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Abstract

Over a three month period in a high school on Prince Edward Island, I conducted a study involving three volunteer, struggling readers and the computer-assisted reading instruction software program, Academy of Reading 2000. While my initial goal was to improve students' reading ability, I was hoping to explore the efficacy of computer-assisted instruction (CAI) in a high school setting and to make recommendations regarding its use. What I learned indirectly from the literature on CAI and directly from my own experience with the students was that CAI can be a useful tool for struggling readers but it cannot replace one-on-one quality attention from a teacher. Although CAI was moderately effective, the human component in assisting struggling readers is vital. With adequate training and support, CAI can be considered an aid for teachers who have time to understand the complex literacy issues facing individual students with reading difficulties. The more I learned, from interviews with the three students and their parents, the more I was able to understand the context and possible alternatives for their reading challenges. It is the three stories of these students – one with a documented history of learning difficulties and assessments, one with an undocumented history of an inability to focus and severe reading difficulties, and one learning English as a second language who was apparently without reading difficulties – that will give teachers, parents, and students themselves insights into the difficulties of achieving success by using any one tool for reading intervention. What is needed most in the school system is someone who both cares and has the time to help the students make a difference in their learning.
Acknowledgements

I would like to thank the three students and their parents for participating in this study. I appreciate their trust in my ability to provide computer-assisted instruction in reading and their willingness to share information about their struggles with learning.

I wish to acknowledge the support for my research of my colleagues and the administration at Bluefield High School. I thank Leon Berrouard for graciously editing an earlier version of my paper.

Fulfilling the requirements of a graduate thesis has been an ongoing learning experience and although this thesis is finished, the learning has not. My interest in the problems faced by students who struggle with reading has not diminished but has been heightened by thesis process. I wish to thank my thesis advisor, Dr. Anne-Louise Brookes. Anne-Louise, by her example, has taught me so much about what makes a good teacher - laughter, kindness, support, inquiry, reflection and competence.

I thank Dr. Fiona O'Donoghue, as internal reader, and Dr. Ursala Kelly, as external reader, for their careful reading and suggestions for improvement. I also thank Dr. Gerry Hopkirk for his constructive comments at an earlier stage of this writing.

A thesis is like a journey and the journey is made easier in the comfort of fellow travellers. Through many of the courses taken in the Master of Education program, I have enjoyed learning with and feel privileged to know so many fine colleagues. The class discussion would continue in the ride home with Fran Albrecht. I value the conversation and companionship.

We all learn in different ways. Some write to learn while others, like myself, verbalize then draft to paper. I thank Annie MacPhail, my neighbour and fellow member of the teaching profession, for summer coffee breaks and for her willingness to provide a sounding board for my research.

Some say writing a thesis is like having a baby. For this baby to be delivered in good health, I thank my final editor, partner, and sweetie, Lorraine Helen Begley.
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Introduction

On October 3, 2002, I attended a public lecture given by Dr. Christina Fiedorowicz\(^1\) on the topic of learning disabilities. The audience was composed mostly of parents of students with learning disabilities. These parents with students from primary to university level shared the frustration and pain of their child’s school experience. The most common difficulty voiced was that of their child’s struggle with reading. As a former resource/remedial reading teacher and an elementary classroom teacher, I felt somewhat threatened and hurt by the criticisms of the education system for not meeting the needs of all students. However, I realized that my discomfort was slight compared to the anguish of the children and the parents dealing with the absence of success in school. A parent told of her child who wanted to drop out of school; this is perhaps not uncommon for students in junior high or senior high, but her child was only in grade four! Another parent of a child in grade three was desperately seeking solutions to problems in reading. Yet another young mother had spent $4000 since January purchasing one-on-one instruction at Spell Read Canada and in the following week was going to try yet another program, again outside the public education system.

At the same time, a week does not go by without media reports on educational applications of computer technology. Sometimes these reports praise schools for their efforts, but often they call for schools to get with the times, purchase more hardware and software, and to use computer technology more effectively (Potter & Small, 1998). As well, the opposite viewpoint is aired; schools are wasting too much money on computer technology and funds could be better spent on traditional learning materials (Armstrong, 1998). Combining this discussion of

\(^1\)Dr. Fiedorowicz is one of the developers of the *Academy of Reading* software.
computer technology with criticism of our public education system for failing to teach students how to read inspired this question of the usefulness of computers for reading instruction.

Many educators agree that literacy instruction is best accomplished in a one-on-one situation with a learner and a teacher (Balajthy, 1997). Sadly, we see that our educational system has difficulty providing the human resources to fulfil that best practice scenario. The classroom teacher may try her or his best to accommodate struggling readers in class by giving additional support and by adapting or modifying programs. The classroom teacher may also become the advocate for the child to access a resource teacher, a teacher assistant, a tutor, or a volunteer. Even if some human resources are available, they often are not adequate. The classroom teacher may still require more one-on-one assistance for the student. Can computer technology provide one-on-one reading instruction? Does computer technology have advantages that make it uniquely suitable for struggling readers? Can computer technology provide reading support for struggling readers and lead to more reading practice? In 1995, 1011 software programs purported to be relevant to reading and literacy education (Balajthy, 1997). Today there may be more; which program, if any, should teachers and administrators choose?

As a classroom teacher for most of the past 25 years, I have had in each of my classes a number of students who struggled with reading. Except for specialty areas such as physical education classes, delays in reading ability affected all subject areas. Silent reading time for these students was especially long because they were unable to read. Reading was not enjoyable so they did not practice and they lagged further behind their classmates in reading ability. There never seemed to be enough remedial/resource time allocated to the class. Volunteers, such as LOVE (Let Older Volunteers Educate) volunteers, were helpful in providing assistance with reading practice but not with reading instruction. From my classroom experience, I noted that on
indoor recess days the students with reading difficulties were the first to sign up to use the
computer in the classroom to play educational games such as Math Blaster or Factory.

From this early observation sprang the idea for this research study. I began my
investigation on the topic of using computers to improve students’ reading levels in the fall of
1999 when I enrolled, on a part-time basis, in the Master of Education program at the University
of Prince Edward Island (UPEI). Most members of that cohort were also full-time teachers and
we were fearful of the thesis requirement. One advantage of the UPEI program is that we could
work towards completing the thesis in steps throughout the course work over the following years.
For example, the major assignment for the first course on quantitative and qualitative research
methods was to complete a “research problem statement and literature review”. Mine was
entitled, “Can computer technology provide effective reading instruction?” In a subsequent
course on quantitative research designs, offered in the winter of 2001, I presented a research
proposal entitled, “The efficacy of reading software in the elementary classroom.” In May 2001,
for the final course, the graduate seminar, I reworked the previous proposal. I designed a
quantitative study to see if reading software with a “game like” atmosphere, specifically Reading
Blaster and Kid Phonics 2, would improve students’ reading levels. As I moved towards
implementing a quantitative study, my interest waned as the requirements of ensuring
statistically significant results seemed to take priority over my guiding research questions. The
questions that I was seeking to answer did not fit within a quantitative methodology.

A job change in September 2001 from elementary to high school, from classroom teacher
to teacher-librarian, put the thesis project on hold. Bluefield High School has an enrollment of
860 students from the surrounding predominately rural communities. Because of my background
as a special education/resource teacher, the principal, Grant Canvin, asked me to be a part of the
Student Services Team\(^2\) at Bluefield. He summarized the role of the team as trying to help those students who were in danger of falling through the cracks in the system. The team met regularly to discuss both students who were having academic difficulties and what could be done to improve their situations. If a reading problem was suspected, I would do an informal assessment of the student's reading level. Sadly, and not surprisingly, I found there were students with severe reading difficulties in high school.

From my involvement with the Student Services Team, I realized that I could still pursue both my interest in computers and in reading instruction. In October 2001, Dr. Anne-Louise Brookes agreed to become my thesis advisor and I started to work on the proposal for the Research Ethics Board (REB). At the same time, with funds acquired from Technology P.E.I. for making a Web site for a class project on the Great Depression that connected students and seniors, I was able to purchase a computer system with software (text and speech recognition) for special needs students.

For reading instruction software, I chose to use the *Academy of Reading 2000* as it was one of the most commonly used programs in Canada and particularly on Prince Edward Island (PEI). In November 2001, I requested from AutoSkill International in Ottawa and was given permission to use *AutoSkill*\(^3\) on one computer for the duration of my research. In December 2001, I visited Ms. Lillian MacKenzie, a Social Service Worker/Literacy Trainer with the Southern Kings Literacy Enhancement program, for training on using *AutoSkill* with students. Ms. MacKenzie had been using *AutoSkill* since 1992 and highly recommended the program. As

\(^2\) The Student Services Team was comprised of the principal, both guidance counselors, the special education teacher, the resource teacher, one other teacher and myself.

\(^3\) Throughout the paper the term, *AutoSkill* will refer to AutoSkill International's *Academy of Reading 2000* software program.
teacher-librarian at Bluefield, I had the luxury of an office with a new multimedia computer for student use. I was ready to provide computer-assisted instruction (CAI) in reading using *AutoSkill* with three students who came to my attention through the Student Services Team.

After my research proposal was approved by the REB in March 13, 2002, I met with the parents of the three students who would become participants in this study of CAI in reading. The participants began using *AutoSkill* in late March 2002. The research was conducted along with my work as the school’s full-time teacher-librarian. Using qualitative research methods, I interviewed the participants to document how they perceived the CAI method. As teacher/researcher, I also kept a weekly log to record my perceptions of not only providing the computer program, but of how students interacted with the software. I also tested the reading ability of the participants before and after the intervention period, in March and June 2002. Although a comparison of pretests and posttest scores with a sample size of three participants would not hold any statistical significance, I wanted to know if the participants’ reading ability had improved. As the research developed, I was drawn to understand better the context of each of the participants, their history of schooling, prior attempts at remediation, and past and present frustrations and successes. Following the intervention, I interviewed the participants’ parents in July 2002. In retrospect, it would have been more useful had the interviews occurred earlier. However, because a qualitative research approach allowed me to be more responsive during the course of this study, I was able to pursue additional paths and gather additional data to present better the stories of three struggling readers.

*Someone Has to Care: Computer Assisted Instruction and Struggling Readers* documents the context and experience of three students and the teacher with computer-assisted reading instruction.
Chapter 1
Research Methodology

Purpose and Overview

As teacher-librarian, I meet students at all program levels, practical, general, and academic, who experience reading difficulties. While qualified personnel providing one-on-one instruction and support may be the best way to help students read, most schools do not have the resources to provide one-on-one instruction. And, while the needs of many students with severe learning problems are being met by the services of special education teachers and teaching assistants, other struggling readers receive no support or specific reading instruction. It is from this latter group that I drew my research participants.

The purpose of the study was to determine if computer assisted instruction would improve the reading ability of high school students who struggle with reading. To do this I worked closely with three high school students all of whom agreed to participate for the purpose of improving their reading ability. My aim was to examine if technological support would lead to improved reading ability. At the same time, my goal was to understand better the context in which these students struggled to improve their reading.

Comments that I have heard struggling readers make at all levels, elementary school, junior high school, and most recently at senior high school include: I can’t read very well; I read too slowly; Reading is too hard; I hate reading. From my first teaching assignment as a remedial reading teacher through to my present assignment as teacher-librarian, I recognized the importance of literacy acquisition. Trying to help struggling students improve their reading skills has always been part of my teaching. For this reason, I set out to examine if computer assisted instruction software, specifically AutoSkill International’s Academy of Reading 2000, would
boost the reading level of struggling readers. Students were also provided with the text-to-speech software, TextAloud. My goal was to understand how students used and perceived the use of CAI. As well, I wanted to understand the context of their struggle to read through their school histories and through prior attempts at remediation. At the same time, I documented my experience as a teacher providing CAI in addition to my regular teaching assignment. My log provided a space where I could react to the CAI program and document my experience of providing the software for the three participants.

Working from the assumption that CAI might hold promise, especially at the high school level, I wanted to know if struggling readers would be more willing to practice reading and receive instruction from a computer, rather than from a teacher. Because struggling readers do not have to show their deficits in reading to a teacher when using CAI, they might appreciate the anonymity offered by the computer. While I am interested in the efficacy of CAI, I am also interested in understanding how students view their own reading, as well as how they view the process of learning to read. This research, then, proposes to examine how students react to the instruction and practice provided by the AutoSkill computer program. I wanted to examine the strengths and weaknesses of CAI for students. I wanted to understand if text-to-speech software, TextAloud would encourage students to practice their reading skills. From my perspective as teacher-librarian, I wanted to know what technological skills were needed and how much time was required to manage CAI. As well, I wanted to know if CAI was a useful tool for teachers to help provide “one-on-one” reading instruction and support. And, I wanted to know what were the technical glitches. Finally, my goal was to determine if and how the use of AutoSkill might place an additional burden on a classroom teacher, specifically if time would be an issue; here I was examining my own reactions to CAI.
The study commenced on March 13, 2002 with approval from the Research Ethics Board. The intervention with AutoSkill began on March 20, 2002 and continued until the end of classes in June. The study concluded with the last interview with parents on July 10, 2002.

Participant Selection

The Bluefield Student Services Team recommended students for the study. Preference was given to students who were not receiving support from a teaching assistant and who had severe reading difficulties. The criteria for final selection of the participants was made in the same manner as determining which students received additional learning support from the resource teacher, by the Student Services Team whose decision was based on greatest need. Three high school students, wanting to improve their reading ability, were offered the opportunity to take part in the study. Participation in the study was voluntary. The three participants and their parents were told of the purpose of the study and what was expected of them. (See Appendix A for the Information Form for Participants and Appendix B for the Student Consent Form.)

Research Design

A quantitative design for this study was not chosen for several reasons. It would have been impossible for me to provide AutoSkill to a large enough group of students to have statistically significant results to evaluate the efficacy of CAI for reading. But, more than this, I wanted their stories, about learning to read, to emerge. This study is more than comparing the students’ pretests and posttests scores of reading ability. Saban (2000) gives reasons for using qualitative methodology which I adapted for my research. The qualitative method allowed me to study my own experience of offering CAI reading instruction in a natural school setting. In
addition, I was able to document the participants’ perspectives on using CAI and their impressions of CAI in comparison with previous methods of reading instruction.

Using a case study methodology within a qualitative research framework, the students kept biweekly logs and I documented my observations of the of three students and my own experience as a teacher in providing CAI. I adapted the steps that Gall, Gall, and Borg (2003, pp. 481-482) outline for a phenomenological inquiry while relying on the power of narrative. Their guidelines suggest four steps: select a topic of longstanding interest and significance; select participants who can become co-researchers; interview participants; and, analyse the data. Firstly, I selected a topic that has been a long standing concern of mine, how to help struggling readers improve their reading ability. Secondly, the three student participants were willing to try to improve their reading ability using CAI and, being fully aware of the purpose of the study (see Appendix A), they became co-researchers. Thirdly, data was gathered from: my weekly teacher’s log, the students’ bi-weekly learning logs, two interviews with each student, and interviews with the parents of the students (see Appendix C for the Informed Consent form). The fourth and final step was the analysis of the data, which is presented in the form of stories, about the experiences of the three student participants and my experience as the teacher offering CAI.

My research was designed to provide teachers with another tested tool to assist in day-to-day reading instruction in the style of action research as described by Borg, Gall, and Gall (1993). Borg et al. write, “Action research has been defined as ‘research carried out by practitioners with a view to improving their professional practice and understanding it better’ (Cameron-Jones, 1983)” (p. 390). Although I would be very interested in reading a quantitative research study on the efficacy of CAI in reading with high school students, this was neither the intent of my research nor my desire. I believe that the way to improve teaching practice is to
focus on the particular. In a similar fashion, perhaps the students in the Great Depression project mentioned earlier, gained a fuller understanding of the Depression from interviewing one senior than they would have gained from statistics on job losses, wage rates, and infant mortality. This focus on the particular to gain a greater understanding of the whole is, in my opinion, the strength of case study methodology.

Presenting the data in the form of stories is probably the most useful part of this study. Through critical pedagogy (Wink, 2000), I am encouraged to examine carefully current practices and new tools such as CAI, to reflect, and to write in order to gain greater understanding. As Wink suggests:

Writing is one way of inquiring into your own knowledge. Write your stories, your ideas, your perspective, your experiences, your biases, your voice, and your ways of knowing.

Critical pedagogy has taught me to be a listener and a storyteller (p. 181). Also by presenting the findings through stories, I hope that my research will be more easily, and more willingly, read by other educators. A question that I was asked by a colleague at Bluefield High School goes something like this, “So what happens to the thesis when you are finished? Does it sit on a shelf?” This is a fair question. An inquiry, into both understanding the context of students who struggle with reading and whether CAI holds promise for these students, should be seen as important work. If, by presenting the data through stories makes the findings more readable, then the soundness of the methodology has been proven.

*Intervention with Academy of Reading 2000*

Participants were expected to use the *AutoSkill* computer software program for a minimum of 25 hours following the claim made on the face of the installation disk: “Jump 2.5 grades in only 25 hours with [Academy of Reading 2000](#).” Also, 25 hours of instruction was a
realistic goal to achieve during the second half of the school semester. AutoSkill International granted a free program license for use on one computer for the duration of the study. (The purchase price for one license, as of April 2003, is $840).

The student participants used a computer in a quiet area, in the back of my office in the library, for 40 minute sessions three to five times a week. They began after the March break and finished at the end of the school year in June 2002. I placed two filing cabinets, across a section of my office to act as wall divider. I could easily see the participants working but at the same time there was an element of privacy. The participants, wearing headphones, could continue with AutoSkill when other students or teachers were in the front part of the office.

AutoSkill has three major areas of instruction, phonemic awareness, reading subskills, and reading comprehension. The latter is the least emphasized area of instruction in which students read passages and select correct responses to questions on details, inference, and main ideas. Students can be assigned to begin the program by one of three methods. The first is by using the “Auto Test” feature. This is based on a cloze test where the student reads a paragraph and chooses the correct word from among three or four words depending on the level of instruction. The student is then automatically placed in the program with a sequence of skills to be mastered. The second method of program assignment is by using the “Auto Pilot” which uses as a starting point the student’s age and grade level in school. The third method involves extensive pretesting or diagnostic testing that purports to match the student’s learning difficulty with special training exercises. Lewis (1999) questions the appropriateness of this connection:

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4I refer to the Academy of Reading 2000 program binder to explain what the cloze test measures. “Each subtest [there are ten subtests or levels] determines the student’s ability to use context clues, grammatical structure and prediction skills. A student who is able to fill in the blanks consistently is understanding the material” (p. 172).
Some Integrated Learning Systems, such as *AutoSkill*, are based on hypothesised links between ‘diagnosis’ of a particular sub-type of learning difficulty and associated remediation. However, beliefs about such diagnosis-remediation links are still contested as they may be irrelevant or counter-productive (p. 154).

Also, the *AutoSkill* diagnostic testing method, in my opinion, requires more time than a classroom teacher would have available.

Although I administered the word recognition and the cloze comprehension tests within *AutoSkill* for pretesting purposes, I had difficulty deciding on the starting point for each of the students. Following advice from *AutoSkill*’s support staff, I used the “AutoPilot” feature. This method started the participants at the beginning of the program with phonemic awareness training. I was told that this was the most common method used. The students would meet with success and quickly progress to the level where the instruction would be more challenging. This would also ensure that the students has mastered all the prerequisite skills of reading. The assignments were automatically generated and the students worked through the program from phonemic awareness training, to reading subskills, and on to reading comprehension.

Perhaps the best way to describe a session with *AutoSkill* is to leave the computer behind for a moment. Picture a teacher working with a student at a desk with flash cards. The teacher flashes a card with a word, a consonant blend, or a letter. The student very quickly has to point to the matching card among several other cards laid out on the table. Or, instead of showing the card, the teacher says aloud what is on the card and again the student has to choose the correct response among several cards on the table. The teacher also has a stop watch to time how long the student takes for each response. Then the teacher calculates the average response time for each set of cards. This is what is involved in reading subskills training except that the teacher is
replaced by the computer. Teachers call this method “drill and practice.” The order of exercises follows a hierarchy of skills and the computer records the results of each practice session.

The AutoSkill or the Academy of Reading software, as the name suggests, is designed to look like an academy. When using the software, students enter the academy and the choices available to them are set up as rooms within the academy. On entering, the students usually go to either the phonemic room or the reading room. After each session students may go to the results room and see a graph of their session. Or, to the awards room to see the printable certificate they earned for each training exercise mastered.

The students have to meet the preset accuracy rate in three separate trials before the program will move them to the next level of training. In the reading subskills training, the program also measures the speed of student response and these response times have to be consistent. One of the foundations of AutoSkill rests on automaticity. For a definition of automaticity, I referred to the AutoSkill program binder:

The reading subskills exercises train rapid and accurate responding to the basic components of reading (i.e., the processing of letters, syllables and words) until they can be processed automatically. This automaticity of response then facilitates the attainment of higher level reading skills like comprehension (Academy of Reading 2000, p. 5).

Data Collection and Presentation

The students were asked to make biweekly entries in their learning logs, and to respond to the following questions:

• What reading skills have you been practicing?
• Was AutoSkill easy to use? Did you find that you needed much help to use the program?
Did you like using AutoSkill? What do you like about the program? Are there things that you don’t like?

Did you use TextAloud? If yes, what were you reading? Did you find it helpful?

Two recorded interviews of approximately 30 minutes were conducted with each student, at the halfway point of the intervention and at the end of the school year. The interviews provided an opportunity to review the responses in their learning logs, to illicit from the student participants clearer and richer responses, and to talk about reading gaffes I had made. The students were also asked about both their general school experience and the amount of extra help accessed over their years in school. The interviews started with the questions listed above but developed into conversations about school, both their present experience and their recollections of past attempts at remediation. As Shank (2002) writes, the semi-structured interview may bring interesting and necessary information.

Something about the makeup of many of us makes us extraordinarily task-oriented. If you are setting out to interview someone as a task, and you have a clearly articulated set of questions and goals (maybe that you eventually hope to code using your actual transcript data) then you are almost certainly flirting with disaster. I call these “elephant” interviews. The task-oriented interviewer, like a bull elephant heading for its watering hole, relentlessly tramps toward its goal. By and large, the stuff that gets pushed aside is often more interesting and more important than the set of preconceived findings for which the interview was nothing but another task (p. 105).
The interviews were two-way conversations. As co-researcher, I had questions to ask and I tried to be open to listen, as well, to what was not expected or anticipated. As Wink (2000) says:

Dialogue is talk that changes us or our context. Dialogue is profound, wise, insightful conversation. Dialogue is two-way, interactive visiting. Dialogue involves periods of lots of noise as people share and lots of silence as people muse. Dialogue is communication that creates and recreates multiple understandings (p. 47).

Interviews were conducted with two of the students’ parents after the intervention to provide a fuller picture of the students’ school experiences, the successes, the frustrations, the previous learning assessments both within and outside the school system, and the attempts at remediation of learning difficulties. Specific questions included were:

- When in school did the problems first arise?
- Did the school notice the problems initially or did you, the parents?
- What frustrations did your child experience in school?
- What attempts were made through assessments to better understand your child’s learning difficulties?
- Was there adequate support given through resource teachers or modifications to programs?
- Did your child take part in any other reading programs outside the school setting?

Before students began the AutoSkill computer program, a one to three hour integrated, computer assessment using was required. Support staff of AutoSkill recommended against using the full placement battery of tests. With the small number of participants, I knew that any comparison of pretest and posttest scores would not have statistical significance. But with the
intent of measuring gains in reading ability, the cloze and word recognition pretests and posttests, within *AutoSkill*, were administered. To validate possible reading improvement shown by the pretests and posttests within the *AutoSkill* program, I thought it prudent to administer an external standardized reading assessment. Three subtests, word attack, word recognition, and passage comprehension, from the Woodcock Diagnostic Reading Battery (Woodcock, 1997) were administered as additional pretests and posttests.

In my role as co-researcher and teacher, I was also a participant in the study as I provided computer assisted reading instruction for three students in addition to my teaching assignment. My daily work in the school library was similar to that of a classroom teacher. Like these teachers, I did not have exclusive time to dedicate to the students taking part in the study. In addition to the struggling readers, a classroom teacher has the remaining 25 to 35 students to attend to in each class; my role was that of teacher-librarian for a school of almost 900 students. By inviting students to participate in this study, I took on the responsibility of trying to improve their reading ability in addition to my regular teaching assignment.

Keeping a weekly teacher’s log allowed me to reflect on the following research questions: What were the difficulties of managing computer assisted reading instruction? Was the additional burden too much? Did I see that the students enjoyed this method of instruction? Did students show up on time? Were they anxious to leave? Did the students want to spend additional time with the program? Did the students want to continue the program “on their own” after the 25 hours? What were my impressions of the reading instruction offered through a computer program?

When my teaching colleagues became aware of my attempt to provide reading instruction to a few students, they asked questions such as: Why would a student at the high school level
struggle with reading? Why did the student not learn how to read in elementary school? Because I believed these were important questions, I wanted to delve into the story of each student and try to understand the context in which each student learned. The story of each struggling reader is unique; by presenting the stories of three individuals, perhaps other teachers will be better able to provide assistance in the future. As well, teachers could benefit from reading my story as a co-researcher tracing the elusive path toward the acquisition of reading skills. It follows, then, that the results of this study are presented in the form of stories about the researchers who participated – three students, Harry, Thomas, and Marvin, and one teacher-librarian.
Chapter 2

Literature Review

As a teacher with a reading speciality, I approached the study of computer-assisted instruction with the goal of finding out both through the literature and through hands-on experience if CAI might be a solution to reading problems for struggling readers. I was more interested in the CAI literature than I was in covering what for me was already the familiar territory of the importance of reading. What I discovered from talking to other teachers, from reading the literature, and then from conducting the research with the students matched what the CAI literature review actually suggested indirectly: the best tool for intervention is human, not digital. Nevertheless, CAI has benefits as a tool and, as the CAI literature suggested, can be a valuable way for students to work on their own with the guidance and support of a teacher. My focus in the literature review is to become more knowledgeable about the applications and efficacy of CAI for struggling readers.

I found that most of the literature is positive about the use of computer technology and speaks of the benefits and promise of CAI. To divide the information meaningfully, I focused on the following forms of computer technology found in the literature: general computer-assisted instruction, supportive reading environments such as CD-ROM (an acronym for compact disc read-only memory) books and computer mediated text recognition, and CAI for reading instruction.

CAI is defined as "programmed instruction utilizing an electronic computer as the principal medium of instruction. Instructional material is presented on a terminal under computer control and student responses are processed by the computer" (Shafritz, Koeppe, & Soper, 1988, p. 117). Reading instruction is "instruction designed to develop the skills necessary to perceive
and react to patterns of written symbols and to translate them into meaning" (p. 385). As well, "Learning to read is the acquisition of print-accessible lexicon" (International encyclopedia of education, 1994, p. 4942).

**General Computer-Assisted Instruction**

The multimedia supports offered through a computer provide a new medium for students to learn. Both electronic reading and traditional books can support the reader by including illustrations and graphics, a table of contents, glossaries, summaries, and self evaluations to improve comprehension. In addition electronic reading can add sound, animation, pronunciation, definitions, and communication with fellow learners. At the same time warnings are made about reduced reading comprehension: "The presence of highly stimulating and heavily supported reading environment may provide some students with a source of distraction that they don't need" (Horney & Anderson-Inman, 1999, p. 24). A study comparing reading comprehension rates of grade four students when reading from plain text on paper, formatted text on paper, and "jazzed up" text on a computer, reported that the lowest comprehension rates were with the computer version (Baker, 1998).

CAI was one of five key components in nationally recognized "Blue Ribbon" elementary schools in the United States (Kletzien, 1996). Blue ribbon schools achieve high scores, above the 55th percentile, on state tests in reading and mathematics. Integrating computer technology in the reading, writing, and content areas led to improvements in both the reading and writing ability of students (Zakaluk, 1996). Students in grades six through twelve were found to have greater academic gains when their traditional instruction was supplemented by CAI in many subject areas (Christmann, Badgett, & Lucking, 1997). Low achieving grade five students made significant improvements in both reading and mathematics with CAI over traditional instruction.
(Weller, Carpenter, & Holmes, 1998). When comparing gains in reading comprehension levels within a class of grade five students with one group using computers and the other using traditional materials (handouts), there were no significant differences. However the group using CAI had a more positive attitude (Tillman, 1995).

On the other hand, Batchelder and Rachal (2000) concluded their experimental study of 71 prison inmates needing Adult Basic Education with the following statement, “expectations for a computer ‘fix’ for the basic-skills needs of undereducated adults is a fond illusion and a false promise.” They caution that CAI is only as effective as the quality of the software used and the key determinants of success are student motivation and teacher enthusiasm.

A county in Virginia questioned and refused to fund the expenditure to provide the hardware and software, SuccessMaker, in elementary schools (“Critics warn against using computers ...”, 1997). The article questions the educational value of computers and the value of research studies financed by computer companies. “Students can’t interact with a computer as they could with a teacher, and schools should use computers to help students find and understand information rather than to teach basic skills” (Benning, The Washington Post as cited in “Critics warn against using computers ...”, 1997, p. 926).

CD-ROM Books and Computer Mediated Word Recognition

As Topping and Paul (1999) wrote,

The more you read, the better you read. The importance of reading practice has long been recognized by teachers. Yet weak or unmotivated readers often seem to put as much energy into avoiding reading as into actually doing it, thus perpetuating a vicious circle (p. 213).
Once struggling readers get disheartened, their reading ability falls further behind their peers as they not only avoid reading but practice reading less often. On the other hand, confident readers enjoy reading and as a consequence read more and continue to make increased gains. “These factors, dubbed by Stanovich (1986) the Matthew Effect (a biblical reference to the poor getting poorer), operate over and above any initial source of literacy difficulties, making it increasingly difficult to remedy any reading problems” (Lynch, Fawcett, and Nicolson, 2000, p. 334). And Hall, Hughes, and Filbert (2000) express similar thoughts:

The rich get richer (those who read well, read more) and the poor get poorer (those who don’t read well, read less). Students with LD in reading do not practice the tasks of reading enough. . . . One potential solution to provide additional instruction and needed practice comes to us through computer technology. (p. 15).

Will struggling readers practice reading more with the supports provided by computer technology?

CD-ROM books account for the second largest and fastest growing type of commercial literacy software closely following “drill and practice” software (Balajthy, 1997). A CD-ROM book, like a conventional book, offers attractively formatted text and beautiful illustrations. In addition CD-ROM books offer a multimedia experience by combining text, graphics, sound, and animation to motivate children to learn early reading and writing skills (Glasgow, 1997). Animation in the text can encourage the student to spend more time with the CD-ROM book (Okolo & Hayes, 1996) and CD-ROM books are easy to use (Roffey, 1995). A study using CD-ROM books with kindergarten children from lower income homes reported improved verbal skills (Johnston, 1997). Difficulties with reading can quickly lead to negative attitudes toward reading even at a young age. An Australian study found that CD-ROM books can help reluctant
readers form more positive attitudes toward reading (Adam & Wild, 1997). A British study also found "cognitive and affective benefits" (Lewin, 1997). Horney & Anderson-Inman (1999) write about the benefits of the supportive environment provided by electronic books: “Over the years, electronic reading environments have received increasing attention as educational tools for promoting reading fluency and enhancing reading comprehension, particularly for students who experience difficulties in learning to read and reading to learn.”

Okolo and Hayes (1996) found that the adult reading a printed text to a child is more effective than the child reading from a screen with colourful graphics, sounds, instant assistance for problem words, and lively animation. Literature was presented to primary students in three different ways. One group had an adult read to a child. The second group used a CD-ROM version of the book with no animation. The third group used a CD-ROM version but with high levels of animation. Both CD-ROM versions allowed students to click on difficult words to hear the word read aloud or hear the whole page read. The popular choice was the highly animated CD-ROM; the students spent almost four times as long with the CD-ROM version than with the adult reading aloud. Although the students enjoyed using the CD-ROM version, the highest comprehension occurred with the adult reading. It appears that the animation detracted from the comprehension.

A similar study with preschool children measuring word recognition used three conditions of presenting a picture story: an adult reading, a computer display with still pictures with the text on audio, and the story fully animated on videotape (Terrel & Daniloff, 1996). The adult reading was again found to be slightly more effective and there were no differences between the results of the animated videotape and those of the computer.
Davidson, Elcock, and Noyes (1996) found that primary students benefited by practicing reading on the computer with speech prompts. Case and Truscott (1999) report that computer based reading instruction (CBRI) is effective in raising the literacy skills of struggling readers: “CBRI has allowed them [struggling readers] increased interaction with texts, attention to individual needs, and an increased independence through an ability to read texts they would not otherwise be able to read.”

The limitations of CD-ROM books to support struggling readers are the cost and the comparatively small number of titles available. Providing support for struggling readers is available from a new generation of inexpensive computer mediated word recognition software or, more simply, text-to-speech software. For example, TextAloud will read aloud any text on a computer screen. Although the voice does sound like a computer “talk + ing,” the student can select the voice (gender and accent), set the voice pitch, and adjust the speed of the reading. Scanners which are no longer expensive, combined with improvements in the software to convert scanned text to a format that can be recognized by the text-to-speech software, allow for a broader range of learning materials to be used by struggling or even nonreaders. Therefore, “The result is that none of the children are excluded from classroom activities that involve reading. The poorer readers in the class successfully interact with material that would otherwise be incomprehensible to them” (Mike, 2001). Most text-to-speech software, including TextAloud, have the option of having the words highlighted as students read. This is referred to as bimodal reading wherein the text is simultaneously presented visually on screen and auditorily through the computer speakers. Montali and Lewandowski (1996) reported on the benefits of bimodal reading for struggling readers in grades eight and nine: “Furthermore, bimodal presentation of passages brought comprehension for less skilled readers up to a level comparable to the level of
comprehension seen in the average group when they read the passages by themselves (visual condition)” (Montali & Lewandowski, 1996).

Computer-Assisted Instruction for Reading Instruction

Emphasis should be placed on the term "assisted" in computer-assisted instruction. No record suggests that improvement in reading ability could be made without qualified instruction. No study saw a diminished role for teachers and specialists. On the contrary, teachers must be aware of programs available for individual student needs and be given training and ongoing support (Sands, & Buchholz, 1997). Interventions with computers still have to be individualized and monitored by teachers (Heimann et al., 1995). Computers can help teach reading but teachers should be "cautious in accepting the computer as the solution for all reading problems" (Greene, 1997).

CAI is motivational especially for at-risk students (Leong, 1995; McCullough, 1995; McKenna, Reinking, Labbo, Kieffer, 1999; Potter & Small, 1998). McCullough (1995) writes about the applications of text-to-speech systems to remediate reading difficulties and concludes: "Computers can add structure, motivation, consistency, immediate, nonthreatening, nonembarrassing feedback, self-paced instruction, automated data collection to monitor progress, and opportunities for creativity" (p.12). Lynch, Fawcett, and Nicolson (2000) found computer assisted reading instruction to be effective and cost-efficient with eight students, average age eleven years, whose reading and spelling ability were four years behind their peers. They use the acronym, RITA (Reader’s Intelligent Teaching Assistant) which emphasizes the primacy of the teacher and the computer as a tool of the teacher.

The objective of ITA [Intelligent Teaching Assistant] is to free the teacher to undertake those tasks where human instruction is indispensable, by allowing the computer to carry
out those tasks for which it is particularly well-suited (motivating, engaging, repetitive, nonjudgmental, with immediate feedback, automatic record keeping and replay etc.) (pp. 335-336).

Marston, Deno, Kim, Diment, and Rogers (1995) compared six different teaching strategies with 176 elementary students with mild learning disabilities and reported significant differences in reading improvement. Thirty-one resource teachers received training in one of the following teaching strategies: CAI, direct instruction using Science Research Associates Curriculum, direct instruction using basal readers by Holt, effective teaching, peer tutoring, and reciprocal teaching. (In reciprocal teaching, students take on the role of teacher and lead the discussion on the text using four strategies: summarizing, making questions, clarifying, and predicting.) The study reports the greatest gains from using direct instruction with basal readers, CAI, and reciprocal teaching.

After 100 hours of computer-assisted reading instruction, 27 adults showed varied gains in reading ability. The greatest gains were with the adults who scored above the grade 2 level on the pretest. The importance of having skilled and empathetic staff was noted (Evans, et al. 1992). A study using the computer program, AutoSkill International’s *Academy of Reading*, with reading disabled adolescents reported gains in students spelling, word attack, and general reading skills (Kerr, 1993). Drill and practice software can be the best instructional support program for children with dyslexia. CAI for phonological awareness training was found to be effective with children with learning disabilities (Torgesen & Barker, 1995). Eighty-three students with dyslexia showed greater gains using computers for phonological training than other students using conventional methods (Lundberg, 1995). After the phonics-based instruction is given by the teacher, struggling students can benefit by daily practice of these skills with appropriate
computer software (Sands & Buchholz, 1997). A related study with elementary students found CAI effective in improving phonemic awareness and faster word recognition (Wise & Olson, 1995). Meanwhile, Sawyer (1999) using commercial software to supplement the phonetic reading program with her transition class, a class beyond kindergarten but not ready for first grade, found no significant difference between the experimental group using the computers and the control group using traditional pencil and paper practice. Sawyer did report that “The students enjoyed their time on the computer and enjoyed the software that was used. They often asked for more time during recess and free time available through the day” (p. 37).

Supplementing traditional reading instruction with CAI was found to be effective with boys in grade one. The girls made gains but not to the same extent as the boys (Erdner, Guy, & Bush, 1998). Nine hundred students in one junior high school received 20 minutes a day of reading instruction on a computer. With higher standardized testing results over two years, the school recommends the use of computers for reading instruction (Potter & Small, 1998). A year-long case study with an eleven year old autistic boy found that hypermedia was successful in improving his reading and writing skills. “Hypermedia provides a platform which can be conducive to language growth for autistic learners. It is nonbiased, can be highly repetitive, is based on pattern generations, and provides links to senses through visual, tactile, and auditory senses” (Hill & Stephens, 1999).

Computer intervention was found to be effective in improving the phonological awareness, letter naming, and word recognition skills of preschool children at high risk of learning disabilities (Mioduser, Tur-Kaspa, & Leitner 2000). The high risk status of the participants was determined from low scores on standardized test of phonological awareness. Struggling readers in grades two through grade five showed gains in their ability to decode and
read words from phonological drills through the computer and story reading. These rates of improvement were greater than for more capable readers (Wise, Ring, Olson, 2000). A K-5 school used the computer program, *Sentence Master*, to provide basic reading instruction for at-risk readers. The classroom teachers found the program to be effective (Schetz & Dettmar, 2000). A middle school using a variety of CAI programs with students failing to pass state reading tests reported significant gains in reading levels (Byrd, 2001).

At the other end of the age spectrum, computer reading treatment was found to be effective with aphasic adults (stroke survivors) averaging 62 years of age. It was also reported that managing the computer reading program required little assistance from the staff and the improvement in language was not due to the interaction with the computer but from the software language content. The study also had a treatment group using the computer for activities that did not require language but focussed on attention span and memory games. This group did show improvement in language but not to the same extent as the computer reading treatment group (Katz, 1997).

Two recent meta-analysis research studies, “Effect of Computer-assisted Instruction (CAI) on Reading Achievement: A Meta-analysis” (Soe, Koki, & Chang, 2000) and “Computer Assisted Instruction in Reading for Students with Learning Disabilities: A Research Synthesis” (Hall, Hughes, & Filbert, 2000), pertain specifically to my research questions. Both cautiously support the benefits of CAI. Soe, Koki, and Chang (2000) conclude:

The overall finding of this meta-analysis is that computer-assisted instruction has a positive impact on reading achievement. However, there is a wide range in the foci, procedures, materials and findings among the studies included in this meta-analysis. In some cases, a scarcity of acceptable studies was evident in many categories. Therefore,
the results given here must be interpreted with caution until a greater number of similar studies with similar reporting styles is available to confirm or refute the findings (p. 13). And, similarly, Hall, Hughes, and Filbert (2000) report:

CAI may become a tool for teachers to not only provide adequate reading practice for students, but also additional instruction. Those CAI programs providing systematic instruction with effective correction procedures contributed most to increasing reading skills (p. 190).

The call for more research to confirm or to refute their findings is noted. I also point out that although the two above studies were published recently, in 2000, the research studies analysed were not nearly as current. The studies examined in the meta-analyses were from 1984 to 1996. Since the research studies report on the positive uses of CAI 5 - 17 years ago and with the enhancement of the multimedia components of CAI reading software, then can we assume that CAI is even more effective today?

Lewis (1999) raises doubts about the use of computer based learning. She cites a study of teachers’ predictions that the best type of program for students with special needs or learning disabilities is with an “Integrated Learning System” (computer based content and record keeping). Is this prediction based on sound pedagogy or survival in the classroom? Is computer based programming seen as a way to remove struggling learners from the classroom mix? Lewis writes:

A danger is that this approach also allows, perhaps encourages, the teacher to abdicate responsibility for the pupil’s learning and therefore fosters an implicit belief that special educational needs pedagogy is outside the scope of the non-specialist [classroom teacher].
Such a position may be attractive to program-makers as it reinforces a dependence on the machine to do the teaching and to make assessment-based decisions (p. 153).

Lewis reports about evaluations on integrated learning systems in the United States:

They suggest that where well-designed, independent evaluations have been carried out (ie [sic] not sponsored by the program makers) pupils with learning difficulties tended to use Integrated Learning Systems less effectively than other pupils and their capabilities may be under-evaluated by the computer (p. 155).

Lewis, in looking at eight studies in the United Kingdom from 1994 through 1998 states that “overall, the use of Integrated Learning Systems was not conspicuously more effective than other approaches . . .” (p. 156).

From the review of the literature, I came to the following position:

- CAI with its multimedia capabilities provides another way for students to learn to read, especially for those with whom traditional methods have not been successful.
- Computer technology can be used as a support for instruction with students finding it difficult to read subject material independently.
- CAI in reading may hold promise for students who struggle daily with reading.
- the pedagogy of CAI reading instruction software programs needs to be critiqued.

The review of the literature did not fully convince me of the efficacy of CAI in reading when compared to reading instruction provided by a teacher. With this in mind, I offered the CAI intervention in the hope that the three participants would make significant gains in reading.
ability. Even if CAI in reading did not produce measurable gains, I saw no detrimental effects for the participants by using *AutoSkill* software to practice reading and to receive instruction. Also, the three struggling readers would not be missing other forms of reading instruction by using CAI as there were no others available.

The following chapters present the stories of the three student participants: their perspectives on the use of CAI reading instruction software, comparisons of their pretest and posttest reading scores, and their contexts in coming to the intervention with *AutoSkill*. It is my hope that this research meets the following criteria:

"Research focussed on discovery, insight, and understanding from the perspectives of those being studied offers the greatest promise of making significant contributions to the knowledge base and practice of education (p. 3)" (Saban 2000, para. 3).

By presenting the perspectives of three student participants and by telling their individual stories, I hope that this study will add to the knowledge base of assistance available to struggling readers in the school system.
Chapter 3

Harry’s Story

Harry’s parents became aware of his learning difficulties when he was young. As early as nine months, his mother noticed a delay in his development. For Harry, language was late in coming. In kindergarten he had difficulty with numbers such as counting to ten and it was noted that he took in information and solved problems in an unusual manner. His grade one teacher noted that Harry needed extra watching and support.

Harry’s formal testing and assessments started in grade three, in November 1994, at the request of his parents. The school board psychologist who completed the testing reported that Harry was experiencing a great deal of frustration in school. Harry wanted to keep up with the other students but when he was unable to, he experienced frustration. This caused a great deal of stress, tears and often just a refusal to do the work. From a report by a school board psychologist, Harry was described this way:

A picture emerged of an able lad who sets high standards for himself. But there has developed a bit of a hitch in acquiring a rapid sight vocabulary and this has lead to a discrepancy between Harry’s performance and his goals (or the other students’ standing). This has caused a good deal of grief, as exhibited in irregular breathing, tears, work stoppage and finally longer home assignments (Cumulative Record Card, November, 1994).

Harry’s recollections of his early difficulties are remarkably similar.

5Unless otherwise cited the following information comes from an interview with Harry’s parents. Following the interview on June 26, I typed up a draft of the summary of the interview for the parents to read. On July 10, I met with Harry’s mother and she edited the interview summary and made corrections and additions for accuracy.
Researcher: Can you think back then to when you felt that you were finding school frustrating or hard? Can you remember?

Harry: I think ... grade four I think. It was ... I was just sitting there and I'd look over to somebody and they would be, like, "Whoa, I'm done." And I would be like, how could you be done? Like, I don't get it.

Researcher: How did you react to that? Do you remember?

Harry: I would just ... I did my best work I could at school and then brought it home and got it completed (Interview, June 14, 2002).

It was recommended that Harry see the guidance counselor so that he could approach the school work in a less anxious way. The psychologist inaccurately diagnosed the learning problem as anxiety, stating that if Harry could just be less anxious and uptight the problem would resolve. The parents continued to ask for assessments to clarify Harry's specific learning disabilities and receive recommendations and strategies for what could be done to assist his learning. They also wanted their son to understand that it was not his fault that he had difficulty in school. The parents were not as interested in their son's reading level, math competencies, or even intelligence quotient as they knew he was behind and struggling as in obtaining a diagnosis. They knew he had difficulty with learning and pursued any assessment that would enable them, Harry, and his teachers to understand and promote his learning progress. Harry's assessments included:

- December 1994: Speech - Language Pathology Report
- February 1996: A meeting with Dr. Siemens, Paediatric Clinic, Queen Elizabeth Hospital was the beginning of the referral process for an assessment from the Isaac Walton Killam (IWK) Hospital in Halifax.

December 1998: Psychological report by a clinical psychologist at the IWK. After driving to Halifax for tests and expecting a clearer picture of Harry’s learning difficulties, the parents were very disappointed with this assessment. The parents were asked to leave the room during the testing. Harry got frustrated during one of the sets of testing and shut down. For a full 45 minutes, Harry layed his head on the desk in the office of the psychologist and the parents were not called in to assist. Needless to say the assessment was not completed and further assessment was recommended.

June 2001: P.E.I. Assessment Services for Adults, Holland College. The parents were pleased with this assessment. They noted that although this assessment cost them $1500 out of pocket they felt it was worth the expenditure. For the first time, Harry came to understand that he had a learning disability and that it was not his fault. From this assessment, the parents felt that they had a better idea of how to tackle the learning disabilities in order to help Harry learn.

Summer and fall of 2001: Harry attended to Spell Read Canada which offers learners training in phonological skills to improve reading and writing skills.


Seeing your child trying to do his best, struggling to keep up with his peers in the classroom, and experiencing extreme frustration is every parent’s nightmare. Harry’s mother recalls a painful memory of Harry, after a day in elementary school, banging his head on the kitchen floor, crying, and saying, “Why can’t I learn just like the other kids?” This demonstrated Harry’s knowledge at an early age of his awareness that he did not learn in the same way as many others did. He had difficulty learning and the parents were not able to help him with his learning despite their best efforts. Harry’s parents were very proactive in accessing help and
accommodations for his learning difficulties. Beginning at grade four, Harry did not take French and he received resource help in school. The resource periods supported the work in the regular classroom and helped to reduce the amount of Harry’s homework. Grade five was a difficult year for many reasons, including a large class, mixed grades, and a bully. For a relief from the frustration of school, Harry was home schooled on Wednesdays. The junior high school years went more smoothly with the resource periods provided and a teacher in place who was willing to make modifications and accommodations to the math curriculum.

Harry’s parents do not claim to understand fully his learning disability. They knew he understood individual words but because he had to concentrate so hard on each word he had difficulty understanding both full sentences and the overall meaning. Because of visual-spatial difficulties, taking notes in class from the blackboard or from an overhead was difficult for Harry. If he gave the concentration required to get the notes down, he could not take in other things the teacher said. The notes became isolated facts and he did not see how they fit in to the whole picture. Harry’s parents have requested from teachers that he be given a copy of the notes prior to classes but for various reasons this did not work out. The parents felt that the school, particularly Harry’s teachers, should be made aware of the difficulties he experienced in the classroom. Harry is not a disruptive student but he may have appeared to be an unwilling, reluctant, or even a lazy student to his teachers. His parents contend that this behavior in class was the result of his learning disability. His mother gave the following example of preparing for a test. The teacher might have given a review of all the information that could be on the test; the average student would be able to distinguish the important information and the questions that would likely show up on the test. However, Harry would see everything as being important and be overwhelmed with the information. He would feel inadequate, frustrated, and unable to keep up.
During the interview with the parents, an item of confusion for me was cleared up. From the second interview with Harry, there was some confusion with numbers.

Researcher: With your schoolwork and trying to keep up and do what you thought you should be doing, trying to get good grades, was that a problem? Was that a concern for you?

Harry: Um it was a long while back. I mean like, a report card last year like grade like, seven, eight, and nine was like 96, and I mean that was my average for the year and then I moved up to a 70.1 (Interview, June 14, 2002).

Note the confusion, from an average of 96 he moved up to 70.1. I thought Harry had problems with place value, 70.1 having three digits is greater than 96 with only two digits. When I asked his parents about this discrepancy, they said his average was 69, a simple reversal of 96. Harry had been working in the AutoSkill program for nearly three months and I had interviewed him on two separate occasions and yet I didn’t recognize the reversal. My error is perhaps indicative of other teachers in the school system.

The parents would have liked the school system to recognize Harry’s learning disability and continue to make modifications for his learning style as well as to offer remediation in areas of weakness. They tired of convincing each of Harry’s new teachers that he was not a student who was unwilling to do either the work in class or home assignments but that their son had real difficulties in meeting teachers’ expectations. It was not just a matter of having teachers informed about Harry’s learning difficulties from records such as the cumulative record card, but also of having the teachers believe both what they read and what the parents and Harry said about his learning disabilities. The parents tried to encourage Harry to take more control of his learning. He was clear about the difficulties he faces in class.

Researcher: Do you find some parts of your school work frustrating?
Harry: Yeah, very.

Researcher: What parts do you find frustrating?

Harry: It was actually, it just reminded me of when you asked me that question there was a video that me and my mother watched on learning disabilities and this guy had a list of like 20 words or whatever and he was like do all these words make sense? And you are sitting there looking at them on the screen and there was about 30 people around the room looking at them in a book and they all made sense. And then, he put them in some really complex sentence and that’s what happened to me and academic English. There was like, I forget the sentence now but it was like all the words make sense like you could know what like “a visual” and “image” and “effectiveness” were but then it goes “the effectiveness of the visual” and you’re like what that ... like, it didn’t make sense at all.

Researcher: That’s interesting. In other words, you can understand each word ...

Harry: But once you put it in a sentence, it can like ... completely boggles my mind up (Interview, June 14, 2002).

The parents recognized and were sympathetic to the difficulties that teachers face with classes of 25 to 35 students. Some teachers appeared to assume that if other students saw accommodations made for Harry and saw these as an easy way to get a credit, they may demand similar adaption. The parents pointed out the difference between being treated equally and fairly - as with any disability, students should get what they need to be successful. An example given was with the use of wheelchairs. If a student needs to use a wheelchair, it does not mean that all students get a wheelchair even though that would be treating all equally. Or, if one student has a severe difficulty with handwriting and needs to use a computer for word processing, it does not mean that all students can demand a computer. To be fair, students should get the remediation, adaption, or accommodations they need in order to learn.
The parents were of the strong opinion that the education system, in partnership with the health system, must do accurate, timely diagnostic assessments with children with learning disabilities. Despite their many attempts to get to the root of Harry’s problem, his parents did not get the diagnosis of the learning disability from either the public education or health systems. They said, “This is wrong and contributed to Harry’s feelings of low self-esteem, his frustration, increased anxiety, and affected the whole family emotionally. This should not happen with any other students.” They recognized that diagnosis is not the solution but it provides a beginning place for planned interventions which have more chance of success.

In 2001 Harry was the first student to express an interest in using the AutoSkill program. Harry’s parents heard that I was planning to offer CAI in reading. Both Harry and his parents came to see me in November 2001 to discuss accessing the AutoSkill program. Harry was in grade 10 at the time and his parents told me that he had a history of difficulty with learning in the regular classroom and specifically understanding what he read. His parents expressed an interest in CAI in reading; in the previous year they had been taking Harry once a week to Charlottetown for sessions with Spell Read Canada. We agreed to talk again when I received approval from the Research Ethics Board, approval that was granted in March 2002.

In the second semester of school, Harry had one period of resource help daily. A resource period at Bluefield High School means that the individual student receives extra support from the resource teacher or a teacher assistant. In Harry’s case, he and three other students worked on the assignments for their regular subjects with the assistance of a teacher assistant. Harry’s parents did not want him to miss a portion of his 75 minute resource period every day to participate in the CAI research. As Harry wanted to use AutoSkill, they came up with the idea of him giving up some of his free time. The plan was that he would come to the library office to use AutoSkill every second day for 35 minutes during the latter part of his resource period. And, as he often
arrived at school early, he would access the program the other days for 40 minutes before the start of classes. It didn’t take long for Harry to start using AutoSkill independently.

Researcher: Do you find the program easy to use?

Harry: Yeah, pretty easy, I mean I had a little problem getting off at first just because of where you had to go and what you had to do and stuff, after I was pretty good.

Researcher: So, you don’t find it hard to get into the program and start on what you’re supposed to do?

Harry: No

Researcher: And did you need much help to get at that, to get started?

Harry: Yeah, at the beginning, but after that I kinda just walked in and did it regardless of who was there or whatever [AutoSkill was loaded on a computer in the back of my library office.] (Interview, May 21, 2002).

The goal was to reach 25 hours of computer instruction with half of the time during class time and the rest during his free time. Having the goal in mind, Harry often checked on his accumulated time spent with AutoSkill. If there were class tests or assignments due, he did not use AutoSkill during the resource period but he would make up this missed time with extra time before school.

Researcher: If you weren’t thinking of getting the 25 hours in, which is what we aimed for at the beginning, would you still want to use AutoSkill?

Harry: It would all depend on homework. I mean personally I don’t think if it’s there, I won’t really do it but if it’s like, that’s my personal opinion. If it’s there, I will be more like, whoa it’s there I’ll put it off a bit longer, whatever. But if it’s like an appointment you have to meet, then I’ll be more likely to go there (Interview, May 21, 2002).

In the concluding interview Harry expressed similar thoughts.
Researcher: Did it help you, to have that goal of 25 hours, to come and use the program as you did - come and use the program before school on your own time? Do you think you would have done that if you didn't have that goal?

Harry: Probably not. Well it's time or whatever. It's like a 25 hour goal and you're trying to get in there as much as possible and do it.

Researcher: So, did you mind doing it that much or was it a chore for you?

Harry: Not really, no. It was a break from class which is good to get completely out of the whole class atmosphere and just getting into a different atmosphere and doing something different for awhile (Interview, June 14, 2002).

Like the other students, Harry had difficulty meeting the criteria for mastery for the reading subskills. Mastery meant achieving 96% on three consecutive trials with less than a 100 millisecond variance in the average response time. His difficulty was not with the 96 % accuracy but with a consistent response rate. In conversation with the support staff of AutoSkill, they suggested that students develop a rhythm for responses and strive for accuracy over speed, and their speed should naturally develop with practice.

Researcher: Mastering at the 96% level of correction and also within a certain time frame, between your fastest and slowest response, has been a bit of trouble for you. Do you know which has been the most trouble? The time aspect or the percent correct?

Harry: Probably kind of both intertwined. That way I mean it's just like getting it right in a certain, four beats or however many beats you choose and knowing that you are going to screw up at the same time. And yet you got to pick one right quick and don't go beyond that beat (Interview, May 21, 2002).

Harry didn't mind using the AutoSkill program and felt that it provided useful reading practice.
Researcher: Are you learning how to read better or are you practicing something you already know?

Harry: I'm learning how to read better. Because there's no extent of not stopping to learn how to read - like you can always learn how to read (Interview, May 21, 2002).

And,

Researcher: Have you noticed any difference in your reading since you started using AutoSkill?

Harry: Yeah, just everything in general.

Researcher: Better or worse? The same?

Harry: It has been better, anything helps if you're reviewing it (Interview, May 21, 2002).

And,

Researcher: If a friend of yours in a similar situation was thinking of using the program, AutoSkill, what would you say?

Harry: It's a great program like you have another student on there already and doesn't know how to read very well and can go 45 minutes at a time without stopping and more just because you are constantly learning. Ah, I don't know but personally I still like the one-on-one help [with a person] but it is great to have a computer at home. [Harry wanted to have the program loaded on his computer at home but due to licensing restrictions this was not possible.] You can just say O.K. this is what I am going to do today. I am going to go on the AutoSkill program and get caught up with that or do some of that to learn how to read a bit better (Interview, May 21, 2002).
In comparing past one-on-one reading instruction with an instructor or tutor to the CAI from 
*AutoSkill*, Harry preferred the person over the computer. It is interesting to read his comments 
comparing the one-on-one instruction with Spell Read Canada to *AutoSkill*.

Researcher: So you mention Spell Read Canada, how many years have you had training 
in Spell Read Canada?

Harry: I’m thinking two years or one. [From conversation with Harry’s father, Harry 
started Spell Read in June 2001. He had a Spell Read tutor through the summer and 
through till Christmas, five months.]

Researcher: Last year and the year before?

Harry: I’m not . . . I stopped going to it all this winter just because of the icy roads.

Researcher: But were you going to it last year and year before?

Harry: I think so. [Note the difficulty Harry had with time.]

Researcher: And how often were you going to Spell Read Canada?

Harry: Um, one hour I think.

Researcher: Once a week? Twice a week?

Harry: Once a week, I think it would be Friday, Thursday or Tuesday or something.

Researcher: So one hour once a week?

Harry: Roughly, yeah.

Researcher: And did you enjoy going to Spell Read Canada?

Harry: Yeah, like I said I liked the one-on-one teacher versus student. The whole aspect 
of that rather than the computer.

Researcher: What makes it better with the person than with the computer?

Harry: Um, you don’t have to get any percent right and you can stop anywhere. If you are 
in the middle of the skills you have to get the certain beat and the time right. You can’t
just quit and say, "Can I take a break?" cause you’re in the middle of it. With the teacher, you can just say, "Can I take a break?" and take a break. There is no error program. Like there is no errors anywhere and it’s just like the teacher they tell you like what you doing wrong or how you can fix it.

Researcher: So when you find when you do things wrong with the computer, you find that you don’t . . .

Harry: It’s annoying. Not the fact that you’re not here, just the fact that this program should be designed to be used alone and if something comes up like the teacher time, I have to go get you to reset it in a different format. Whereas a teacher would just format it themselves while they were in the middle of doing the program.

Researcher: Are there any similarities between the way the reading skills are taught with the computer and the person with Spell Read?

Harry: Yeah, they are doing the same sounds. They are going over the same sounds except in Spell Read they kind of span it out over a longer period of time. In AutoSkill I kinda feel like they are trying to push it into one little section. Like, ah, Spell Read they take one sound and blend it 50 million different ways, and show you every way it can be used and then go on to another sound (Interview, May 21, 2002).

And in the second interview, Harry confirmed his preference.

Harry: It’s still basically the same. The hard thing about it is that for me it’s not like one-on-one with an actual like, teacher. It’s a computer and computers aren’t my best friend. If you are working with the teacher which I prefer, you can kind of, I don’t know you can take a little bit of a break. She or he kind of takes a project and then bends it to your standards rather than you having to meet the computer’s criteria. And if you don’t then
the teacher time comes up. She or he just kind of bends it a bit out of the way so you can just keep on getting through it (Interview, June 14, 2002).

The teacher time that Harry refers to is, in my opinion, a positive feature of the AutoSkill program. When a student has not met the mastery criteria (previously described) for a subskill after a set number of trials, the student cannot proceed in the program until they “meet” with the teacher. Ideally this feature allows the teacher to intervene and provide support before the student becomes discouraged. The default setting for the number of possible trials before teacher time is 15. It is understandable that Harry would be discouraged after 15 attempts. Sadly, it was not until the conclusion of the study that I realized the number of trials could be adjusted for each student. Harry’s number of trials should have been lowered to allow me to give him support before he reached the frustration level.

Harry’s AutoSkill pretest to posttest report (Table 1) appears to be contradictory. His word recognition increased by one grade level while his cloze test shows a decline of four grade levels. In two and a half months of CAI, how can one test show a gain and the other test show a four-year decline?

Table 1

<table>
<thead>
<tr>
<th>Test</th>
<th>Pretest Date</th>
<th>Grade Level</th>
<th>Posttest Date</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloze (basal)</td>
<td>March 20, 2003</td>
<td>10</td>
<td>June 12, 2002</td>
<td>6</td>
</tr>
<tr>
<td>Words (basal)</td>
<td>March 20, 2003</td>
<td>7</td>
<td>June 12, 2002</td>
<td>8</td>
</tr>
</tbody>
</table>

In the cloze reading test, a screen of text is presented with some words left blank. The student reads the text and clicks on each blank and three words are given as choices. The student then selects a word and moves on until the percentage of correct responses falls below 60% which is called the frustration level. The instructional level is from 60 - 79% and the independent
level is 80% and above. The independent or basal level is what is reported as the student's grade level by the AutoSkill program.

Upon closer examination of Harry's results consistency emerges. Figure 1 shows a screen shot of Harry's cloze pretest from the "Results Room" in the AutoSkill program. The information that is expanded on the right shows the errors Harry made at the grade 10 level. For each of the levels, the teacher can see the errors and the correct response. The posttest results are shown in Figure 2. Harry had no difficulty with levels 6, 8, 9, & 10 as his scores were all over 80% or at the independent level. But because his result at level 7 was 68%, his basal level is reported as grade 6 even though he had no difficulty with the higher levels. In fact, his result on the posttest at level 10 is up to 92% from 88%.
Figure 1 AutoSkill Pretest Results

Cloze Paragraph Test Series
3/20/02 3:39:59 PM

Level 10
Independent
# Correct 22/25
Accuracy 92%
Speed 14 [sec]
Errors
goals wants
at the
our their

Results indicate that seems to have:
- little or no difficulty understanding information presented in a text at a Grade 10 equivalent reading level.

Figure 2 AutoSkill Posttest Results

Cloze Paragraph Test Series
5/13/02 8:04:37 AM

Level 10
Independent
# Correct 23/25
Accuracy 92%
Speed 11 [sec]
Errors
usually seldom
and also

Results indicate that seems to have:
- little or no difficulty understanding information presented in a text at a Grade 6 equivalent reading level.
- some difficulty understanding information presented at a Grade 7 equivalent reading level.
By looking at each level of the cloze reading test, I conclude that Harry did not drop four grade levels in reading comprehension and that the pretest and posttest results are consistent. The reported grade level of the posttest for the cloze reading test does not properly indicate Harry’s performance.

The results from the Woodcock Diagnostic Reading Battery (Table 2) do not show any real change in reading ability. There was only one less correct response in each of the word identification and passage comprehension subtests. The pretests were performed under ideal circumstances, in the morning, with no interruptions, when the school was closed. The posttests were performed in the afternoon during regular school hours.

Table 2

Reading Ability Tests From the Woodcock Diagnostic Reading Battery

<table>
<thead>
<tr>
<th>Test</th>
<th>Pretest Date</th>
<th>Grade Level</th>
<th>Posttest Date</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word identification</td>
<td>April 8, 2002</td>
<td>8.2</td>
<td>June 12, 2002</td>
<td>7.6</td>
</tr>
<tr>
<td>Word attack</td>
<td>April 8, 2002</td>
<td>3.8</td>
<td>June 12, 2002</td>
<td>3.8</td>
</tr>
<tr>
<td>Passage comprehension</td>
<td>April 8, 2002</td>
<td>6.9</td>
<td>June 12, 2002</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Even though Harry didn’t show great gains in reading ability he still remained positive about the AutoSkill program.

Researcher: You said in your first interview, you said something similar, “It’s never a waste of time. You can always get a little bit better.”

Harry: Yeah. Well you feel like you are getting better regardless of the tests. You’re just, actually, for some people accomplishing something, getting through something regardless of how easy it is.

Researcher: So, looking back on this, would you see this as something positive or something sort of OK, or something not OK, or . . .
Harry: From positive to OK. Yeah, it’s pretty good (Interview, June 14, 2002).

From Harry’s story we see a student with learning disabilities struggling in the school system and the parents actively pressing for learning assessments that would provide direction and strategies to help him learn. Harry is fortunate to have parents who are strong advocates for his needs. Although the intervention with AutoSkill did not show gains in the tests of reading ability, Harry felt the practice was worthwhile and gave up some of his free time to use the software. Given the choice, he would still prefer one-on-one instruction with a person over instruction via a computer.

In the following chapter, we see a student who has greater difficulty with reading. Thomas is in danger of dropping out of school. He needs more encouragement to meet the 25 hours of CAI reading instruction.
Chapter 4

Thomas’s Story

Thomas’s difficulties in school began in grade one.6 His mother explained, “There was no phonics whatsoever. He had these little books and he had to learn from them and you couldn’t take them home. And he had trouble right from the start” (Interview, July 5, 2002). Due to the parents’ marital separation, Thomas moved with his mother to a new community and a new school in the spring of 1991. This was hard on Thomas, his mother told: “My husband and I had parted, so he was angry but he had reason to be angry, that part and he didn’t want to do this work at all” (Interview, July 5, 2002).

Mrs. Johnson was pleased with the second elementary school where Thomas was tested by the school guidance counsellor. His mother recalls an example of how he must have had difficulty with learning because of where Thomas placed the tail of the horse in a drawing for the school guidance counsellor.

Mrs. Johnson: He got good help there. And he was seeing the guidance counsellor when he was at _____. And he did a couple of tests. The one that I remember was the horse and the car. And ah ... you got a piece of paper? [She sketches the pictures.] Now you have a horse, and you’ve got the head, you’ve got the body, the legs and the tail. Well he had the body, and he had the tail coming out of the top and he had one leg down here and he had

________________________

6 The account of Thomas’s educational background is based on two interviews with Thomas and one interview with his mother. His cumulative record card included the minimal information of schools attended and placement for the following year. There were no records or mention of learning assessments. Former schools were not contacted. As a former elementary classroom teacher, I remind the reader that the teacher’s or school’s view of a situation can often differ from the parents’ perception. With the best of intentions, information shared with parents by a teacher may be different from the message understood by parents and the passage of time can compound these differences. Although not intending to disregard these difficulties, the view from the student and home must be heard and I fear that it is not heard often enough.
the head there and he another leg down there. I forget anyways he had it all [The picture
is mixed up. The main body parts are there but in the wrong places.] And then what he
did, he took him using squares and boxes, he got him to draw a car and he could do it
using the squares and the boxes but just to draw it. He wasn’t able to. I can remember him
having the tail [top] on the back of the horse.

Researcher: So that was some kind of an assessment by a ...

Mrs. Johnson: Guidance counsellor.

Researcher: And what did they do as a result of that? What did they recommend?

Mrs. Johnson: Um, he didn’t recommend anything actually. I think .. I guess he
recommended resource. He seen Thomas for so long and he’d talk to him and what not
and they just played games. Thomas said they played games and he would do things with
him. He never suggested anything (Interview, July 5, 2002).

Through grades two and three Thomas received extra help from the resource teacher. He
repeated grade three. Thomas had no further testing or assessments other than those done by the
school guidance counsellor. Thomas became increasingly frustrated with school work.

Mrs. Johnson: I figured by grade four he was quite able to do his work without my
assistance. And um, he would just throw things, not big things, but throw the paper down
on the table or what not. He couldn’t do it, so on and so forth. But he doesn’t like doing
homework.

Researcher: Well he wouldn’t like doing it, if he couldn’t do it very well. Do you think
that was more of the problem? He didn’t do it because he couldn’t do it or because ...

Mrs. Johnson: Yeah, he couldn’t do it. I think he kind of just lost all connection
(Interview, July 5, 2002).
After grade five, the school arranged for Thomas to attend Spell Read Canada during the summer, a condition of him entering grade six in September; the school wanted to have evidence of improvement over the summer. His mother thought that gains in reading ability were made but may have been lost with the return to school in September. Thomas found more difficulties with reading in junior high school. Looking back, he said, “The texts looked a lot harder. It was a lot harder to read than it was in elementary” (Interview, May 6, 2002). He spent two years in grade seven then jumped to grade nine. Throughout his junior high years, Thomas was in a smaller, adjusted class.

In his first year at Bluefield High School, Thomas dropped out of school in April. “Cause I got frustrated in all my classes. I just couldn’t do the work. And I just decided to quit” (Interview, June 14, 2002). And according to his mother, “He stopped because he wasn’t going to get anywhere. He wanted to work and get money. It’s been his thing” (Interview, July 5, 2002).

In February 2002, the resource teacher talked to me about Thomas, then in his second year in grade 10, and having great difficulty with reading. She recommended Thomas as a candidate to take part in the study so that he would receive reading instruction through AutoSkill. During parent-teacher interviews in March 2002, she met with his mother and explained what we might be able to provide. Mrs. Johnson was interested and came to see me in the library the next day. I told her about my research study and outlined the AutoSkill program. She wanted Thomas to take part but worried that he might just say no if she suggested it, but, he might agree if I talked to him. She also said there was no way Thomas would do the program unless he decided to do it.

A few days later I met with Thomas and found out more about the courses he was taking. He was taking automotive, social studies, science (one-on-one with the resource teacher), and
ITC (Information Technology Communication). ITC presented the biggest problem as it involved reading printed assignments. Thomas said that he had not attended class in the last two weeks and would not be going to the ITC class anymore. Near the conclusion of the study, Thomas clearly states the frustration he experienced in ITC: “Just because I can’t read the words. Everybody’s going, everybody’s done and I’m just starting pretty much” (Interview, June 14, 2002).

After listening to his oral reading of a selected text, I noted difficulties in his reading. I outlined the AutoSkill reading program to Thomas and he seemed interested. His case was discussed at the next Student Services Team meeting. I met with Thomas again and explained that he could earn a resource credit if he completed 25 hours of instruction with AutoSkill. Thomas agreed and started using the program. He came to the library office for the first half of block four as another student came during the second part of the period. Bluefield has a four-block per day system in a six-day cycle. On odd numbered days, he would come at 12:40 p.m. to 1:20 p.m. and on even numbered days from 2:05 p.m. to 2:45 p.m.. There was no resource teacher help available for the other half of the period, so an attempt was made to set up Thomas with a peer tutor but this arrangement did not work. Consequently, Thomas was on his own for the remaining part of the period. Attendance was a problem since he would often miss the even numbered days when he started during the last period at 2:05 p.m.. When asked about his ideal school, he said it should be in the morning, “cause in the afternoon there is lots more to do” (Interview, June 14, 2002).

Although Thomas started out with the best of intentions, I worried that he would not manage to stay with the program for 25 hours. He had difficulty with the subskill mastery criteria, 96 % in three consecutive tests with the average response time varying less than 100 milliseconds. Also, Thomas seemed to have problems staying focused on the individual tasks.
Researcher: I notice sometimes that when you are with the computer in the afternoon especially, you just can’t seem to stay with it.

Thomas: Yeah.

Researcher: Why is that?

Thomas: I’ve always had that problem.

Researcher: What do you mean? You just can’t sit still or ...?

Thomas: Yeah, I always have to be moving or doing something (Interview, June 14, 2002).

The subskills component of AutoSkill presents 50 items on the computer screen giving the reader three choices. The student scans the choices and selects the correct response by pressing Z, X, C or 1, 2, 3 on the numeric keyboard. Students may be competent with the subskill but have difficulty proceeding in the program because either they try to go too fast and make errors in keying in the correct response, or there is too great of a difference in their response times due to lack of mastery, or just inattention. On a few occasions I had the time to sit with Thomas and key in the responses for him. I found that he could often tell me the correct response before I saw it myself. He seemed to be able to do well but found it hard to stay on task or wanted to go too fast to get it finished and as a result made mistakes.

Researcher: Now lately in the program you have been saying that you can’t do this.

Thomas: Yes.

Researcher: ... that you find it too hard. What do you mean?

Thomas: It’s just got to a point where it’s getting a lot harder and harder.

Researcher: Do you understand though that when you are practicing, it doesn’t matter if you don’t get it completely right, you just do it over again.

Thomas: Yes.
Researcher: Do you realize that you just have to practice?

Thomas: uh huh.

Researcher: and when I did some of the tests with you, you knew all the right answers?

Thomas: uh huh.

Researcher: except for one. Remember?

Thomas: Yeah.

Researcher: So, you can do it.

Thomas: Yeah.

Researcher: Why do you think you have trouble getting through what you have to do in the program now?

Thomas: Just because it's getting frustrating. I have been doing it so many times, over and over and over again.

Researcher: But when I sit with you and I do the keyboard and you tell me the answers ...

Thomas: uh huh

Researcher: You do OK.

Thomas: Yeah because I go a lot faster. I always go fast and get mixed up (Interview, June 14, 2002).

I thought that AutoSkill would be a good program for Thomas to use and I assumed that it would help improve his reading. Thomas was a student that would have benefitted from having a teacher available to him more often while using the program. He needed the practice that AutoSkill could provide but also needed support and encouragement in meeting the program standards for success. When he reached the frustration point, I would modified the mastery criteria for the subskill by reducing the number of items from fifty to thirty, hoping that he could stay on task for a smaller number of items. This allowed him to move ahead in the program.
Although Thomas had some frustration with learning through CAI, when compared to the frustration experienced in the classroom he said, "It doesn't. I have more frustrations in the class than I do with the computer" (Interview, June 14, 2002). And from entries in his learning log he wrote:

I think the AutoSkill was a good program. It was not too hard [sic] and not too easy to use. I fond that I did not need to much help but I needed some (April 18, 2002).

I find the program is helping my reading a little. The program is starting to get harder but the more I work on it the easier it gets. The program is starting to get a lot faster. I like that. I find that the odd time I need help but not to much (May 9, 2002).

I find that the program is really starting to help me reading the newspaper and school work (May 14, 2002).

Thomas did not reach the goal of 25 hours of instruction. AutoSkill records that he used the instructional part of the program for 21 hours and seven minutes. During the last few weeks of school I encouraged Thomas to reach the 25 hour goal. In order for him to complete the resource credit, I included the two hours spent on the posttests and the concluding interview, leaving him only two hours short of the target.

The pretest and posttest scores (see Tables 3 & 4) show modest gains in reading ability.

Table 3

Reading Ability Tests From Within AutoSkill

<table>
<thead>
<tr>
<th>Test</th>
<th>Pretest Date</th>
<th>Grade Level</th>
<th>Posttest Date</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloze (basal)</td>
<td>March 26, 2002</td>
<td>3</td>
<td>June 13, 2002</td>
<td>3</td>
</tr>
<tr>
<td>Words (basal)</td>
<td>March 26, 2002</td>
<td>4</td>
<td>June 13, 2002</td>
<td>5</td>
</tr>
</tbody>
</table>

I leave the spelling errors as written in his learning log.
Table 4

*Reading Ability Tests From the Woodcock Diagnostic Reading Battery*

<table>
<thead>
<tr>
<th>Test</th>
<th>Pretest Date</th>
<th>Grade Level</th>
<th>Posttest Date</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word identification</td>
<td>April 8, 2002</td>
<td>3.8</td>
<td>June 13, 2002</td>
<td>4.1</td>
</tr>
<tr>
<td>Word attack</td>
<td>April 8, 2002</td>
<td>2</td>
<td>June 13, 2002</td>
<td>2.2</td>
</tr>
<tr>
<td>Passage comprehension</td>
<td>April 8, 2002</td>
<td>4.6</td>
<td>June 13, 2002</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Even though the cloze test in *AutoSkill* reports no change in the reading grade level, Table 5 shows the percentage of correct responses for the pretest and posttest at each level. A closer look at the results for the cloze test shows that there was an improvement. *AutoSkill* reports the grade level based on the basal level where the percentage correct has to be a minimum of 80%. On the posttest scores, Thomas reached this percentage at level 3, not at level 4, and again reached it at level 5. Yet, the grade level reported is level 3 since level 4 was missed.

Table 5

*Cloze Test Within AutoSkill*

<table>
<thead>
<tr>
<th></th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
<th>Level 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>80%</td>
<td>64%</td>
<td>60%</td>
<td>68%</td>
<td>60%</td>
</tr>
<tr>
<td>Posttest</td>
<td>90%</td>
<td>70%</td>
<td>85%</td>
<td>70%</td>
<td>56%</td>
</tr>
</tbody>
</table>

*AutoSkill* claims, on the face of the CD-ROM program disk, “Jump 2.5 grades in only 25 hours with Academy of Reading.” I had hoped for a greater improvement in Thomas’s reading ability. However, he used the program for slightly more than two months with many interruptions (storms, exams, and irregular attendance). I do think that the modest gains in his reading ability can be attributed to the 21 hours of CAI in reading.

However, if I had had more time to dedicate to Thomas, I feel confident that he would have made greater gains. The number of days absent from school was a factor. Every second day
Thomas would use *AutoSkill* during the last period of the school, a time when he was often absent. Morning sessions may have been more productive for Thomas.

Thomas is a student who is in danger of dropping out of school. His problems with reading cause frustration in all school subjects. I see the need for a resource/literacy credit in high school. One teacher with a small number of students could use CAI reading software along with age and reading level appropriate print materials to foster real reading. Computer software such as *TextAloud* could also be used to provide support in reading for pleasure or reading in other school subjects.

In the next chapter, the case of an English as a second language (ESL) student is presented. Here we see a student new to Canada, unencumbered by learning disabilities and requiring minimal teacher involvement who made tremendous improvement in reading ability through CAI in reading.
Chapter 5

Marvin’s Story

I first met Marvin in early February 2002 when he came to the library to get a book to read for English class. He was accompanied by a teacher’s aid who introduced me to this new student from Europe. Marvin struggled with English but asked for help to find a book that he could read himself. The easiest novels in the library were at about the grade 3 - 4 level of reading ability. I asked Marvin if he would read a few sentences and he tried; I knew the book was too hard but it was the best I could offer. Marvin said he would try it and checked out the book.

I assumed Marvin was an exchange student and that he would be here for a short time. A week later his name come up at a Student Services Team meeting. His English teacher was asking for an assistant or tutor to work with Marvin as he was an ESL student and could not take part in much of the grade 11 English literature class. Assuming he was an exchange student, I thought he should be placed low on the priority list. It was not until the next Student Services Team meeting that it became clear that Marvin had moved to PEI permanently. The Student Services Team suggested that Marvin be one of the students to use the AutoSkill program, and I agreed. I agreed because I wanted to examine how an ESL student accessed CAI. I wanted to see the differences between Marvin, Thomas, and Harry.

I met with Marvin to explain my study and the use of AutoSkill. During the parent-teacher interviews, I met with Marvin’s mother and outlined the program to her as well. They agreed to participate and once permission was given from the REB, we started work. During the March break, I picked up Marvin at his home and went to Bluefield for the pretesting of his reading ability. The plan was for Marvin to use AutoSkill for the first 40 minutes of English class each day.
Marvin was a conscientious, dedicated student; after the first few sessions, he needed little assistance with the AutoSkill program. At Bluefield there is a seven minute break between classes and each day Marvin would log on and use the program before the start of his English class. It wasn’t long before Marvin was spending almost the entire period in AutoSkill. He made the decision that he was learning more with the computer program than he was learning in class.

Researcher: Do you see when you go to do your other schoolwork that some of things you may have learned in the program [AutoSkill] have helped you or are these two separate things?

Marvin: No, it’s better. I can write better and a ______ [Marvin struggles to express his thoughts in English]

Researcher: Go ahead.

Marvin: and the same, the goods, when it’s, it must be, it is, I can’t say it.

Researcher: Take your time.

Marvin: I can’t

Researcher: Try, I have lots of time.

Marvin: No, but I can’t. It must be better than it is yesterday. The difference to write I think is better. I can more understand (Interview, May 6, 2002).

And in response to the question of working with a computer instead of with a person we had this exchange:

Researcher: What about learning from a computer as opposed to a person? ... You’re learning from a computer now instead of person. What do you think about that?

Marvin: The computer that’s relaxer [more relaxed].

Researcher: Pardon, say that again.

Marvin: The computer is relaxer than the person (Interview, May 6, 2002).
And again later in the same interview:

Marvin: Well then I would like more the computer.

Researcher: Why?

Marvin: It's [the computer] easier and your own [on your own] (Interview, May 6, 2002).

And from the second interview:

Researcher: How did you find learning from the computer? Do you think the computer program was a good teacher or was it just something to do?

Marvin: No, it was a good teacher. You can self plan your time. ... It is your own speed and the testing is every day and it says how many hours you got exactly (Interview, June 13, 2002).

*AutoSkill* provides extensive records of the student's interaction with the program: times, dates, all practice session errors, average response times to the millisecond. An example of the detail of the internal record keeping is that Marvin used the *AutoSkill* program for 50 hours, 15 minutes and 32 seconds and this can be broken down by day and by the particular skills practiced.

As the teacher, administering the program, I can report that Marvin needed only minimal support and no supervision. The greatest difficulty Marvin faced in the *AutoSkill* program was in recognizing the difference in the sound of the short vowels, “a” and “o”. This problem prevented him from progressing in the program as the mastery criteria for a reading subskill is 96%. I noted the problem in my teacher's log.

The ESL student is having difficulty with short vowel sounds. I think it's the same as me saying some words in French. No matter how many times I hear the expression correctly, I don’t really hear the difference and as a consequence don’t pronounce the word correctly. Marvin may be having the same problem. Even I find the *AutoSkill* exercises
difficult. Marvin says he finds it hard to hear the difference. He is willing to keep trying and I’ve lowered the percentage of correct responses that he needs to go to the next level from the default, 96 percent, to 85 percent. This is a judgment call and I hope I am making the right decision. Note that teachers have to modify computer-assisted instruction (Teacher’s Log, May 4, 2002).

I had to remind Marvin to take a break from the computer as AutoSkill recommends 45 minute sessions for adults. I asked him about eye strain and encouraged him to take a stretch or a washroom break but Marvin did not take breaks. He had a strong work ethic and a long attention span.

Researcher: Now, one thing that you did different from what was recommended, the program says that you should use it for about 40 to 45 minutes at a time.

Marvin: Yes, I know. I use for at least 70 minutes.

Researcher: Yes, every day you use the program for 70 minutes.

Marvin: Yeah.

Researcher: Did you find that hard? boring?

Marvin: No, it’s not harder than to sitting in class.

Researcher: What do you mean by sitting in class? Explain.

Marvin: Sitting in class to follow the stuff that teachers talk about and it’s not harder than the computer.

Researcher: It’s easier on the computer than in class?

Marvin: Yes.

Researcher: Did your eyes get tired?

Marvin: Who?

Researcher: Did your eyes get tired looking at the screen?
Marvin: Oh yeah, the last 20 minutes, I can feel it a little bit.

Researcher: Did you take many breaks?

Marvin: No.

Researcher: Why not?

Marvin: Why? It isn’t not specially needed (Interview, June 13, 2002).

In May as he neared the goal of 25 hours of instruction, there was no doubt that he wished to continue with the program until the end of the school year. I had noted his enthusiasm very early in my journal entry on April 16. “Already he has close to 11 hours on task. Yesterday Marvin asked if he could continue to use the program after the 25 hours was met” (Teacher’s log).

Marvin knew that his reading was improving and I was as pleased as Marvin with the gains in reading ability from the pretest and posttest results. See Table 6 and Table 7.

Table 6

Reading Ability Tests From Within AutoSkill

<table>
<thead>
<tr>
<th>Test</th>
<th>Pretest Date</th>
<th>Grade Level</th>
<th>Posttest Date</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloze (basal)</td>
<td>March 20, 2002</td>
<td>2</td>
<td>June 12, 2002</td>
<td>4</td>
</tr>
<tr>
<td>Words (basal)</td>
<td>March 20, 2002</td>
<td>3</td>
<td>June 12, 2002</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 7

Reading Ability Tests From the Woodcock Diagnostic Reading Battery

<table>
<thead>
<tr>
<th>Test</th>
<th>Pretest Date</th>
<th>Grade Level</th>
<th>Posttest Date</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word identification</td>
<td>April 8, 2002</td>
<td>5.1</td>
<td>June 12, 2002</td>
<td>7.6</td>
</tr>
<tr>
<td>Word attack</td>
<td>April 8, 2002</td>
<td>2.4</td>
<td>June 12, 2002</td>
<td>7.8</td>
</tr>
<tr>
<td>Passage comprehension</td>
<td>April 8, 2002</td>
<td>2.6</td>
<td>June 12, 2002</td>
<td>3.6</td>
</tr>
</tbody>
</table>
AutoSkill's test results are nicely grouped into three ranges: the basal or easy reading level, the instructional level, and the frustration level. This may account for the slightly higher scores from the Woodcock Diagnostic Reading Battery as AutoSkill reports the basal level. It is expected that there would be gains in reading ability with an ESL student even without the reading intervention program because he was immersed in the English language in school, both orally and in print. However, the gains shown over two and a half months from both the tests in AutoSkill and the Woodcock Diagnostic Reading Battery are exceptional. Marvin’s success is due to his work and access to the AutoSkill software. And how does Marvin view his improvement in reading?

Researcher: What would be your comment on using the program [AutoSkill] this year?

What did you think of it?

Marvin: It was good. My English is much better because the program, the language around everywhere.

Researcher: So, do you notice a difference with your reading now?

Marvin: Yes, it’s every time a little bit. You can say now it’s much better. Every day, a little bit better.

Researcher: Can you see a difference between now and February?

Marvin: Yes, I can more understand and I can read it. It must be (Interview, June 13, 2002).

Unlike the Harry and Thomas, I did not feel it necessary to discuss Marvin’s educational background as Marvin did not have a past history of difficulties in school or of learning problems; Marvin was an ESL student. I did arrange to meet with his mother in June to share the results of his dramatic increase in reading ability.

In the next chapter, we move from the student participants’ stories to my teacher account as a co-participant in this research study.
Chapter 6
Teacher’s Account

As researcher, I also have recorded how I learned to use CAI in reading in a research context. I remind readers that the program used was the *Academy of Reading 2000* supplied to me by AutoSkill International for the duration of the study. Although the student and teacher experience with CAI in reading relates to this specific software, I would posit that the experience would be similar with other programs. Educators will see the students’ stories as the primary data. The context of each student, the students’ reactions to learning through a computer, and the efficacy of CAI are paramount. Using the data from my weekly teacher’s log, I discuss my role in providing CAI.

As an early user of computer technology, an information technology consultant, and the school technology contact, colleagues often consider me knowledgeable about computers. In fact, I know little of the inner workings and configurations of computers, yet I am not intimidated by computer software. If the software is well designed, I feel confident in being able to use it. At the same time, I am not embarrassed, when confronted, to ask for help. Teachers who do not use computers are more reluctant to ask questions. *AutoSkill* recommends a one day training program for teachers as well as follow-up sessions. My contact person with *AutoSkill* did not want me to start working with students until I had received training. Because there were no training sessions scheduled on PEI, in early December 2001, I received informal training from Lillian MacKenzie, a Social Service Worker/Literacy Trainer. Ms. MacKenzie first started using *AutoSkill* in 1994, spoke highly of the program, and provided me with sound advice. I also found *AutoSkill*’s toll free support service very helpful; I was always able to talk to a person, not voice mail, to get immediate advice and answers for specific questions. I did not find any technical glitches but I did have one scare recorded in my log.
The power at Bluefield was erratic as it blipped about seven times in one afternoon. Harry was using *AutoSkill* at the time and the program stopped working. The next day I couldn’t get any of the data files. No one could register in the program. Of course I freaked. I did my normal tricks with the computer: shutting down, scandisk, and defragging. Nothing worked. I put a call in to *AutoSkill* and again, excellent service. My contact, Peter Cleary, got a technician on the line and within twenty minutes had the program working again. There is a utility to run when there is a power outage while using *AutoSkill*. It is a weakness in the programming but I was pleased with the tech support available (Teacher’s log, June 3, 2002).

Teachers that already use computers for word processing should not be fearful of using *AutoSkill* as long as training and ongoing support are provided. I found that the *AutoSkill* program was easy to manage and I wrote in my log on April 18, “So far the program seems manageable. Once the students are started, they seem to be able to work in the program without assistance.”

*AutoSkill*’s extensive records on the students’ interaction with the program were useful not only for modifying the instruction but also would be useful for parent-teacher interviews.

I have just spent half an hour looking at the reports available in the *AutoSkill* program. If a teacher wanted to have a clear account of what students did while using a computer program, *AutoSkill* seems to have it. Each subskill is recorded in great detail with the time spent recorded by day, hour, and to the second (Teacher’s log, April 26, 2002).

I did not find the extra work to provide the *AutoSkill* program too onerous. Some of the frustrations experienced by Harry and Thomas with mastery criteria would have been lessened if I had been more familiar with the program. Meeting the mastery criteria or automaticity is one of the basic principles of *AutoSkill*. If the student does not meet the criteria before 15 attempts or
trials, they see the message, *teacher time*, which means that they cannot continue in the program until they meet with the teacher. Harry and Thomas became frustrated before the *teacher time* message was displayed. For these students, the number of trials should have been lowered to ten. The teacher has the choice of reassigning the skill and/or adjusting the mastery criteria or even skipping that subskill. I did not realize until the end of the intervention that I could adjust the number of trials.

CAI is a useful tool for teachers to provide “one-on-one” reading instruction. From the students’ stories, it is clear that Harry, Thomas, and Marvin benefited from their use of the *AutoSkill* program but teacher involvement is vital. I think that Thomas would have gained more if I had more time to give him. In my teacher’s log I wrote:

I sat with Thomas on three different occasions for practice sessions where the computer says the word and he has to choose the correct word among three choices. With me staying with him and keying in the responses he chose, he did very well. The problem is staying focused and on task for about five minutes at a time. To succeed the student has to have the correct answers within a very narrow time margin for each response. This could be a weakness with the computer program as opposed to a person. Is it easier to stay on task with a person or a computer program (Teacher’s log, June 13, 2002)?

Having the time to give human support when needed is crucial. From my meeting notes with Ms. MacKenzie, I had written and underlined her advice on using *AutoSkill*: “Somebody has to care!” Other advice was also based on having human support for the program: “Don’t push too hard. If it is a bad day for the student, do something else today; Be prepared to adjust the success criteria for special needs, for example the range of average time of response.”

In summary, from the final entry in my teacher’s log:
In the three months of using the program, I think that it is a manageable program for teachers to use. I have gained experience that would be valuable to pass on to other teachers using AutoSkill for the first time. I would have benefitted from more instruction in using AutoSkill before I started. The toll-free support was good and available but a support group for teachers using the program the first time is necessary. Next year, if the program were available, I would be willing to offer the program to a few students. It is possible for regular classroom teachers to provide this form of reading instruction to students while teaching a larger class at the same time (Teacher's log, June 26, 2002).

Because I offered CAI in reading via AutoSkill in a research context, my entry in the teacher's log was a "compulsory" weekly task. These weekly entries forced me to think about what I was doing, to become a more reflective practitioner. My compulsory teacher logging was an essential part of the research process as it allowed me to look back and review the process or stages I went through in providing CAI reading instruction for the three students. However, as teachers, we struggle to meet the daily challenges and often do not have the time to reflect on our teaching practices. Those of us who teach know that teaching is very demanding and our days speed by without enough time to complete all that is required. I refer to Wink (2000) when she writes of the benefits of reflection as a component of critical pedagogy.

We do not come from a tradition in schools that encourages critical reflection. We, in schools, are often so busy doing that we fail to take time for thinking. Thinking about important ideas needs nurturing in our classes. It takes time (p. 15).

My teacher's log has been an invaluable asset in encouraging or allowing this self-reflection.
Chapter 7

Discussion & Conclusion

In this research I examined the way in which three students, Harry, Thomas, and Marvin, made use of a CAI program designed to improve reading skills. As well, I examined my role as a researcher, in this process.

All three students told me that CAI in reading through AutoSkill was less frustrating than teacher instruction in the large classroom setting. One of the three told me clearly that while he enjoyed computer assisted learning, he still preferred one-on-one instruction with a teacher. This is because he knows that the teacher can adapt and adjust the instruction to meet a student's particular need.

Can any teacher manage AutoSkill? This was an important question that shaped this research. My comfort with administering AutoSkill may be the result of my long time interest in literacy, my work as a resource/remedial reading teacher, and my experience as a long-time user of computer technology in education. In wondering if other high school teachers be comfortable with or be inclined to offer CAI, I examine my teacher’s log. I conclude that AutoSkill is a manageable program which most teachers could use. Teachers require clear instructions about how to use CAI, and should be reasonably comfortable with the use of a computer.

While undertaking this research I read a recent study completed in partnership with the Ontario Institute for Studies in Education, at the University of Toronto, and the Toronto Catholic District School Board. This study, directly relating to my research, reads in part:

Secondary school staff in a large urban school board were surveyed on their use of computer based literacy interventions, specifically, the highly successful Academy of Reading software program (Morgan, White, Portal, Vanayan & Lasenby, 2002).
All secondary teachers were asked to complete the questionnaire. From the concluding sections of the study, the following two points are specified:

- Results from the survey indicate that a large number of secondary school teachers feel that they are not prepared to address the literacy demands in secondary schools. In addition, a number of teachers indicated that their preservice training did not provide support in this area. Not all secondary school teachers feel literacy is their responsibility (p. 14).

- With respect to the Academy of Reading software, many teachers indicated that one of the major impediments to implementing the program was limited professional development and training. It appears that in most schools using the software, a staff member is assigned to oversee the use of the program. Respondents clearly indicated that more support, training and ongoing professional development is necessary (p. 14).

With a response rate of 53.4%, it could be argued that if the other half of the teachers had responded, the conclusions above would be even more powerful. Although my experience with managing AutoSkill was positive, I felt I would have benefitted from having more training prior to working with students. As well, I would have benefitted from ongoing training during the intervention period. Teachers interested in helping struggling readers need not fear the computer technology demands of AutoSkill as long as they are provided both training and ongoing support.

Because I provided AutoSkill in addition to my work as teacher-librarian, I know I was not always available to the three students when they needed teacher support. In my opinion, this human component for struggling readers is essential, not just to administer and monitor student interaction with the software, but also for teachers to know the learning contexts for students who are struggling to read. This knowing may, in fact, provide clues about why a particular student is...
experiencing difficulty and allow teachers to motivate and to support the student to overcome difficulties in learning. Understanding the past, present, and expected frustrations of struggling readers is key to their learning. This is no less so with CAI.

The main advantage of using a qualitative, rather than a quantitative, approach in this study was that I was able to change direction during the actual research. For example, my original proposal did not include meeting with the parents of the three students beyond explaining the purpose of the study, and acquiring the necessary parental consent. While interviewing the students during the research, I became more interested in their background, their learning histories and the contexts in which they struggled to read. The knowledge from these interviews prompted me to then interview the parents of each student. In retrospect, I think it was a mistake to have not met sooner with the parents of the students. Time taken to the listen to students’ parents was time well spent. I needed to be reminded that the parents generally know their children better than do teachers. Teachers need to be reminded, moreover, of parents’ fear and pain in seeing their children struggle in school. Clearly, the whole family is affected by a child’s struggle to read.

Two of my participants had difficulty adapting to the demands of a large classroom. Harry’s parents, for example, spoke about the difficulty in obtaining timely learning assessments. Only because they were strong advocates for Harry did he receive assessment through the school and then the medical system. When this intervention was not successful for them, they chose to use their own funds to garner what they considered to be a ‘complete assessment’. During an interview they told me that they recognized that an assessment is not the solution to Harry’s problem. Rather, it is a starting point for a more successful educational plan. As well, they spoke about the frustration they felt when they tried to convince Harry’s teachers that their son was not lazy or uncooperative but rather that he had a learning disability. Thomas experienced many of
the same problems as Harry but lacked the benefit of a strong, supportive advocate for assessment and resource. Because Marvin was coping primarily with ESL issues, he was exempt from the labels used to explain the reading struggles of Harry and Thomas. It was clear from Harry’s story that once he began to realize that he had a learning disability he was able to feel less negative about his struggle to read.

Thomas did not have the luxury of knowing that he had a learning disability. Unlike Harry, a thick learning assessment file had not been completed for Thomas even though he has struggled to read since grade one. Thomas became one of the many students whose literacy problems simply slip through the cracks and neither the system nor parent advocates intervened in adequate ways. Parents may not be aware of the need for learning assessments and the route through the school and health care system can be intimidating navigation for parents. This, in turn, makes it difficult for parents to push for learning assessments for their children.

To varying degrees all three participants benefitted from the CAI in reading through AutoSkill. From an analysis of the stories of the three students, and the patterns of their experiences, all felt that their reading had improved. This perception alone is significant. If students feel they are successful, it is possible that they will be successful. In my opinion, a student’s positive attitude toward a subject, as in the case of CAI in reading, is a vital determinant of increased motivation and consequently increased reading ability. In a comparison of pretest and posttest scores with the AutoSkill program and the Woodcock Diagnostic Reading Battery, Marvin made the most obvious gain in his reading ability. Because Marvin was an ESL student this finding is not surprising; Marvin does not have a learning difficulty – his task was one of learning a second language. Thomas made modest, but significant, gains. Keeping in mind that Thomas’s reading problem has never been adequately assessed, it is not surprising that his will to improve was eroded through his school career. Using CAI in reading, this will was
slow to develop. Harry, the most capable reader at the outset, showed no change in reading ability.

Earlier in my work as a resource teacher, I visited an elementary resource teacher who was achieving amazing results in boosting the reading levels of children. I visited this teacher because I wanted an answer about how to reach struggling readers. I wanted a program that would teach all students how to read. I now believe that her success with struggling readers was the result of her hard work and genuine love of children. Because the children saw this, their attitude about reading changed and, as a result, success followed. In my opinion, the determinant of success lay in her personality and not in the reading instruction program she followed.

This realization lead me to wonder if the same might be for AutoSkill. Did the participants in my study improve because I was attempting to boost their reading ability through CAI? In all three cases the participants would probably not have received any special reading instruction at Bluefield High School if they had not been offered AutoSkill. I have no doubt that the AutoSkill program allowed Marvin, with his diligence, to make a big jump in his reading ability. Had I more time to spend with Thomas, I think he, too, would have shown an even greater improvement in his reading competence.

Harry's reading scores showed no change. It is possible that I misplaced Harry in the program; I started him at the beginning. Had I placed him to the reading comprehension component rather than beginning with the phonemic awareness training, he may have shown a greater change. As it was, he only reached this part of the program two weeks before the end of the school term. When I spoke with Lillian McKenzie, the Social Service Literacy Trainer, whom I visited for training with AutoSkill, she spoke glowingly about the effectiveness of AutoSkill. She found it to be effective with nonreaders and low-level readers. Harry, by contrast,
came in to the program reading at a much higher level. It is possible that Harry was beyond the
effective reading range of the *AutoSkill* program.

Like the secondary school teachers in the Morgan, White, Portal, Vanayan & Lasenby (2002) study into the use of *AutoSkill* for literacy intervention, I too question the efficacy of the
*AutoSkill* software when used in a school environment to improve literacy levels. While Morgan et al. state that *AutoSkill* is an effective program, it is important to note that the claim is
substantiated only through *AutoSkill*’s literature and research conducted primarily by the
developers of the software in 1990, or earlier. According to them:

This report will focus on the use of the *Academy of Reading* computer intervention
program, which has been shown to be effective as a reading intervention program [italics
added], and has been widely distributed to secondary schools within the Toronto Catholic
District School Board.

“The *Academy of Reading* is a computer-based training program designed to help
underachieving students develop effective reading skills. The program is built on
a solid foundation of research-based principles” (*AutoSkill*, 1999).

The software uses a balanced approach to reading instruction, incorporating elements of
phonemic awareness, fluency and decoding skills, automaticity principles, and reading
comprehension, and utilizing a mastery approach to learning.

There is substantial research evidence that the *Academy of Reading* software
package is effective in developing specific reading skills in a number of populations.
*Fiedorowicz and Trites, the developers of the software* [italics added], along with other
researchers, have conducted a number of studies on the following populations to
demonstrate the effectiveness of the program (p. 5).
Morgan et al. (2002) go on to list six groups - socio-economically disadvantaged students, ESL students, reading delayed and reading disabled children, adolescent literacy training, adult literacy training, and inmate education - that have benefitted from *AutoSkill*. Of the 20 studies cited, all predate 1995, and 85% were conducted in 1990, or earlier. At the time of this writing, I question if this early research is a problem. I also was discouraged to find that only one of the studies was peer reviewed.

As previously cited in the review of the literature, Lewis (1999) offers a similar critique of the research on the efficacy of CAI in reading by saying:

They suggest that where well-designed, *independent evaluations have been carried out* *(ie [sic] not sponsored by the program makers)* [italics added] pupils with learning difficulties tended to use Integrated Learning Systems less effectively than other pupils and their capabilities may be under-evaluated by the computer (p. 155).

Lewis also raises questions about the pedagogy used by *AutoSkill* for reading instruction by saying:

Some Integrated Learning Systems, such as *AutoSkill*, are based on hypothesised links between ‘diagnosis’ of a particular sub-type of learning difficulty and associated remediation. However, beliefs about such diagnosis-remediation links are still contested as they may be irrelevant or counter-productive (p. 154).

My research with these three students brings me to a less-than-clear position. I did not find peer reviewed, independent research studies that convince me of the efficacy of *AutoSkill*. I recognize that there are many ways to improve the reading ability of students and as a result of my research I have concerns about the use of *AutoSkill*. As previously stated, a strength of *AutoSkill* is that it provides a detailed account of the student’s use of the software. Extensive records are kept, practice sessions recorded, and timed to the millisecond, and errors recorded for
each session. The software enables a teacher to have a multitude of information for parent-
teacher conferences.

One danger with the use of CAI is that it may be seen as an easy fix, by administrators,
for students with reading difficulties. In the fall of 2002, the Eastern School District on PEI
gathered administrators and resource teachers for a presentation by sales representatives from
AutoSkill. In the discussion that followed, one person suggested that a provincial license be
purchased, and that AutoSkill be used from the elementary to college level. Although the
suggestion was not followed, software such as AutoSkill can be perceived as the panacea for
reading difficulties.

At the same time, however, my three research participants believed they benefited from
their time spent using AutoSkill. As well, with Marvin and Thomas, gains in reading ability were
confirmed by both the testing within AutoSkill and the Woodcock Diagnostic Reading Battery.
My study shows that more qualitative research needs to be completed on learning and reading
difficulties, on assessment within schools, and on how to intervene when children experience
literacy problems.

Are there “best practices” which help struggling readers? AutoSkill is based on a drill and
practice methodology to achieve automaticity in the mastery of the subskills of reading. CAI can
handle drill and practice but there is a limit to the efficacy of this technique. Other important
components should be included in a literacy program such as encouraging and supporting
struggling readers to facilitate more time spent on real reading for school purposes and ideally
for enjoyment. The use of the CAI program underscores the need for more thorough
interventions with students and parents about specific reading problems.

This research began as a case study to evaluate an instrument of intervention, AutoSkill,
but actually gave me access to stories and histories that allowed me to understand both the
usefulness and limitations of any one method of instruction. As the stories of Harry, Thomas, and
Marvin suggest, whatever method of intervention is used should be accompanied by in-depth
interviews with both students and the parents.

I am pleased with the results provided by this research. Not only did I have the
opportunity of providing CAI in reading which benefited three participants, but I also had the
opportunity to approach them in a meaningful way, a way that enabled me to understand better
the complexity of how they are learning to read. When I first began this research, I assumed a
quantitative approach would allow me to test the efficacy of CAI. Even if I had been able to offer
AutoSkill to a large number of students, and use statistical analysis to compare pretest and
posttest scores, I assume I would have missed the key component to understanding the literacy
issues of these three readers. It was necessary for me to hear the stories of the students and their
families in order to understand more fully the context in which they were reading. By taking the
time to talk with all the participants, students and parents, through interviews, I know I have
gained more insights into the efficacy of CAI in reading. Working with them, I felt that more
than just providing a service in reading instruction, I also had the opportunity to deepen my
understanding of how literacy is acquired, or not.

Teachers' work days are filled with a multitude of demands and there is little time to
evaluate teaching methodology, to be reflective practitioners. The requirement to keep a
teacher's log for this research forced me to stop, reflect, and record my experience of providing
CAI in reading to the three students. By offering CAI within a qualitative research context, all
have benefitted from the experience.

All too often educators know the real crunch in assisting struggling readers is time. I
began hoping for an inexpensive program that would improve the reading skills of three students
who trusted me enough to allow me to do research with them. I wanted to save them and their
school time and money. As a result of the research I undertook with the three students, I conclude that CAI in reading can be a useful tool to supplement learning as long as it is offered in the setting where there is human attention to the individual students and their histories.

Although I intended to have the three student participants practice reading with the support of the computer mediated word recognition software, TextAloud, I did not have time to facilitate its use. The limited time available was used to support students in CAI in reading.

From my perspective as teacher and researcher, CAI reading software such as AutoSkill, should be considered as one of the tools available to provide reading instruction for students struggling with severe reading difficulties. I do not propose that AutoSkill provides the most suitable program for all struggling readers. I concur with Wink (2000) when she writes, “Jonathan taught me that one-size-does-not-fit-all when it comes to reading and teaching and learning” (p. 10).

Teachers involved in this work will require adequate training and on-going support to be able to use CAI effectively. With CAI, I place emphasis on the term “assisted” in computer assisted instruction. Teacher involvement is lessened with CAI but having a teacher to support, encourage, and adapt CAI to meet the individual needs of students is essential. CAI does not replace the human interaction needed between student and teacher. Students, especially those with learning difficulties, have stories to tell about how and why they find reading difficult. In no way does CAI allow teachers to process or service large numbers of struggling readers. CAI may be a useful tool for teachers to assist struggling readers, but it should not be seen as a stand-alone solution.

PEI has an ambitious program at the primary level to catch at-risk readers before they lag too far behind their classmates. The model used is Marie Clay’s “Reading Recovery” in which a highly trained teacher works one-on-one with students for up to 20 weeks. The goal of this
intensive instruction is to have the students catch up and return to the regular classroom with confidence, having attained the necessary literacy skills (Clay, 1998). Even with "Reading Recovery" at the primary level, Clay recognizes that not all students will read at grade level. She asks, "... what to do about older children who have slipped through the net. What can be constructed for effective learning among these older children" (p. 215)? Clay recommends that around age ten or eleven schools again take stock of their struggling readers and provide a three month intensive make-up program. She recommends that the intervention at this age be in small groups rather than one-on-one instruction as in the primary level.

The problems tackled would be different for different pupils, focusing on, say, strengthening comprehension,
building interest in reading and/or writing and/or spelling,
approaching texts of various kinds with flexible strategies,
switching genres with ease,
building vocabulary,
increasing awareness of devices used in written language (p. 217).

As PEI has adopted Clay's teacher intensive Reading Recovery model for primary schools, might we not continue with her recommendations for students who struggle with reading at the high school level? An intensive literacy enhancement program is also needed in high schools. Just as the elementary schools allot extra teachers for the Reading Recovery program, high schools require an additional allotment to provide small group instruction for literacy enhancement

I recommend CAI reading software as one component in a literacy enhancement program for struggling readers in high schools. AutoSkill can provide reading instruction and practice with the subskills of reading, but more is required. Students need to interact with text in more
meaningful and enjoyable ways to overcome the Matthew effect, the better readers read and get
better and the poorer readers read less and fall further behind. Struggling readers have to practice
reading more, not less.

Computer mediated word recognition software could be made available to assist students
in “reading” any text they wish to read. This can be for either personal enjoyment or for use with
curriculum related materials. Textbooks can be scanned and converted to digital format and be
read aloud. As well, there is a wealth of reading material available in electronic format through
Web sites, on-line books, and on-line databases of magazines and newspapers. And just as
importantly, individual struggling readers could be matched with conventional print books of
specific interest and appropriate reading level to promote a real interest in reading.

There are other important areas for further research that relate to my study. A reader may
ask, why was it that the three students in this study were all male? Is sex an issue with struggling
readers? From my teaching experience, yes, as I have encountered far more boys than girls with
reading difficulties. Halpern (2002) concurs, “Females also obtain higher overall reading scores
among average (i.e., nondisabled) readers (Mullis and others, 1993) and have a lower incidence
of reading disorders than males (Stein, 1994)” (para. 8).

Which leads to the follow-up question, why do boys have lower reading scores than girls?
In my literature review, I referred to the Matthew effect where those that read well, read more,
and advance quickly. And those who struggle with reading in turn read less which widens the
gap between the skilled readers and struggling readers. And if we combine the Matthew effect
with research that suggests that males are more inclined to disengage earlier from learning than
girls, we may have an answer. Royer and Wing (2002) write,

In reading, the low performing boys do not have an inherent advantage to begin with, and
their more engaged female counterparts begin to perform better than boys on verbal tests
relatively early in the elementary school years. The difference in engagement also has a major impact on course performance, with girls achieving higher grades than their male counterparts.

Which leads to another follow-up question, why do boys disengage from learning more than girls? But I leave this for another thesis.

My study, profiling three students, has taught me that any work to improve reading and comprehension skills of students involves first taking time to know the individual student. Teachers have to consciously take detailed stock of a student’s history of learning. An action research, pilot project offering literacy enhancement at the high school level would provide our public school system with a plan to assist struggling readers.

Someone has to care.
References


Critics warn against using computers ... to take the place of teachers. (1997). *CQ Researcher, 7*(39), 926-927.


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Appendix A  Information Form for Participants

Can computer programs help students improve their reading?  
A research study by Richard Baker as part of the thesis requirements to complete a Master of Education in Leadership and Learning from the University of Prince Edward Island

This research study will try to find out whether or not computer assisted reading instruction will improve your reading level. You will be using the computer program, AutoSkill: Academy of Reading 2000. The program is based on phonemic awareness (sounding out words), decoding skills, and reading comprehension. The skills are broken down and practiced so that you can read more quickly and improve in understanding what you read. This research study, is not just about seeing if the a computer program will improve your reading but also ask you to think about the way you are learning. What is learning from a computer program like?

Also you will be asked to practice reading and you will have the support of text to speech software, TextAloud. Text to speech software will read aloud any words that you see on a computer screen. What can you read? That answer is simple. You can read anything that you want to or need to read. The reading could be on a topic of your interest (an appropriate one of course) or reading for your school work at Bluefield. I hope that this extra reading practice will also work to boost your ability in reading.

The results of this study are important for not just Bluefield High School but all schools. There are many students who would like to improve their reading ability but schools always find it hard to provide the one-on-one instruction that is needed. Can computers and software help to fill this need? The cost of one license for the computer software that you will be using, AutoSkill: Academy of Reading 2000, is $840. If this method of reading instruction is found by you, the learner, to be effective, then a stronger case can be made to spend the limited dollars the school system has on software for instruction in reading. Also it is important to see how you, the students, view this way of learning. What will be the strengths and weaknesses of computerized instruction?

Why should you take part in the study?

• a chance to boost your reading ability
• access to a computer assisted reading intervention program, Academy of Reading 2000

For 16 years AutoSkill International has been producing award-winning reading intervention software that has helped tens of thousands of students at all levels achieve an average of 2.5 Grade Level Gains in 25 hours of time of task


When will you use the program? Depending on your situation, it could be:

• if you are taking English, it could be counted as part of your class time for credit (with teacher permission
• during your free period (if you have one), at lunch, before or after school

Richard Baker

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8 This was the original title for the research study.
Appendix B
Student Consent Form

*Can computer programs help students improve their reading?*

Before beginning the program and at the conclusion of the study, I know that my reading ability will be assessed. I will use the software program, *AutoSkill: Academy of Reading 2000*, for 25 hours. I will also have access to computer software, *TextAloud*, that will read any text on a computer screen aloud. The forty minute sessions (three or more sessions each week) will be set up with Mr. Baker in a closed seminar room in the library. I will be asked to write a response in a learning log once every two weeks. I will also have two fifteen minute audio taped interviews with Mr. Baker. The first interview will be at the halfway point and the other after my 25 hours of computerized reading instruction are completed. And lastly, I will be asked to take part in a forty minute recorded “coffee shop” discussion with the other participants in the study. All participants will be asked to keep the information given in the group discussion private or confidential but Mr. Baker can not guarantee this.

My name will never be shown in any write up in this study. The only person that will know exactly what I have said or written is Mr. Baker. All records will be kept in a secure place.

The proposed schedule for my sessions using *AutoSkill: Academy of Reading 2000* is:

By taking part in this study, I will complete the 25 hours of computerized reading instruction and write in the bi-weekly learning log. There may be times when this will be difficult, but Mr. Baker wants me to give it my best. However, I know that I am free to change my mind and drop out of the study at any time without penalty. If I have any questions, I will ask Mr. Baker before I sign this form. You will be provided with a copy of this consent form.

For further questions or explanation, contact:

Richard Baker  or  Fred Kibenge
Bluefield High School  Chair, UPEI Research Ethics Board
675-2611  566-0967
I have read carefully the consent form with my parents (or guardian) and agree to take part in the research project, *Can computer programs help students improve their reading?*

Name _______________________________ Date __________________________

Address ______________________________________________________________________

Phone ______________________________________________________________________

Signature of student _____________________________________________________________

Signature of parent (or guardian) ________________________________________________
Appendix C   Informed Consent Form for Interviews with Parents

INFORMED CONSENT FORM

Researchers name: Richard Baker
Argyle Shore, P.E.I. Phone: 675-2611

Thank you for agreeing to participate in this interview. The main purpose of the interview is to examine the school history of your child.

- When in school did the problems first arise?
- Did the school notice the problems initially or you, the parents?
- What frustrations did your child experience in school?
- What attempts were made through assessments to better understand your child’s learning difficulties?
- Was there adequate support given through resource teachers or modifications to programs?
- Did your child take part in any other reading programs outside the school setting?

With your permission, I will make an audio recording of the interview. The notes that I gather from the interview will be typed and a copy of the report will given to you to ensure that they accurately represent your thoughts.

You are encouraged to ask any questions at any time about the nature of the study and the methods that I am using.

1) Neither your real name or your child will not be used in the report.
2) No audiotapes will be used for any purpose other than to do this study, and will not be played for any reason other than to do this study. At your discretion, these tapes will either be destroyed or returned to you.
3) Your participation in this research is voluntary; you have the right to withdraw at any point of the study, for any reason, and without any prejudice, and the information collected and records and reports written will be turned over to you.
4) You will receive a copy of the report before it is submitted, so that you have the opportunity to suggest changes to the researcher, if necessary.

Do you grant permission to be audiotaped?       Yes_______No_______

Do you grant permission to be quoted directly? Yes_______No_______

Do you grant permission to use information from your child’s school cumulative record card? Yes_______No_______

I agree to the terms;
Respondent_________________________ Date_________________

I agree to the terms:
Researcher:_________________________ Date_________________