have been sighted since the ancient Egyptians and possibly before recorded history. Scientists have found drawings on cave walls of men coming down from the sky. Unless they had parachutes or the need to fly these drawings are of spacemen. U.F.O's have also been known to kidnap people. For example on a December night in 1985 novelist Whitney Stieber reported to have wakened up to find a strange creature standing in his doorway. When he woke up again after passing out he was inside a small grey room full of quick little humanoids. Suddenly one of them brought out a hair thin needle and told him he was going to put it in his

Page 2



brain. He flamed into [illegible]. Then with a bang and a flash of light the needle was fl[illegible]nto his head. After this he felt like crying. Then he [illegible]ken into an operating room and was poked and tested by the [illegible]. Finally they took him back to his home. These cases of [illegible]le being kidnapped and returned are not uncommon. In fact [illegible] of the people being kidnapped have been returned a short [illegible]later. If some of these sightings were proved to be tr[illegible] would mean we are or were being watched. If that is the ca[illegible]ho's to say we aren't being watched right now.Think about it.

Page 3



SEA CREATURES

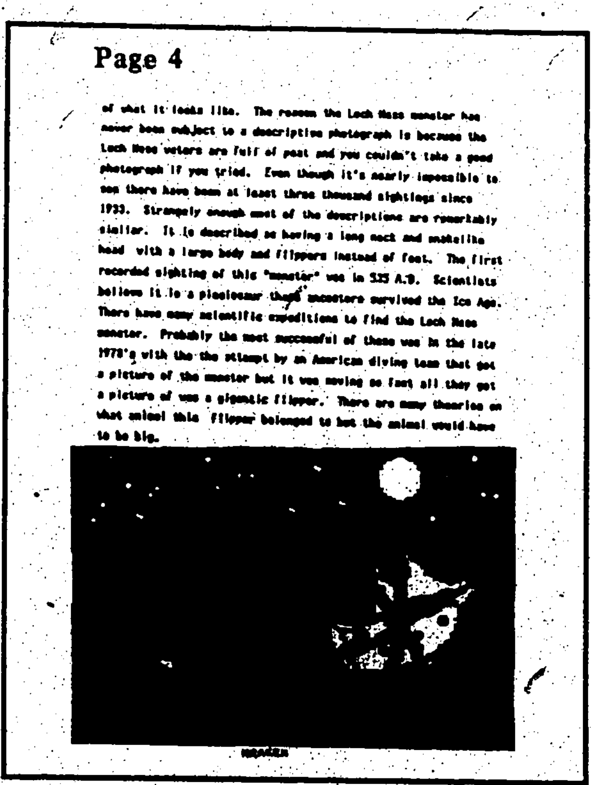
The Kracken

The Kracken is from an ancient Greek myth about a giant squid who terrorized the seas and devoured ships. "Kracken" is a norse word that means "sea creature". It is entirely possible the kracken does exist because the squid can keep growing till it dies. If a squid lives deep enoygh in the ocean it could live to be hundreds of years old and grow to be as big as the kracken is said to be. Something that gives the clue that it does exist is that during this past century a small fishing boat caught a huge squid in their fishnet. At first they thought they caught a small whale but the way it was twisting around they realized that they had caught a huge squid. They eventually killed it and brought it back to show off. Another instance of proof is a group of scientists that found a sperm whale skull. Squid is the sperm whales favourite food so they end up in a lot of whales stomachs. These scientists found a tentacle print on the head of the whale that belongs to a squid 25 metres long. If giant squids do exist they could be what we believe is the Loch Ness Monster because if they stuck a tentacle above water it could be mistaken for the head and neck of the monster in the Loch.

The Loch Ness Monster

The Loch Ness monster is probably the best known of all sea creatures because everybody has heard of it and has some idea

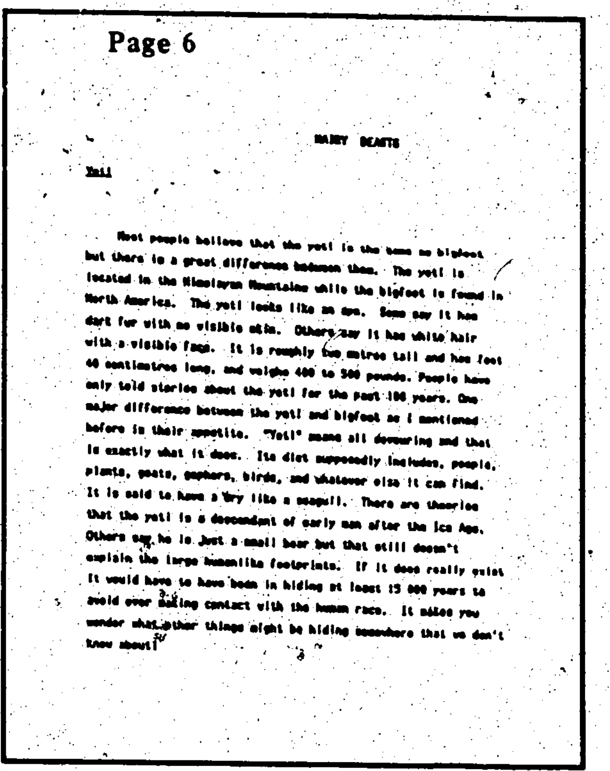
Ex5 Product Structure: Scott Continued ...



Page 4

of what it looks like. The reason the Loch Ness monster has never been subject to a descriptive photograph is because the Loch Ness waters are full of peat and you couldn't take a good photograph if you tried. Even though it's nearly impossible to see there have been at least three thousand sightings since 1933. Strangely enough most of the descriptions are remarkably similar. It is described as having a long neck and snakelike head with a large body and flippers instead of feet. The first recorded sighting of this "monster" was in 535 A.D. Scientists believe it is a plesiosaur those ancestors survived the Ice Age. There have many scientific expeditions to find the Loch Ness monster. Probably the most successful of these was in the late 1970's with the the attempt by an American diving team that got a picture of the monster but it was moving so fast all they got a picture of was a gigantic flipper. There are many theories on what animal this flipper belonged to but the animal would have to be big.

[illegible]

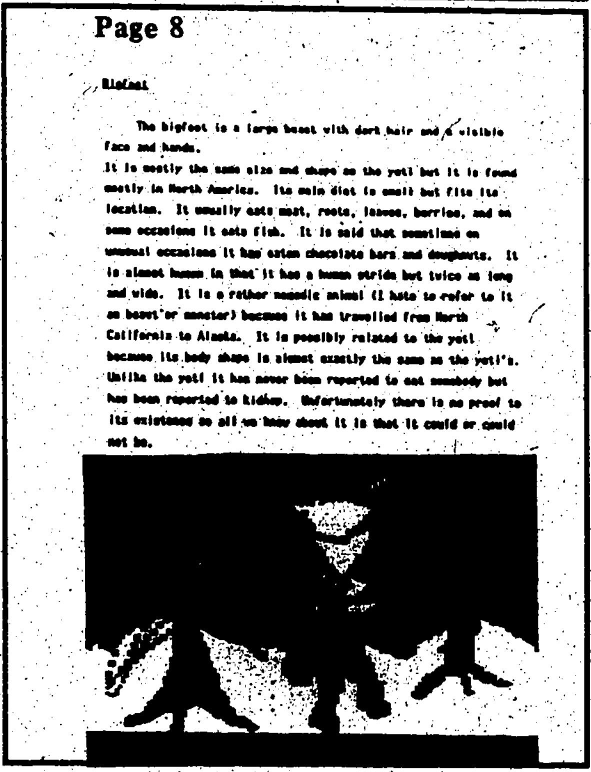


Page 6

HAIRY BEASTS

Yeti

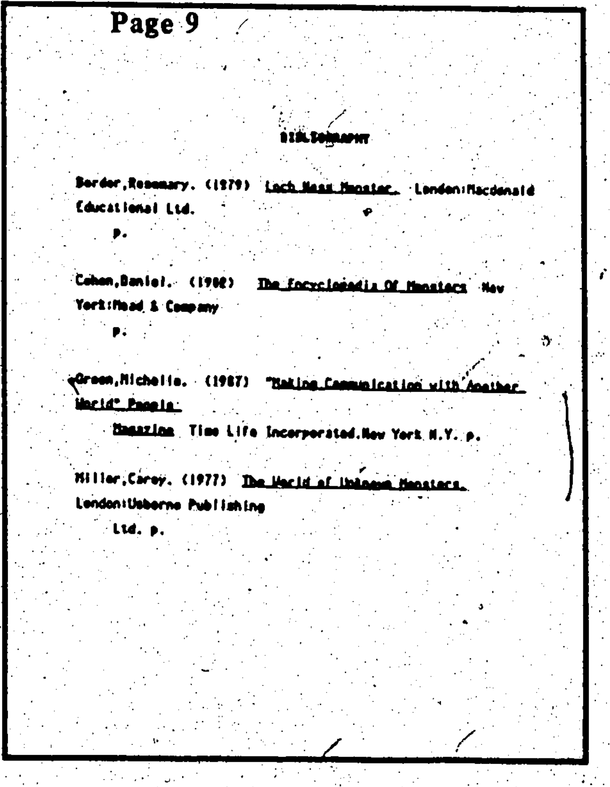
Most people believe that the yeti is the same as bigfoot but there is a great difference between them. The yeti is located in the Himalayan Mountains while the bigfoot is found in North America. The yeti looks like an ape. Some say it has dark fur with no visible skin. Others say it has white hair with a visible face. It is roughly two metres tall and has feet 40 centimetres long, and weighs 400 to 500 pounds. People have only told stories about the yeti for the past 100 years. One major difference between the yeti and bigfoot as I mentioned before is their appetite. "Yeti" means all devouring and that is exactly what it does. Its diet supposedly includes, people, plants, goats, gophers, birds, and whatever else it can find. It is said to have a cry like a seagull. There are theories that the yeti is a descendant of early man after the Ice Age. Others say he is just a small bear but that still doesn't explain the large humanlike footprints. If it does really exist it would have to have been in hiding at least 15 000 years to avoid ever making contact with the human race. It makes you wonder what other things might be hiding somewhere that we don't know about!



Page 8

Bigfoot

The bigfoot is a large beast with dark hair and a visible face and hands.
It is mostly the same size and shape as the yeti but it is found mostly in North America. Its main diet is small but fits its location. It usually eats meat, roots, leaves, berries, and on some occasions it eats fish. It is said that sometimes on unusual occasions it has eaten chocolate bars and doughnuts. It is almost human in that it has a human stride but twice as long and wide. It is a rather nomadic animal (I hate to refer to it as beast or monster) because it has travelled from North California to Alaska. It is possibly related to the yeti because its body shape is almost exactly the same as the yeti's. Unlike the yeti it has never been reported to eat somebody but has been reported to kidnap. Unfortunately there is no proof to its existence so all we know about it is that it could or could not be.



Page 9

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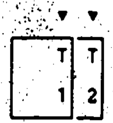
Ex$_4$ Product Structure: Nancy



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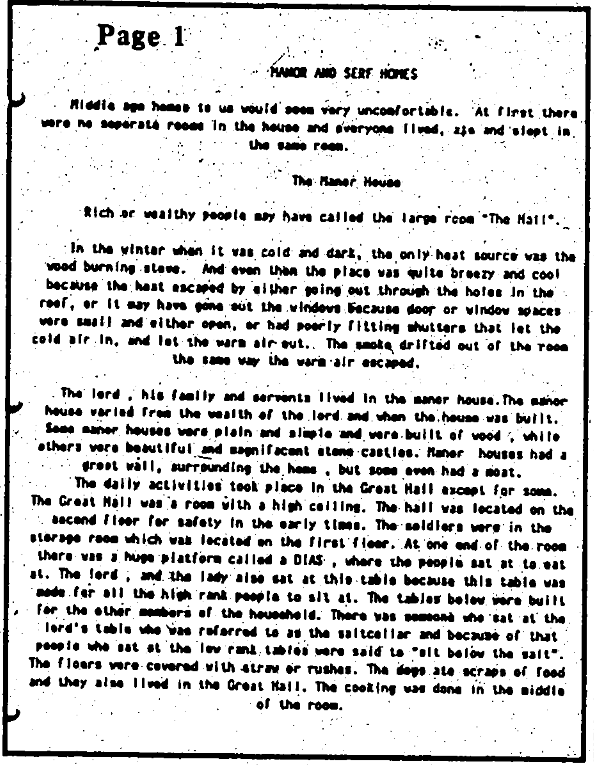


Page 1

MANOR AND SERF HOMES

Middle age homes to us would seem very uncomfortable. At first there were no seperate rooms in the house and everyone lived, ate and slept in the same room.

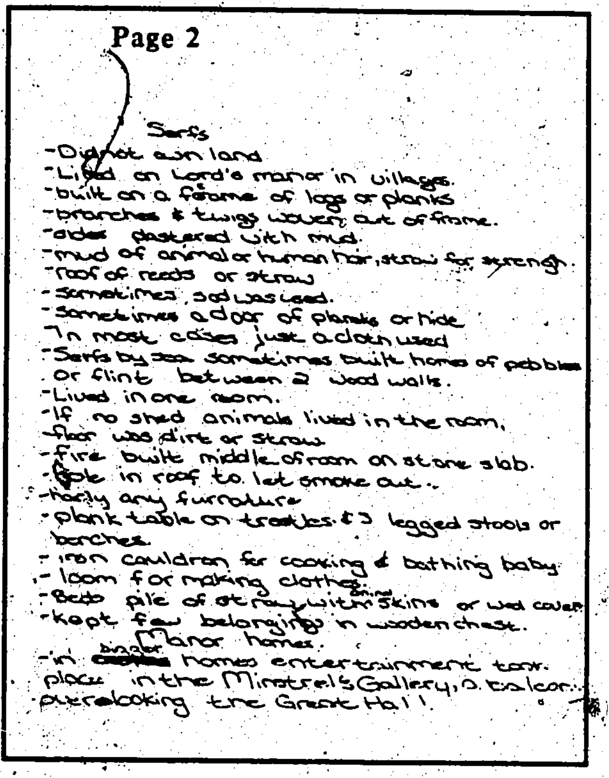
The Manor House

Rich or wealthy people may have called the large room "The Hall".

In the winter when it was cold and dark, the only heat source was the wood burning stove. And even then the place was quite breezy and cool because the heat escaped by either going out through the holes in the roof, or it may have gone out the windows because door or window spaces were small and either open, or had poorly fitting shutters that let the cold air in, and let the warm air out.. The smoke drifted out of the room the same way the warm air escaped.

The lord , his family and servents lived in the manor house.The manor house varied from the wealth of the lord and when the house was built. Some manor houses were plain and simple and were built of wood , while others were beautiful and magnifacent stone castles. Manor houses had a great wall, surrounding the home , but some even had a moat.

The daily activities took place in the Great Hall except for some. The Great Hall was a room with a high ceiling. The hall was located on the second floor for safety in the early times. The soldiers were in the storage room which was located on the first floor. At one end of the room there was a huge platform called a DIAS , where the people sat at to eat at. The lord , and the lady also sat at this table because this table was made for all the high rank people to sit at. The tables below were built for the other members of the household. There was someone who sat at the lord's table who was referred to as the saltcellar and because of that people who sat at the low rank tables were said to "sit below the salt". The floors were covered with straw or rushes. The dogs ate scraps of food and they also lived in the Great Hall. The cooking was done in the middle of the room.



Page 2

Serfs
-Did not own land
-Lived on Lord's manor in villages.
-built on a frame of logs or planks
-branches & twigs woven out of frame.
-sides plastered with mud.
-mud of animal or human hair, straw for strength.
-roof of reeds or straw
-Sometimes, sod was used.
-Sometimes a door of planks or hide
In most cases just a cloth used
-Serfs by sea sometimes built homes of pebbles
or flint between 2 wood walls.
-Lived in one room.
-If no shed animals lived in the room.
-floor was dirt or straw
-Fire built middle of room on stone slab.
-Hole in roof to let smoke out.
-hardly any furniture
-plank table on trestles & 3 legged stools or
benches.
-iron cauldron for cooking & bathing baby
-loom for making clothes.
-Beds pile of straw with animal skins or wool cover.
-Kept few belongings in wooden chest.
Manor homes.
-in bigger homes entertainment took
place in the Minstrel's Gallery, a balcony
overlooking the Great Hall!

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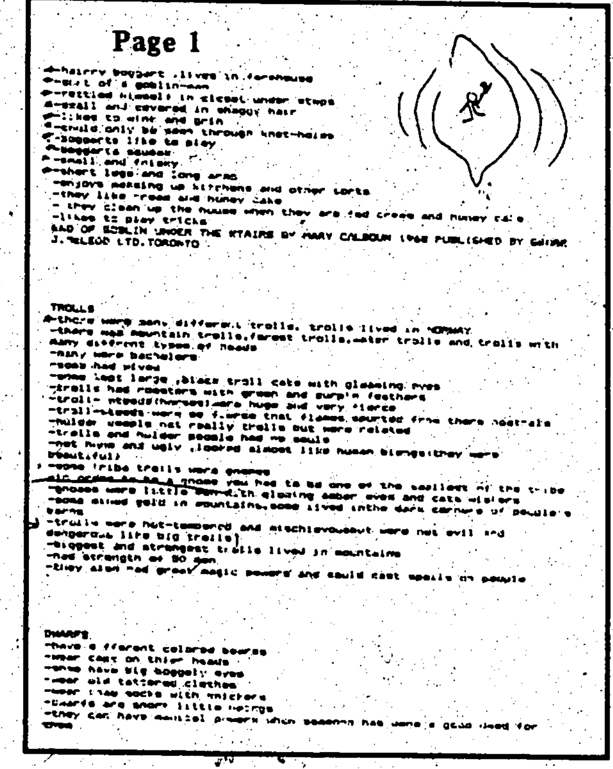
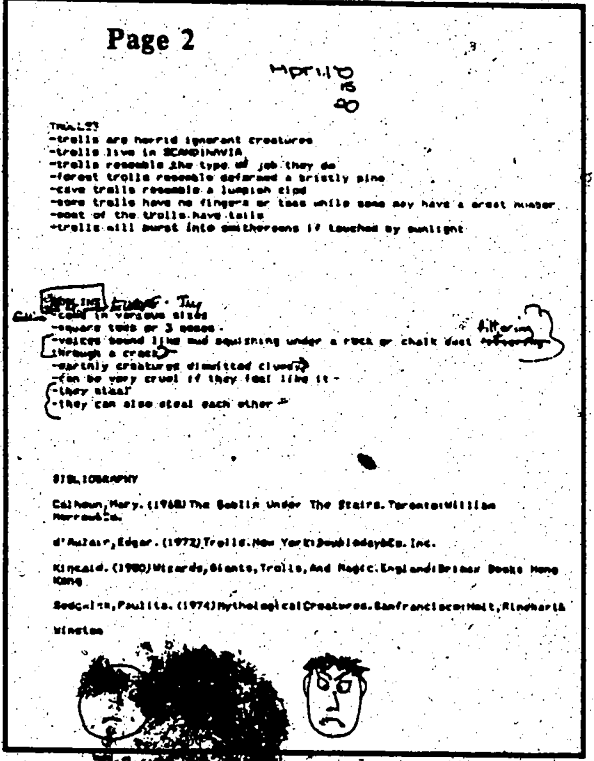


Page 1

-hairry boggart .lives in farmhouse
-sort of a goblin-man
-settled himself in closet under steps
-small and covered in shaggy hair
-likes to wink and grin
-could only be seen through knot-holes
-boggarts like to play
-boggarts squeak
-small and frisky
-short legs and long arms
-enjoys messing up kitchens and other sorts
-they like cream and honey cake
- they clean up the house when they are fed cream and honey cake
-likes to play tricks
BAD OF GOBLIN UNDER THE STAIRS BY MARY CALHOUN 1968 PUBLISHED BY GEORGE J.McLEOD LTD.TORONTO

TROLLS
-there were many different trolls. trolls lived in NORWAY
-there was mountain trolls,forest trolls,water trolls and trolls with many different types of heads
-many were bachelors
-some had wives
-some kept large ,black troll cats with gleaming eyes
-trolls had roosters with green and purple feathers
-troll steeds(horses)were huge and very fierce
-troll steeds were so fierce that flames spurted from there nostrils
-hulder people not really trolls but were related
-trolls and hulder people had no souls
-not huge and ugly ,looked almost like human beings(they were beautiful)
-some tribe trolls were gnomes
~~-in order to be a gnome~~ you had to be one of the smallest of the tribe
-gnomes were little men with gleaming amber eyes and cats whiskers
-some mined gold in mountains,some lived inthe dark corners of people's barns
-trolls were hot-tempered and mischievous(but were not evil and dangerous like big trolls)
-biggest and strongest trolls lived in mountains
-had strength of 50 men
-they also had great magic powers and could cast spells on people

DWARFS
-have different colored beards
-wear caps on thier heads
-some have big boggely eyes
-wear old tattered clothes
-wear like socks with knickers
-dwarfs are short little beings
-they can have magical powers when someone has done a good deed for them



Page 2

Horrid

TROLLS
-trolls are horrid ignorant creatures
-trolls live in SCANDINAVIA
-trolls resemble the type of job they do
-forest trolls resemble deformed a bristly pine
-cave trolls resemble a lumpish clod
-some trolls have no fingers or toes while some may have a great number
-most of the trolls have tails
-trolls will burst into smithereens if touched by sunlight

GOBLINS [illegible] · They
-come in various sizes
-square toes or 3 toes.
-voices sound like mud squishing under a rock or chalk dust ~~scraping~~ filtering through a crack
-earthly creatures dimwitted clumsy
-can be very cruel if they feel like it -
-they steal
-they can also steal each other

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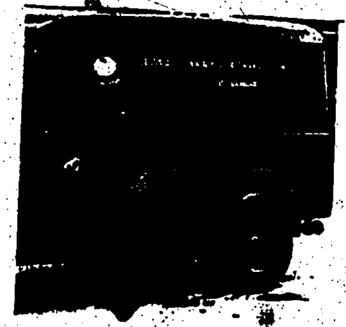
Page 4

Dr. Norman Bethune worked all over the world. In Detroit (1926) he was found to have pulmonary tuberculosis, he then devoted himself to other tuberculosis victims. During 1929-1936 he invented 12 medical instruments and writing 14 articles describing his innovations in thoracic technique. When Spain was in a Civil War (1936), there he organized a mobile blood-transfusion service. In 1938 he left for China who was at war with Japan. He helped Chinese soldiers who were fighting in the battlefield. In my survey 7 people had heard of Dr. Norman Bethune, and only 6 people knew that he was a battlefield surgeon. I think Dr. Norman Bethune was very courageous to end be in the same place as a war, and would consider Dr. Norman Bethune to be a hero.

Billy Bishop served in World War 1 as a pilot (flying ace). He go out alone and make surprise attacks on German air bases. While at war he won a chestful of medals, including being the first canadian to win the Victorian Cross. Billy Bishop also served in and World War 2, as a air marshal. In my survey 13 people had heard of Billy Bishop, and 7 people knew that he was in both wars. I think Billy Bishop had to have a lot of courage to go make surprise attacks all by himself, and would consider Billy Bishop to be a hero.

There has been so much information on Rick Hansen I don't know where to start. Rick Hansen was in a car accident and was paralyzed (Spinal Cord Injury). Two years ago Rick Hansen set out for a world tour, to raise money for Spinal Cord Injury, the Man In Motion World Tour. He visited Canada, United States, Europe, Asia, Australia. On Friday May 22, 1987 Rick Hansen finished his tour. He has raised about $18 million in the two years he was out. Many people were inspired by Rick Hansen, but Rick Hansen was inspired by Terry Fox who ran across Canada with one real leg and one fake leg. While he was in China he tackled a steep stretch of The Great Wall of China. His physiotherapist Amanda Reid has said she will marry him in October. In my survey everyone has heard of Rick Hansen, and everyone knew he wheeled around the world. I think Rick Hansen was very courageous to wheel around the world, and would consider Rick Hansen to be a hero.

Page 5



Dr. Norman Bethune

Billy Bishop

Page 6

Rick Hansen

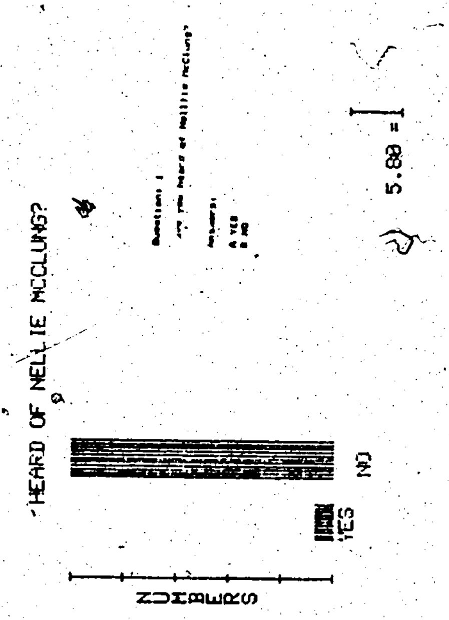
World tour

Page 9

Heroism - The condition or quality of being a hero. A hero is a person important in some event, field, period, or cause by reason of his special achievements or contributions. I agree with this quotation, but I think anyone, who sets goals and accomplishes them could be considered heroic. These individuals may never receive public recognition. However it required personal sacrifice and courage to complete their goals. I personally consider all these people to be heroic.

Please check the graphs and pictures at the back of this report. The graphs are the survey results for the survey I gave to the grade six classes. The pictures are photos of all the people I talked about. There are also pictures of Rick Hansen while he was on his tour, and a map of his tour.

Page 10



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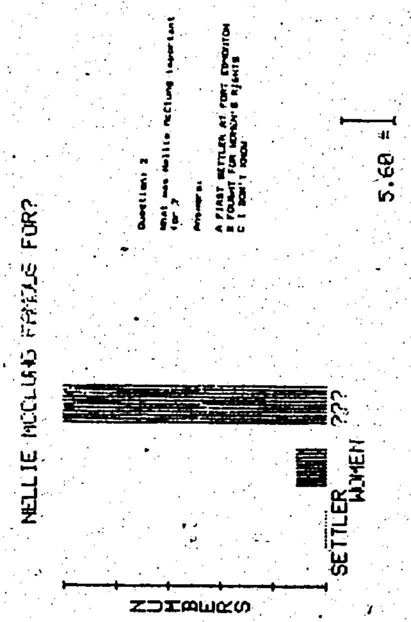

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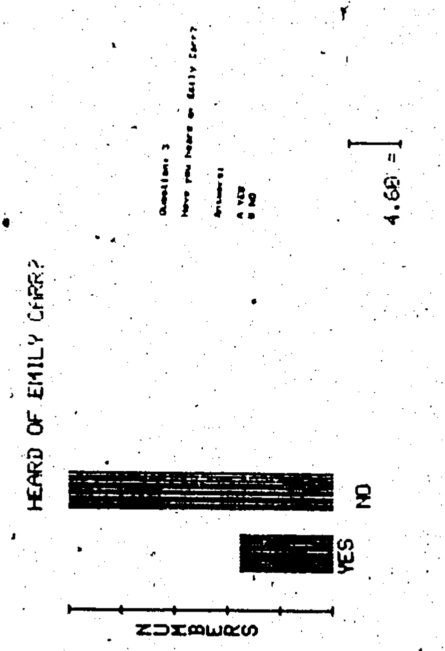

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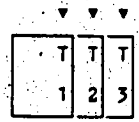

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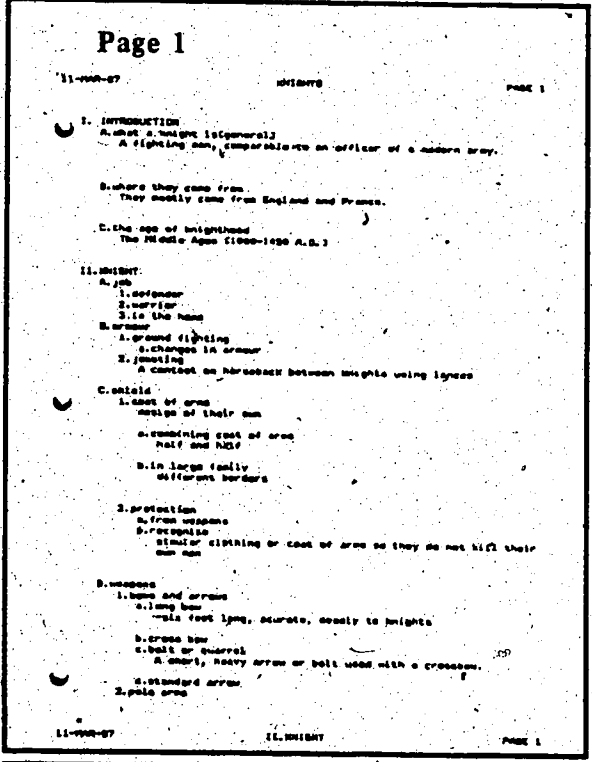

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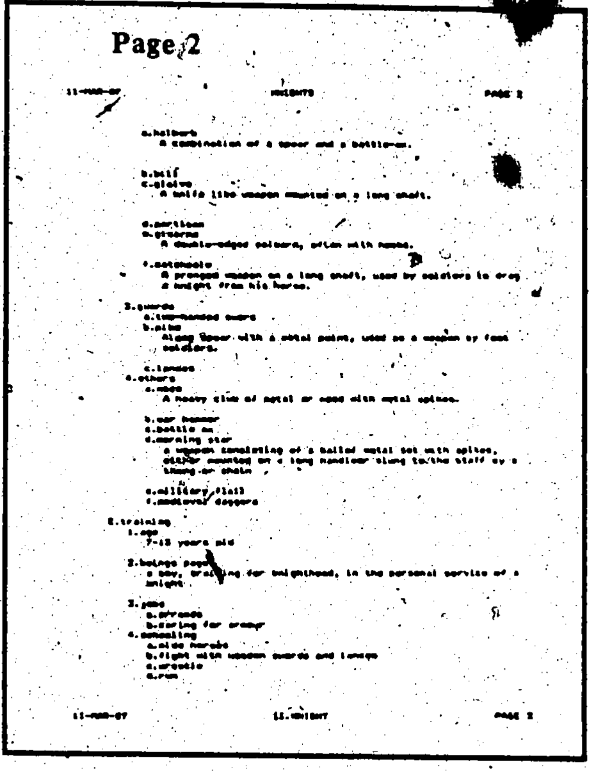

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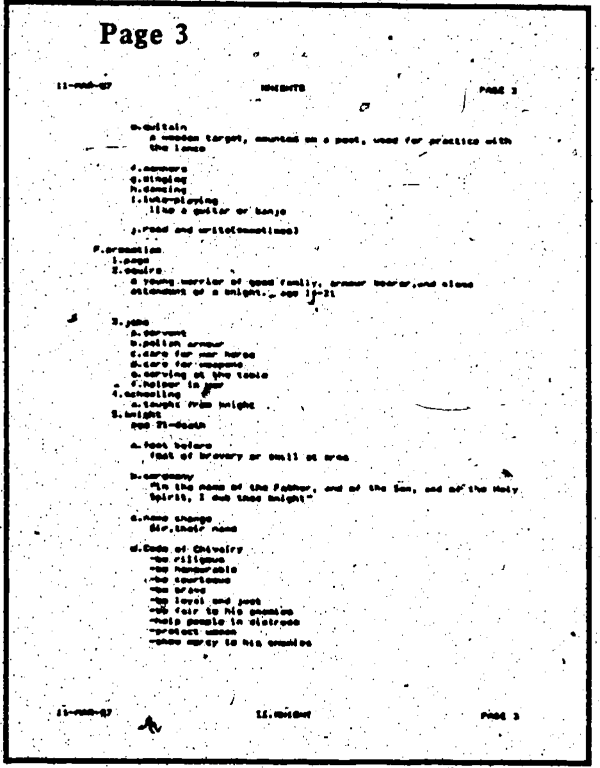

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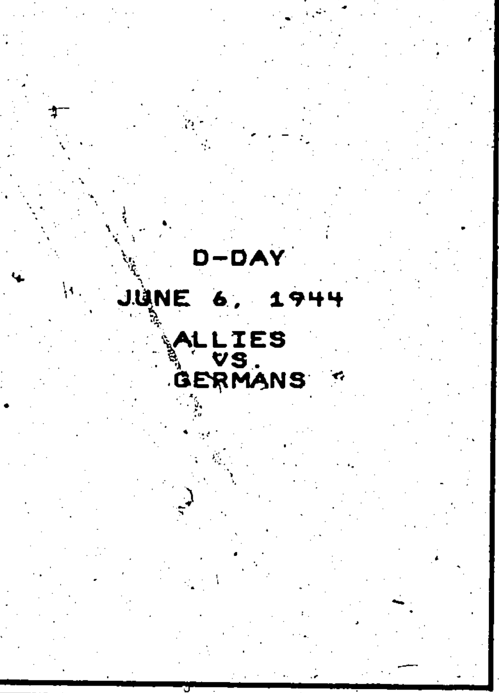
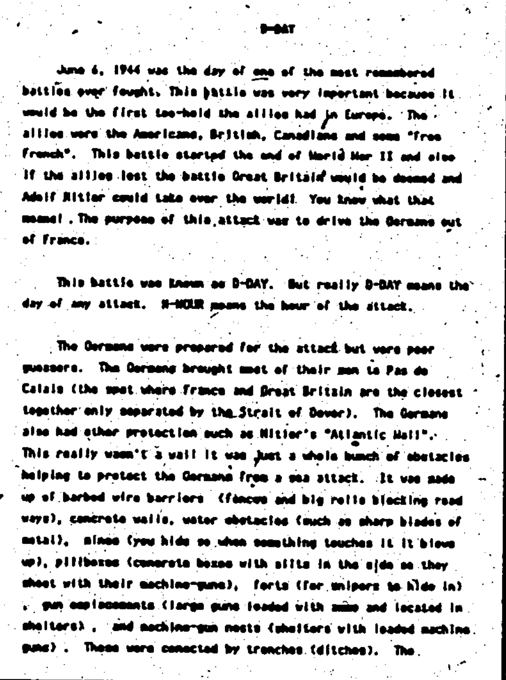


D-DAY
JUNE 6, 1944
ALLIES
VS.
GERMANS

Page 1



D-DAY

June 6, 1944 was the day of one of the most remembered battles ever fought. This battle was very important because it would be the first toe-hold the allies had in Europe. The allies were the Americans, British, Canadians and some "free French". This battle started the end of World War II and also if the allies lost the battle Great Britain would be doomed and Adolf Hitler could take over the world! You know what that means! . The purpose of this attack was to drive the Germans out of France.

This battle was known as D-DAY. But really D-DAY means the day of any attack. H-HOUR means the hour of the attack.

The Germans were prepared for the attack but were poor guessers. The Germans brought most of their men to Pas de Calais (the spot where France and Great Britain are the closest together only separated by the Strait of Dover). The Germans also had other protection such as Hitler's "Atlantic Wall". This really wasn't a wall it was just a whole bunch of obstacles helping to protect the Germans from a sea attack. It was made up of barbed wire barriers (fences and big rolls blocking road ways), concrete walls, water obstacles (such as sharp blades of metal), mines (you hide so when something touches it it blows up), pillboxes (concrete boxes with slits in the side so they shoot with their machine-guns), forts (for snipers to hide in) , gun emplacements (large guns loaded with ammo and located in shelters) , and machine-gun nests (shelters with loaded machine guns) . These were conected by trenches (ditches). The

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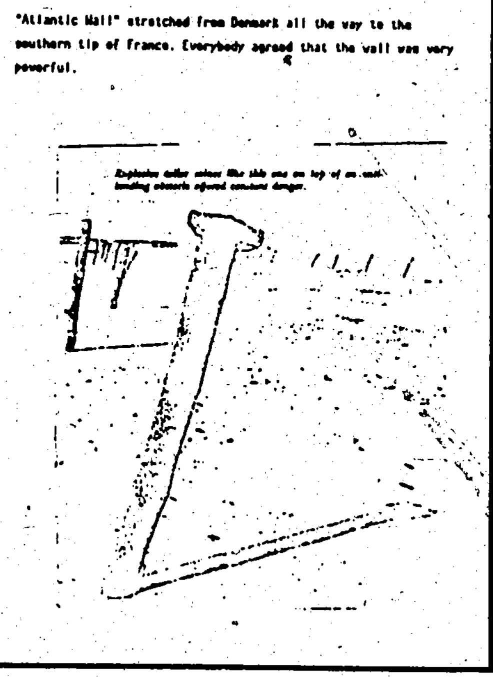
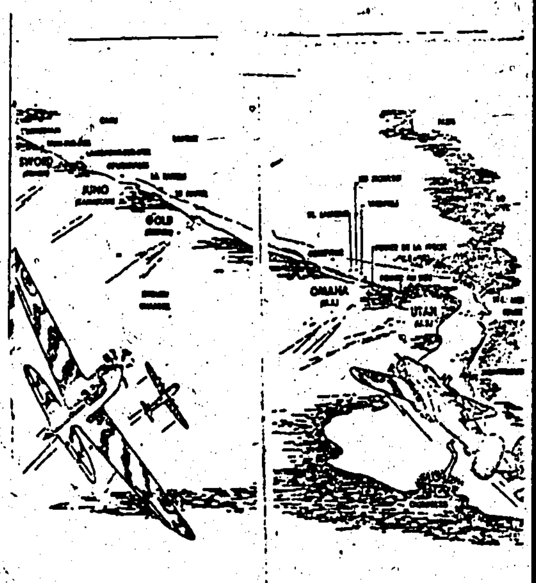
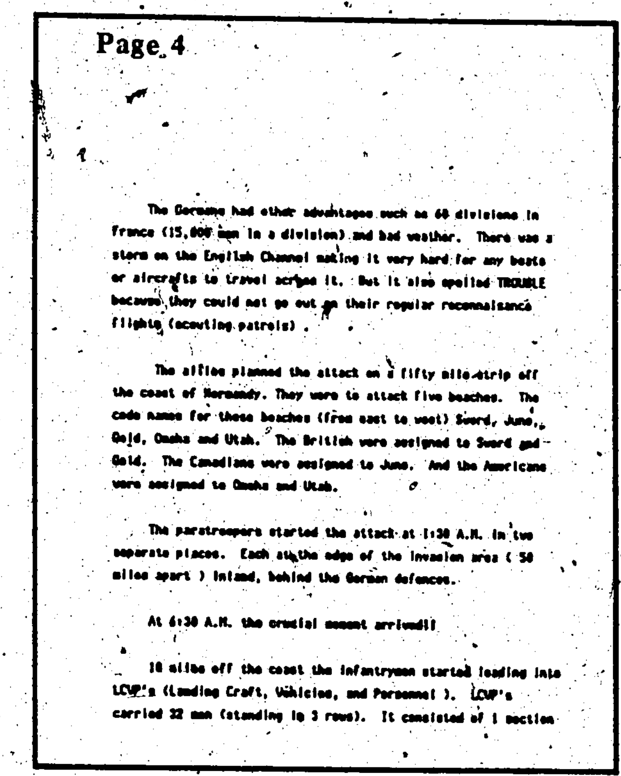


"Atlantic Wall" stretched from Denmark all the way to the southern tip of France. Everybody agreed that the wall was very powerful.

Explosive teller mines like this one on top of an anti-landing obstacle offered constant danger.

Page 3





Page 4

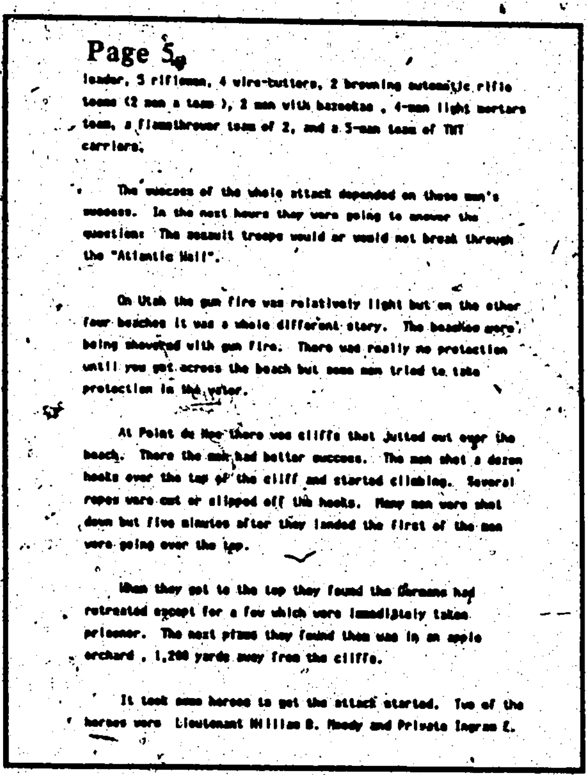
The Germans had other advantages such as 60 divisions in France (15,000 men in a division) and bad weather. There was a storm on the English Channel making it very hard for any boats or aircrafts to travel across it. But it also spelled TROUBLE because they could not go out on their regular reconnaissance flights (scouting patrols) .

The allies planned the attack on a fifty mile-strip off the coast of Normandy. They were to attack five beaches. The code names for these beaches (from east to west) Sword, Juno, Gold, Omaha and Utah. The British were assigned to Sword and Gold. The Canadians were assigned to Juno. And the Americans were assigned to Omaha and Utah.

The paratroopers started the attack at 1:30 A.M. in two separate places. Each at the edge of the invasion area (50 miles apart) inland, behind the German defences.

At 6:30 A.M. the crucial moment arrived!!

10 miles off the coast the infantrymen started loading into LCVP's (Landing Craft, Vehicles, and Personnel). LCVP's carried 32 men (standing in 3 rows). It consisted of 1 section



Page 5

leader, 5 riflemen, 4 wire-cutters, 2 browning automatic rifle teams (2 men a team), 2 men with bazookas , 4-man light mortars team, a flamethrower team of 2, and a 5-man team of TNT carriers.

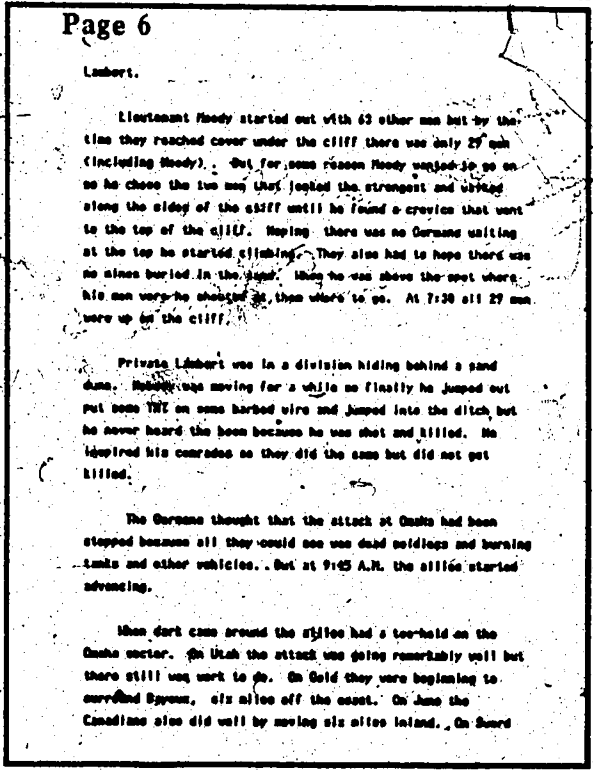
The success of the whole attack depended on these men's success. In the next hours they were going to answer the question: The assault troops would or would not break through the "Atlantic Wall".

On Utah the gun fire was relatively light but on the other four beaches it was a whole different story. The beaches were being showered with gun fire. There was really no protection until you got across the beach but some men tried to take protection in the water.

At Point du Hoe there was cliffs that jutted out over the beach. There the men had better success. The men shot a dozen hooks over the top of the cliff and started climbing. Several ropes were cut or slipped off the hooks. Many men were shot down but five minutes after they landed the first of the men were going over the top.

When they got to the top they found the Germans had retreated except for a few which were immediately taken prisoner. The next place they found them was in an apple orchard , 1,200 yards away from the cliffs.

It took some heroes to get the attack started. Two of the heroes were Lieutenant William B. Moody and Private Ingram E.



Page 6

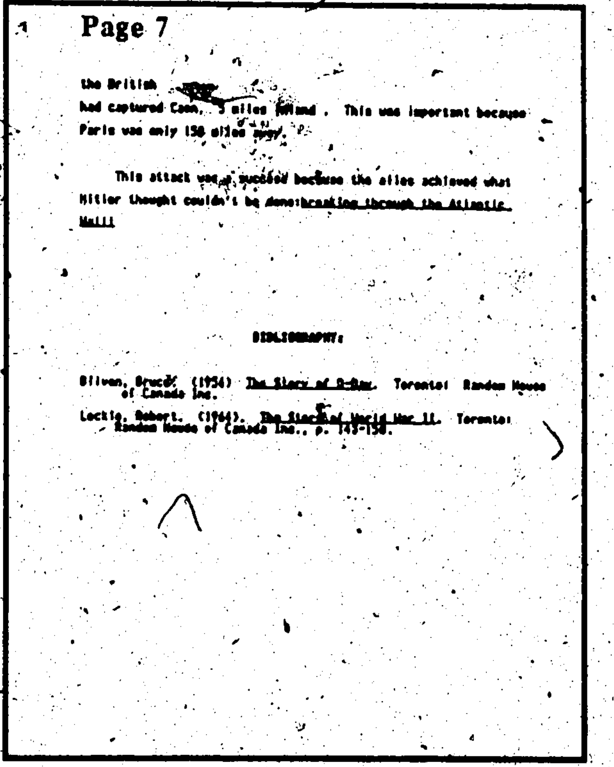
Lambert.

Lieutenant Moody started out with 63 other men but by the time they reached cover under the cliff there was only 29 men (including Moody). But for some reason Moody wanted to go on so he chose the two men that looked the strongest and walked along the sides of the cliff until he found a crevice that went to the top of the cliff. Hoping there was no Germans waiting at the top he started climbing. They also had to hope there was no mines buried in the sand. When he was above the spot where his men were he shouted at them where to go. At 7:30 all 29 men were up on the cliff.

Private Lambert was in a division hiding behind a sand dune. Nobody was moving for a while so finally he jumped out put some TNT on some barbed wire and jumped into the ditch but he never heard the boom because he was shot and killed. He inspired his comrades so they did the same but did not get killed.

The Germans thought that the attack at Omaha had been stopped because all they could see was dead soldiers and burning tanks and other vehicles. But at 9:45 A.M. the allies started advancing.

When dark came around the allies had a toe-hold on the Omaha sector. On Utah the attack was going remarkably well but there still was work to do. On Gold they were beginning to surround Bayeux, six miles off the coast. On Juno the Canadians also did well by moving six miles inland. On Sword



Page 7

the British
had captured Caen, 5 miles inland . This was important because Paris was only 150 miles away.

This attack was a success because the allies achieved what Hitler thought couldn't be done:breaking through the Atlantic Wall!

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APPENDIX - D

RELATING COMMUNICATION AND CRITICAL THINKING SKILLS TO THE FOUR CORE ACADEMIC CURRICULA*

Categories of Skills	Mathematics (Problem-solving)	Science (Scientific Inquiry)	Social Studies (Social Inquiry and Participation Skills)	Language Arts
Receiving Skills	Communicating - receiving of mathematical data	Observing - obtaining information using the five senses	Interpret ideas and feelings of self and others (Participation Skills)	Listening and viewing Reading and viewing
Thinking Skills	1. Understand the problems 2. Develop a plan for attacking the problem 3. Carry out devised plan 4. Verify (looking back)	1. Initiation - identifying and defining problem; hypothesizing; designing collection data 2. Collection of data 3. Processing Data - classifying; measuring; interpreting 4. Conceptual of Data - developing a "mental model"; predicting; controlling variables 5. Openendness - experimenting; applying knowledge; seeking further evidence; identifying new problems for investigation	1. Identify and focus on the issue 2. Formulate research questions 3. Gather and organize data 4. Analyze and evaluate data 5. Synthesize data 6. Resolve the issue 7. Apply the decision 8. Evaluate the decision, the process and the action; begin inquiry anew	Recognize and identify; recall, understand Select appropriate materials; locate information; interpret information Analyze communication; infer relationships Make generalizations; synthesize Draw conclusions; predict outcomes Evaluate; form judgments
Expressing Skills	Communicating - expressing results	Communicating - describing objects, situations or events	Communicate effectively (Participation Skills)	Speaking Writing

Other subject disciplines are not included in this chart because they are under revision and review.

*Alberta Education: Program of Studies - Elementary, pp. (ix) and (x); Junior High, pp. (vii) and (viii).