TECHNOLOGY AND PRIMARY TEACHERS' VALUES:

RETHINKING THE COMPUTER REVOLUTION

by

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Abstract

Many people have come to regard computers as an essential part of a student's education. Yet, despite years of effort by promoters, computers have had a minimal impact on teaching methods in the primary grades. The promised revolution has not occurred, and shows little evidence of occurring soon, if ever.

There are many possible reasons for the lack of impact of computers on teaching. The beliefs of teachers may have an influence on their willingness to integrate computers into their classrooms. This study explores the relationship between the beliefs, values, and goals held by two teachers and values commonly associated with computer technology.

The thesis begins with a review of some reasons previously cited for various technologies' limited impact on schools. A literature review outlines some ways that teachers think about their work, providing a framework with which to discuss their beliefs and practices. Some values commonly attributed to computers are described, including objectivity, individualism, and control.

The core of the thesis is a case study of two primary teachers. Participant observation and interviews were used to create a description of their beliefs and practices. The use of qualitative methods enables an understanding of the thinking behind the teachers' decisions.

This study reveals a discontinuity between the beliefs and values of the teacher-participants and the values attributed to computer technology. The teachers' priorities concern putting knowledge in context, encouraging social

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responsibility, and sharing some of their control. Central to each teacher's practice is the emotional climate of her classroom. Neither teacher's goals would be adversely affected by the elimination of computers from the schools. Furthermore, time constraints make learning about computers difficult for the teachers. This suggests a limited potential for computers to change the way they teach.

Rather than seeking to revolutionize primary teachers' practices with computer technology, it may be more beneficial to use computers in ways consistent with teachers' goals. Ways of helping teachers with computer technology, while respecting their time constraints and their values, are suggested.

Dedication

For Jonathan and Sacha.

Acknowledgments

I am indebted to the members of my supervisory committee for their time and advice. Sandy Dawson prompted me to look at technology with new eyes. His guidance in directing me to provocative authors started me on this journey, and led to the framing of this study. He was supportive throughout the process of bringing this work into being. Celia Haig-Brown helped me appreciate the value of, and the rigor involved in, qualitative research. She was generous with her time, and provided detailed comments on the drafts, forcing me to look at what I had written with a critical eye.

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My sincere gratitude goes to "Pat" and "Rachel," the teachers who took part in my case study. Each teacher's willingness to take a risk and open her classroom to me for most of a school year was the key to the success of my research. I hope that the strength of their values shows through my writing so that their work might be inspiring to others, as it was to me.

Finally, I offer my deepest thanks to my wife, Lynn Westwick, without whose patience and understanding none of this would have been possible. She bore the burden of maintaining a normal family life, allowing me the luxury of becoming absorbed with my studies.

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Chapter I

The Unrealized Promise of Technology in the Schools

Statement of Purpose

Since the introduction of microcomputers into schools in the early 1980's, computers have become regarded by many members of the public as an essential part of education. Parents and the public expect students to become computer literate in school. Computers are seen in part as the means to prepare students for the future, and business and government constantly remind the public that we live in an "information age" in which high technology is essential to our economic survival (Education Technology Centre, 1992). Proponents of computer technology in the schools have predicted that computers will revolutionize the way teachers work, and have promised changes to what students learn, how they learn it and how well they learn it (Akins, 1992). This creates a high expectation of teachers who are already overloaded with demands for better results while dealing with an increasingly diverse student population composed of non-English speaking children[1], and children with behaviour disorders, learning difficulties and physical disabilities.

Yet, despite over a dozen years of effort by promoters, computers have had a minimal impact on teaching methods (Cuban, 1986; Cohen, 1987; Akins, 1992). The promised revolution has not occurred, and shows little

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[1] Although knowledge of a second language is a strength, the presence of children who do not speak English is regarded by many teachers as a problem, since their teaching must be adjusted to account for these differences.

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evidence of occurring in the next few years. One observer declared computers in schools as "the revolution that fizzled" (Elmer-Dewitt, 1991, p. 48). Generally speaking, the greatest impact that computers have had on primary education involves a weekly trip to the lab to play educational games. While there may be nothing on the surface that is wrong with this (aside from the tremendous expenditure of funds on hardware and software), computer promoters might argue that this type of superficial exposure is not the best use for computers and does not contribute substantially to children's education.

There are many possible reasons for the lack of impact of computers on primary teaching. This thesis explores the role of beliefs in the lack of revolutionary impact of computers on primary teaching. The means for doing this is to examine the relationship between the values commonly associated with computer technology and the beliefs, values, and goals of two primary teachers. The beliefs, values, and goals of teachers may have a dramatic impact on their willingness to integrate computers and other high technologies into their classrooms. Consideration of deeply held beliefs (the ones that require more thought and response than would generally be sought on a survey) that are inconsistent with values associated with technology could be one piece of the puzzle of the slow progress of computers in changing the ways teachers work. Teachers' thinking and beliefs about the nature of their work can be thought of in terms of images which guide their practices (Elbaz, 1983; Clandinin, 1986). Innovations are judged, in part, by their compatibility with these images. Innovations compatible with teachers' images are more likely to be adopted.

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This chapter introduces the problem, provides a rationale for its study, examines the history of limited adoption of new technologies, and provides an outline of the rest of the thesis.

Rationale

Until now, the problems surrounding computers in the schools have revolved primarily around acquisition of funding and hardware, and implementation of various programs such as computer literacy, computer programming, LOGO, computer assisted instruction and word processing. Computers have been accepted almost without question as beneficial to students and are "the latest in a long line of mythologized machines, endowed with near-miraculous powers" (Cohen, 1987, p. 154). School districts around the province have sought effective ways to provide inservice to their teachers. To this end, districts have held workshops, provided individual consultation, and facilitated computer purchase incentives for teachers. To date, however, the impact on the way teachers work has been negligible. The computer is still widely treated as an add-on that intrudes on time for academic subjects and social development rather than as an essential tool for enhancing curriculum delivery.

There are a number of possible reasons for this lack of progress including insufficient hardware for a full class to use simultaneously, a lack of curricular direction provided by the provincial government, a lack of training for teachers in appropriate uses of the computers, a lack of software that fits the curriculum, and a lack of time for teachers to familiarize themselves with the hardware and software. In addition, teachers are often guided by practical concerns. For a teacher struggling to meet the needs of

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twenty-five students, and the seemingly constant stream of government directives for curriculum change, what may appear to be an add-on in the form of computers takes a low priority. One of the tensions that exists for teachers is the expectation that they will implement computers in the curriculum, but without the necessary resources and training. Practical roadblocks, such as jammed printers or malfunctioning computers, cause frustration and feelings of inadequacy. Timetables which only allow small blocks of time for a class each week augment the frustration; one or two periods per week with a half-class set of computers is not enough time to accomplish any significant tasks. I concur with Moursund & Ricketts (1988) who suggest that thirty minutes of computer time per day is needed to accomplish significant tasks.

Reasons for the Lack of Change

Cuban (1986) describes the history of classroom technologies since 1920. He shows how each new technology—film, radio, television, and computers—has been hailed as a revolutionary force in education, promising greater individualized instruction and improved learning. Proponents of these technologies—nearly always non-teachers—promised greater efficiency, effectiveness, and interest for students. Rather than the promised revolutions, however, each technology was initially welcomed enthusiastically, adopted on a more limited scale, and (previous to computers) finally allowed to fall into relative disuse. Cuban offers four reasons frequently cited over the last fifty years for the lack of use of classroom machines (pp. 52-62).

The first reason lies in the nature of the innovation: inadequate equipment that breaks down easily or is obsolete; scheduling problems that discourage use; widely varying quality of instructional software (film, radio or television); and a lack of time to preview the material. These factors can also be seen in computer implementation.

The second reason is flawed implementation. Cuban points out that top-down mandates for new technologies have been attempted with radio, films and instructional television, but that adoption does not necessarily translate into classroom use. When an innovation does not fit classroom routines or is inconsistent with the beliefs of the teachers, the response is often token compliance. In other words, stockrooms are filled with projectors and televisions, and labs are outfitted with computers, but teachers are generally free to ignore the machines.

Cuban's third reason for lack of adoption focuses on how the work place shapes behaviour. Students attend school, by and large, involuntarily. "The teacher is expected to maintain control, teach a prescribed content, capture student interest in that content, match levels of instruction to differences among students, and show tangible evidence that students have performed satisfactorily" (p. 57). To deal with these demands, teachers organize their classrooms, and ration their time and energy in ways that help them cope "with a large number of students in a small space for extended periods of time" (p. 57). Practical techniques that allow the teacher to cover the curriculum in the prescribed time are, understandably, adopted. The old technologies of chalkboards and textbooks are flexible, inexpensive, and readily available. The new technologies tend to be awkward to move (or

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must be traveled to), expensive, and must be scheduled. The simplicity of the older technologies often outweighs the benefits of the new ones.

The fourth reason Cuban cites for the failure of new technologies in the schools is that teaching is a conservative profession, populated with people who did well in the traditional system. "Teaching is one of the few occupations where practically everyone learns firsthand about the job while sitting a few yards away, as students, year after year. We all have absorbed lessons on how to teach as we have watched our teachers" (p. 59). The system of teacher recruitment tends to favour stability. New teachers, trying to cope with the many demands of the classroom, resort to practices from their own school experiences, or to practices gleaned from the advice of more experienced colleagues. Teachers tend to concentrate their energies on holistic concerns of student progress rather than on the minute details of technique and mastery of specific facts. "Furthermore, because teachers believe that interpersonal relations are essential in student learning, the use of technologies that either displace, interrupt, or minimize that relationship between teacher and child is viewed in a negative light" (pp. 60-61). There is also a belief held by some that the technologies of film, radio, television, and computers are more appropriately identified as entertainment rather than as teaching tools.

Cuban incorporates two of the explanations (school and classroom structures and the beliefs of teachers) into a single explanation he calls "situationally constrained choice" (p. 63). The structure of the school along with teacher beliefs, he argues, creates boundaries which influence what is possible within the school. Teachers perpetuate established methods of

teaching as practical solutions to the demands placed on them so that they can survive the school year. This does not mean that all teachers share the same beliefs and use the same practices. Teachers' beliefs are influenced by societal pressures; new ideas appear about child development and teaching strategies; teachers consider, adopt, and reject new ideas as they find appropriate. Teaching practices have changed over the years, but only when they solved problems that the teachers themselves believed needed solving. The issue becomes one of power:

> Whose questions count? Teachers ask very different questions of new classroom technologies than do administrators, school board members...and scholars. Teacher questions are anchored in the classroom.... Policy makers who adopt innovative technologies and ship them into classrooms ask very different questions about productivity, equity, and cost. (p. 67)

Cuban's principle of situationally constrained choice places the teacher's perspective at the core of decisions whether to adopt or reject new technologies. Teachers will adopt a new technology if it helps them solve a problem that they themselves see as important and as long as it does not undermine their authority. "They will either resist or be indifferent to changes that they see as irrelevant to their practice, that increase their burdens without adding benefits to their students' learning, or that weaken their control of the classroom" (p. 71).

In a study of teachers in a British Columbia school district, Akins (1992) found a number of factors both encouraging and discouraging computer use in the schools. Factors encouraging use included the perception that computer skills are important for the students' future, the belief that computers are an essential part of schooling, the improved appearance of

student writing, new learning opportunities for students, increased access to computers, the presence of a resource teacher who instructs students and consults with teachers, and personal familiarity with computers. On the other hand, factors discouraging use included the lack of access to hardware and software, the lack of time to learn about computers and prepare for their use, a lack of knowledge about the implementation of computers, a lack of direction for computer use provided by the government or school board, a perceived lack of payoff for the time and energy invested in learning to use computers, and a fear of computers.

The Role of Values and Beliefs

This thesis considers the role of values and beliefs in the decisions two primary teachers make in their daily classroom lives, and asks whether those beliefs may contribute to the explanation for the lack of revolutionary impact computers have had on their teaching methods.

Fullan (1991) points out that three factors must be addressed for a new program to be successfully implemented: materials, practices, and beliefs. Computers (materials) have been present for over a decade. Practices in the form of new ways of delivering parts of the curriculum have been demonstrated and encouraged, and, to a limited degree, adopted. Beliefs are trickier to address, however. It is unclear at this point whether beliefs have been influenced by the materials and practices in more than superficial ways. There is certainly a general attitude among teachers that computers are good for children (Akins, 1992), but what teachers think intellectually about the value of computers in education may bear little relation to their deep-seated values. Teachers are bombarded with the view that knowledge of computers

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is essential for students to succeed in the twenty-first century, but it is possible that they subscribe to that attitude only at a surface level.

Akins (1992) found that all the teachers in his study stated they believed that computers should be used in the curriculum, yet approximately one quarter of the teachers had never initiated a student activity requiring the use of computers. The question arises: why were teachers' stated beliefs inconsistent with their practices? It is erroneous to assume that people have entirely consistent belief structures (Schutz & Luckmann, 1973). The normal state may be one in which various experiences and perspectives sift down to a variety of contingent beliefs and practices. The presence of inconsistencies may point to dilemmas and competing demands that teachers face in carrying out their jobs.

We are not born with a viewpoint of the world. Rather, our view of the world is socially constructed (Eisner, 1985). Each of us knows the world differently, depending on many factors, including gender, nationality, cultural heritage, religion, personal interests, life experiences, education, and many others.

> Our understanding of the world is not simply a reflection of reality, produced like a mirror image; nor is it built up from certain basic sense-data or intuitively given 'ideas'. Rather, it is something constructed by people in the course of their interaction with others and constructed from what they have learned from others in the past. We perceive the world and think about it in terms that are essentially given to us by the culture in which we live. Furthermore, this culture is based on certain assumptions, on beliefs which we take as given, even though we cannot demonstrate that they are true, and even though they are often culture-specific, not shared by those living in other cultures. (Hammersley, 1977, p. 9)

Certain shared ways of knowing the world, such as those found in religions, have been institutionalized. These are visible and acknowledged world views. But it is also possible that there are world views that people are not consciously aware of. A world view influenced by computer technology may be one such way of knowing. As Michael Apple puts it, new technology "embodies a *form of thinking* that orients a person to approach the world in a particular way" (1988, p. 305, emphasis in original).

The vast majority of today's teachers grew up without computers and many may hold values and beliefs that are not conducive to integrating computer technology in the curriculum. Values often associated with computer technology will be described in detail in Chapter II, but they include a valuing of objectivity, abstraction, individualism, and control. Many teachers, however, might value subjective, interpersonal relationships over objectivity, holistic knowledge over context-free data, cooperative work in which people are responsible to a group, and (to the extent they are willing to allow) shared control. Many primary teachers, in particular, appear to share clearly articulated values—expressed in the British Columbia Primary Program (B.C. Ministry of Education, 1990)—with regard to education. Because the Primary Program was developed by examining existing practices, it enjoys a wide degree of acceptance by primary teachers. The Primary Program legitimizes values that many primary teachers already held: an emphasis on social development, self-esteem, and cooperative learning.

Definitions

The word "technology" has several definitions and is used differently by different people. The traditional definition refers to the study of the

industrial arts. In every day discourse, technology has come to refer to the tools of human engineering. Bolter (1984) defines it as "the controlled application of power. Whether the source is human muscle or nuclear energy, the idea is to channel power so as to modify some natural material in some useful way: to shape clay, to weave cloth, to purify metals and cast them into molds, or to manipulate electronic data" (p. 17). Ihde (1990) uses the term to mean the employment of "artifacts to attain some result within the environment" (p. 12). He asserts that it is virtually impossible for humans to live without some form of technology, whether fire to cook food, clothing to keep warm, or tools to change our environments: *human activity from immemorial time and across the diversity of cultures has always been technologically embedded*" (p. 20, emphasis in original). Technology, according to Ihde, transforms people's experiences with their environments. Corrective lenses and warm clothing, for example, allow for their users different experiences than would be possible without these technologies.

Franklin (1990) proposes a broader definition, incorporating the tools humans use with the mindset they encourage. To Franklin, technology includes more than the material components used by people, but a system that includes a way of thinking. She asserts that technology changes not just our experience with the environment, but social relationships between people. Franklin speaks of technology as a system which "involves organization, procedures, symbols, new words, equations, *and most of all, a mindset*" (p. 12, emphasis added). It is this mindset that she refers to that I emphasize in my critique of computer technology. However, the multiple meanings of the word "technology" can be confusing.

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A term which allows a distinction between the traditional definition of technology and the mindset that Franklin refers to is "technicism." Technicism is defined as "excessive emphasis on practical results or technical methods and procedures" which embodies an attitude "which places central value on what can be measured."[2] Henceforth, I will use "technicism" and variations on "technicist mind-set" (Bowers, 1988, p. 9) to refer to that attitude and the extensions of it that are described in Chapter II. I will use the word "technology" to refer generally to the tools humans use to control their worlds. "Computers" and "computer technology" will be used for the specific technologies built around the microcomputer.

Outline of the Thesis

This chapter has introduced the problem of the unkept promise of computer technology to change schools. It also described reasons for past failures of technologies to transform schools, and considered some of the reasons for the computer's lack of effect on teaching. I introduced the possibility that teachers' beliefs may play a role in the lack of revolutionary impact computers have had on the way they work. Finally, I discussed some definitions of technology, indicating the terms I have adopted for the purposes of this thesis. In the following chapter I present a review of literature on teacher attitudes toward computers, discuss teacher thinking as it relates to this study, and outline some of the values associated with computer technology. Chapter III provides an explanation of the research methods employed during the fieldwork portion of the research, and an

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[2] *World Book Dictionary*. (1989). Chicago: Thorndike-Barnhart

explanation of the method in which the analysis was carried out. In Chapter IV I explore in some depth the practices and beliefs of the two teachers in the study. This chapter forms the bulk of the thesis. Although most of Chapter IV does not deal directly with computers, it provides important insights into the way these teachers view their work, and sets the stage for an exploration of the relationships between the teachers' beliefs and the technicist mindset presented in Chapter II. In addition, I demonstrate some of the struggles that these two teachers engage in while trying to make their practices meet their ideals. These ideals are often expressed in terms of the way they want their students to treat each other in the classroom communities they are trying to build. Chapter V describes the relationship between the beliefs of the two participating teachers and the technicist values presented in Chapter II. Chapter V also presents my conclusions, recommendations, and the limitations of this study.

Chapter II

Literature Review–Teacher Thinking and Values Associated with Computer Technology

Introduction

This chapter addresses the literature in three areas:

- Teachers' attitudes towards computers and how those attitudes affect their decisions to use or not to use computers with their students.

- Teachers' beliefs and ways of knowing the world. By understanding how teachers view the world on their own terms, their beliefs can be seen in relationship with the technicist mindset that I outline. This will help to frame the findings of my own fieldwork and provide a point of comparison.

- The third purpose of this chapter is to describe three aspects of computer technology: first I describe some potential benefits of computers in education; second I present the origins of computer-based models of thinking; third I describe some of the values that have been attributed to computer technology. Much of this literature presents a critical viewpoint and is intended to dispel the notion that computer technology is neutral.

The Literature on Teacher Attitudes Toward Computers

A search of educational research databases (ERIC, Canadian Education Index) revealed few qualitative studies that deal with teacher attitudes toward

computers, and none that deal with teachers' world views in relation to technicism. Lidtke (1981), for example, provides an historical perspective on teacher reluctance to use computers, but it is not current enough to apply to the current situation in B.C. schools. Baylor (1985) and Cicchelli & Baecher (1985) measured teacher attitudes, but their studies also predate the widespread introduction of computers to B.C. schools. These studies all used questionnaires as their data collection method. Questionnaires, while providing data on a large number of subjects, do not address the full range of beliefs of teachers.

Smith (1987) reported that, although teachers responded positively to the idea of computers in the schools, they were "on the negative end of the scale as far as their own personal participation was concerned" (p. 480). This is reflected in Akins' (1992) work in a British Columbia school district. In a study of the factors influencing British Columbian teachers' decisions to use (or not to use) computers, Akins points to three major roadblocks that have kept computers from achieving their promised goals: teachers' lack of access to computers, lack of time to learn about computers, and a lack of knowledge about how to use computers. Although his own study employed some interviews, Akins' research used mostly survey methods, and it did not address the deeper beliefs and lived classroom experiences of his subjects. My work builds on this study by addressing the struggles that two teachers undergo when turning their beliefs into practice.

Cuban (1986) maintains that computers, like technological innovations that preceded them, will be "tailored to fit the teacher's perspective" (p. 99). Similarly, Ragsdale (1988) asserts that teachers' beliefs are a central issue in

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exerting control over their teaching lives with respect to technological innovations. He reports that teachers in a study on programmed instruction took actions to reduce the individualization that was intended in that innovation by limiting the access that faster students had to the materials and by allowing the slower students to take the materials home. In trying to maintain control over their work by keeping the range of achievement narrow, the teachers thus reduced some potential benefits of the innovation. Ragsdale also points out that the presence of computer technology can affect teacher values. This was demonstrated in another study in which a primary teacher who normally emphasized error-free performance in her classroom encouraged exploration, risk taking, and accepting mistakes when using LOGO in the computer lab. Her values thus "seemed to shift between the computer environment and that of the normal classroom" (Ragsdale, 1988, p. 202).

I turn now to a more general discussion on teacher thinking.

Teacher Thinking

Study of teacher thinking is important to this thesis because what a teacher values and the way in which she interprets her experience will guide her actions. Much has been written on the subject of teacher thinking. My purpose here is not to summarize all the research, but to touch on aspects of that body of research that pertains to the practical knowledge teachers develop that informs their decisions.

Clark and Yinger (1977) in a summary of research on teacher thinking report that teacher thinking and practice is informed by a set of practical

guidelines and beliefs that often operate at an unconscious level. These guidelines have later been termed a teacher's "perspective" by Janesick (1982), "practical knowledge" by Elbaz (1983), "personal practical knowledge" by Connelly and Clandinin (1985), and teachers' "images" by Clandinin (1985, 1986).

Janesick (1982) describes an ethnographic study of one elementary teacher's classroom perspective. To Janesick, a teacher's perspective is a combination of his beliefs and behaviours which are shaped by social interactions. This provides a framework for the teacher to make sense of his world, and forms the basis on which he makes decisions for future actions. Group processes were the goals around which the teacher in Janesick's study organized his beliefs and practices. Responsibility to the group was emphasized through the teacher's strong leadership. By examining the teacher's practices and beliefs through participant observation and interviews, Janesick was able to provide some insight into how this teacher created meaning for his classroom practice.

Elbaz (1983) conducted her study of a high school English and Reading teacher with the assumption "that teachers hold a complex, practically-oriented set of understandings which they use actively to shape and direct the work of teaching" (p. 3). Teachers' actions are guided by the knowledge that comes from experience regarding their students, the school, the community, and from theoretical knowledge of their subjects and of learning theories. Elbaz uses the term "practical knowledge" because it "focuses attention on the action and decision-oriented nature of the teacher's situation, and construes her knowledge as a function, in part, of her response to that situation" (p. 5).

Her work views the teacher as an active part of the curriculum implementation process; rather than being a passive instrument of curriculum developers, the teacher plays an active role in making meaning of the curriculum, using her practical knowledge to guide her decisions.

Connelly and Clandinin (1985) posit that teachers' work can be discussed most comfortably in terms of images, rhythms, cycles and routines. These practical constructs of teachers' work can be dealt with "in terms of narratives of experience" (p. 178). The actions of teachers under these constructs have meaning and are selected deliberately. Rather than understanding their work in terms of separate modes of knowing, teachers view their work in terms of the unity of their actions. Thus Connelly and Clandinin view the observed classroom activity of preparing gingerbread boys as having dimensions in the aesthetic, interpersonal, moral, emotional, and spiritual dimensions. All these dimensions were submerged in the activity of the teacher's practice, not consciously separated and thought about, but presumably present in the practical knowledge of the teacher. Viewing the teacher's actions in this way is a formal exercise which the theorist engages in, but which works best for the teacher when it is "invisible": "The user's goal is to put the modes of knowing out of 'sight.' The more effective the tool, the less the user attends to it" (p. 182).

In a study of teacher decision-making, Marland (1977, cited in Clark & Yinger, 1977) reported that teachers are guided by certain principles of teaching. One that is relevant to this study is the principle of "power sharing." Power sharing is perhaps a misnomer since the teacher retains ultimate power and only "shares" it as long as his/her objectives are being

met. In this technique teachers use peer pressure to influence student behaviour. By pointing out student behaviours they wish to encourage, the teacher is perceived to be sharing responsibility and power with certain students who have influence in the class.

Although gender was not a primary focus at the outset of this study, it gradually became clear that this issue could not be avoided and that it has a bearing on teacher thinking. My initial reluctance to place emphasis on gender originated in a desire not to provide material that would allow anyone to deduce blame for the lack of "progress" in integrating computer technology into the schools. Both my research participants are women, and as the fieldwork portion of my research progressed it became increasingly apparent that their world views had striking similarities with the work of Carol Gilligan (1982, 1988a, 1988b) and Mary Belenky et al. (1986) who wrote about women's psychological development.

Gilligan challenges hierarchical models of moral development in which growth is characterized by a move through stages toward abstract, universal principles. These models may be typical of male development, but do not reflect the growth of many of the women in Gilligan's studies. Although these views do not split neatly along gender lines, women's representations of moral dilemmas were characterized much more frequently in terms of the context of the situation and the relationships involved. Gilligan poses a developmental model in which responsibility and caring is the focus for framing dilemmas. This focus, capable of being held by both men and women, is more often the primary focus of women.

> In this conception, the moral problem arises from conflicting responsibilities rather than from competing rights and requires

for its resolution a mode of thinking that is contextual and narrative rather than formal and abstract. This conception of morality as concerned with the activity of care centers moral development around the understanding of responsibility and relationships, just as the conception of morality as fairness ties moral development to the understanding of rights and rules. (Gilligan, 1982, p. 19)

Gilligan points out that most people are able to articulate both viewpoints, but favour one almost exclusively over the other. This tendency to focus is shared equally by men and women, with the overwhelming majority of men focusing on justice concerns. Many women also share the justice focus, but over half of the women in the studies Gilligan cites demonstrated a care perspective.

The references to contextual and narrative thinking in the above quote are reminiscent of Connelly and Clandinin's (1985) and Clandinin's (1986) conception of teacher practice cited earlier, centering around personal practical knowledge. Awareness of different ways of framing moral dilemmas reminds us that viewing teacher practices is subject to interpretation.

Belenky, Clinchy, Goldberger, and Tarule (1986) propose the concept of the "connected" teacher. Picking up on Gilligan's description of connection and relationship which is important to understanding the development of women, Belenky, et al. describe a teaching practice which fosters the development of students' thinking rather than focusing on the teacher's knowledge. The connected teacher assumes that students possess knowledge which can be drawn out. "Instead of the teacher thinking about the object privately and talking about it publicly so that the students may store it, both

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teacher and students engage in the process of thinking, and they talk out what they are thinking in a public dialogue" (Belenky, et al., 1986, p. 219). Connected teachers "assist the students in giving birth to their own ideas, in making their own tacit knowledge explicit and elaborating it" (Belenky, et al., 1986, p. 217). I will return to the idea of the connected teacher in Chapter V.

Next I turn my attention to look at some of the benefits that computer technology can provide for education.

The Benefits of Computer Technology in Schools

Computer technology has many potential benefits for education. Ragsdale (1988) summarizes many of them, and although some (such as "How Computers Work") would now be regarded as having limited value (it is no more necessary for most of us to learn how to program a computer to function in modern society than it is to learn how to tune an automobile), others are still useful. The following discussion is based, in part, on Ragsdale's assessments of the benefits of computers. Since most technologies have benefits and detriments, I point out both in these examples.

Learning to Control Computers

Learning how to control computers, not as programmers, but as skilled and wise users will be of benefit to students in a computer-dominated society. The ability to control computers has the potential of providing more opportunities for employment, though as more power becomes centralized in the hands of fewer people (thanks to technology) this benefit diminishes.

Using Computers to Reflect on Thinking

An emphasis on logical thinking is sometimes promoted as a benefit of computers. Papert (1980), for example, promotes LOGO as a way to help children learn procedural thinking. Parts of the school curriculum may work counter to this goal since many of the creative thinking techniques taught in schools emphasize divergent rather than procedural thinking. Using computers to reflect on how humans think may be of value, but Cuban (1986) counters that there is no evidence that children can transfer procedural thinking skills to other settings. Cuban quotes Joseph Weizenbaum, responding to a question about the ability of computers to improve children's problem-solving abilities: "If that were true, then computer professionals would lead better lives than the rest of the population. We know very well that isn't the case" (in Cuban, 1986, p. 94).

Teaching the Social Effects of Computers

The presence of computers in schools can provide a basis for the study of how computers affect society and individuals. This is a worthwhile study, and one that I support. Students should learn that there are social effects of heavy computerization so that they can make more informed personal and political decisions. Weizenbaum (1976) asserts that teachers should teach the limitations of computer technology as well as its power. This form of study can be enhanced by, but does not require, hands-on experience with computers.

Computers can help many students learn school material. For many teachers, computer assisted instruction (CAI) is useful in that it requires little preparation of student materials. The computer presents the material, tests the students, and provides feedback. The computer is often touted as the infinitely patient teacher, never tiring of presenting the same material repeatedly until it is learned by the student. While CAI may be useful for providing supplementary practice for some skills, too often the software available does not match the prescribed curriculum. CAI often degenerates into an exercise in limited computer literacy, with exposure to computers being the goal. In addition, the quality of CAI software varies widely. Some programs present only a narrow range of goals, and others defeat their own goals by making the incentives for wrong answers more attractive than for correct ones. CAI software must also be examined for the underlying assumptions and biases built into it. This will be discussed again later in this chapter.

Productivity Software

Productivity software (word processors, databases, spreadsheets, telecommunications) is one of the most compelling uses for computers in schools. The skills learned are generic and can be applied in a number of situations. Of course, the quality of the learning experiences still requires a good teacher.

Databases have the potential of teaching students how to gather and manage their own data rather than relying on packaged information.

Students can learn firsthand that the reliability of a database depends on the quality of the data collected.

Spreadsheets, by virtue of their ability to instantly recalculate complex worksheets, can transform an exercise of routine calculation into one of creating hypotheses and testing them. They have the potential of being used in a context that is exciting and meaningful.

Word processing can be used in almost every school subject and is a skill that can carry over into the workplace. Children enjoy writing on the computer and fluent writers find it a more efficient tool for creating and editing their work (Daiute, 1985). In addition, the computer can help students overcome psychological and cognitive blocks to revision by eliminating mechanical difficulties and time restraints, as well as the physical discomfort associated with extensive revision and recopying of drafts (Bean, 1983). By adding more efficient keyboarding skills to the equation, the faster flow of ideas, along with decreased attention to superficial errors, frees the memory for composing activities. However, the potential benefits of word processing depend on regular access to computers, which is not always possible, given the limited computer-to-student ratio in some schools.

Telecommunications and Collaborative Environments

Telecommunications has the potential of putting students in touch with others almost anywhere in the world. It further has the benefit of allowing students to communicate without being judged by their appearance, or possibly by their physical handicaps, but by their words. Accessing information "online" also has the potential of making information more

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widely available. By making information directly available, without the filters of politicians and the news media, people can draw their own conclusions about current events. For example, a recent publication ban about a sensational trial in Canada was undermined by the free passage of information over the Internet, which is not subject to inspection at the border.

A significant potential benefit of computer technology lies in the ability to create collaborative work environments. Telecommunications is one means to create such an environment. In AT&T's Learning Circles projects, students from around the world work together to create publications about their cultures, their writing, or about current events. Another potentially powerful model for collaborative work is CSILE (Computer-Supported Intentional Learning Environment) created by Scardamalia & Bereiter (1991). This program is a database of pictures and written "notes" that students post in a hypermedia-type program over a network to share knowledge and receive feedback on their writing from other students. The intent of CSILE is to change the emphasis of a research project from the completion of tasks to the process of gathering and sharing information, and learning to critique other students' work. This effectively gives more control of the learning process to the students. The success of this type of project, as with other computer programs, depends on regular access to computers, as well as a teacher who is willing to work in these ways. Early attempts to implement CSILE suggest that this is difficult to achieve, requiring that teachers learn to work in new ways, and that students shift their attention from the completion of tasks to the process of learning (Cumming, 1988).

Many proponents of computer technology point out that computers have the potential to change the role of teachers, from authorities to facilitators. Traditionally, teachers have interpreted information, packaged it, and delivered it to students. An alternate vision, assisted by computer technology (databases, telecommunications, CD-ROMs, laser discs, as well as print and video), sees the teacher and student having equal access to information, with the teacher acting as a guide (Hoebel & Mussio, 1990). The success of this vision depends, in part, on the willingness of teachers to learn to teach in non-traditional ways. This is the area that perhaps has the most revolutionary potential for computers on the way teachers work. The work of Cuban (1986) cited in Chapter I suggests that this transition will not occur easily.

This section has outlined briefly some of the potential benefits of computers in the schools. In the next section I consider the values inherent in computer technology itself, looking at its origins and dangers.

A Technicist Orientation

Technologies alter the ways in which people perceive reality (Postman, 1992). Mumford (1934) asserts that new industrial technologies could not have transformed civilizations without an accompanying change in people's thinking. In order to explore the relationships between teachers' viewpoints and values associated with computer technology it is first necessary to define the elements of the technicist mindset. Undoubtedly, there is not one such viewpoint, and although there may be many possible definitions, I attempt

here to extract elements from three kinds of literature: writings of technology enthusiasts, the work of academics in the field of computer technology, and social critics. Before beginning, an explanation of my point of view is in order.

Postman (1992) states that technology helps us live longer and easier, and Ihde (1990) and Franklin (1990) point out that there is hardly any human activity that is not affected by it. Many technologies are taken for granted, becoming almost invisible. In my work as a technology consultant I have a role to promote the use of new high technologies, particularly computers. I find computers and other high technologies fascinating and useful. Technology has many enthusiastic proponents who sing its praises and expect it to improve our lives (Postman, 1992). Apple (1988) and Cuffaro (1985) point out that discussions about computers tend to be technical in nature: "Questions of 'how to' have replaced questions of 'why' (Apple, 1988, p. 291). Postman (1992) reminds us that the benefits technologies provide come with costs and that "a dissenting voice is sometimes needed to moderate the din made by the enthusiastic multitudes" (p. 5). For this reason, I offer a critical examination of computer technology in this review of the literature. This is not because I am anti-technology, but because the dissenting voice needs to be heard. I am increasingly concerned about the faith that some people place in various technologies for solving our problems. It seems that technology is often expected to solve problems that could be avoided if people took a critical look at the consequences of their actions. For example, many North Americans lead unhealthy lifestyles, then expect medical technology to restore their health. I am drawn to Ursula Franklin's (1990) conceptions of "holistic technologies," in which users have control over the processes of

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production from beginning to end. I grow increasingly uneasy about "prescriptive technologies," which Franklin describes as breaking processes down into small steps and concentrating power in the hands of the few, thereby reducing individual power.

There are as many ways of viewing the world as there are people. In spite of this, there are commonalities that help us understand certain modes of knowing. Thus, in a compendium of essays edited by Eisner (1985), writers have pointed out aesthetic, scientific, interpersonal, intellectual, intuitive, narrative, formal, practical, and spiritual ways of knowing. People seek out others with similar views, often formalizing alliances in religions, clubs, fraternities, political parties, and so on. Certain attitudes toward the world reveal a technicist stance in which human engineering is regarded as a solution to many problems. Such an attitude can be seen in the proud declaration of futurist Frank Ogden who recently claimed in an interview to be a "cyborg" because a new technology made his eyes superior to their natural state:

> Did you know that there are currently 72 replacable [sic] human body parts and that we have over 6 million cyborgs in North America alone! I am a cyborg. I have implanted lenses in my eyes. They are better than real ones. (McCourty, 1994, p. 5)

Of course, his artificial lenses are also "real," but Ogden reveals an attitude that equates engineered with "better," making it difficult to argue against technological "progress."[1] But more disturbing are the values

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[1] Michael Apple (1988) asserts that technological progress really embodies changes in relationships. In examining technological change we should therefore be asking, "Whose idea of progress? Progress for what? And fundamentally, who benefits" (p. 290)?

underlying such an attitude which hold that anything natural can be improved upon by humans and that if a technology is profitable it is justified:

> You will also see a tremendous rise in genetics. Teenage Bio-Hackers doing gene-splicing in their basements. It's going to put abortion on the back-burner never to be heard from again. It's going to cause great consternation within religions because the phrase "Only God can make a tree" will no longer be valid. We will be able to create new life-forms. We already use genetic manipulation for cattle, plants, breeding dogs, race-horses, etc. You'll see a lot more of this in the coming years and if North Americans can't handle it because of our restrictive thinking, it will appear elsewhere because the economic implications are too vast. (McCourty, 1994, p. 5)

The "restrictive thinking" that Ogden refers to includes ethics, which, in his view, get in the way of economic activity. Such a stance exposes a morally bankrupt attitude that anything that is technologically possible should be done as long as economic benefits outweigh costs. In fact, what *can* be done usually *is* done (Franklin, 1990; Ragsdale, 1988), though it can be argued that many possible uses of technologies should be avoided (see, for example, Weizenbaum, 1976). Consideration of side effects, and effects on future generations, should be made central in discussions of whether or not to proceed with technological projects.[2] The values Ogden promotes—not always so provocatively stated—permeate our society and become more pronounced as people look to technology to solve the most difficult problems of the world brought about by environmental destruction and global economic restructuring:

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[2] Crevier (1993) points out that it can be dangerous to underestimate the effects of new technologies: Marie Curie could not have imagined the destructive power that her discovery of radioactivity led to.

The solution is to prepare 20% of the western population for a jump into a higher level of consciousness. Just as the industrial age solved many of the problems of the agricultural age, I think the communications age will provide solutions to many of the problems that industrial age technologies were not able to solve. (McCourty, 1994, p. 4)

Ogden ignores that every benefit provided by a new technology has a cost (Postman, 1992). "A higher level of consciousness" almost suggests a mystical experience, pointing to salvation through technology. This attitude is flawed because it ignores the tremendous imbalance of energy and natural resource usage by the technologically advanced nations. It does not follow that the entire world can be sustained with the same level of technology that North Americans rely on.

Much of the current focus on technological change is on the computer. The computer has had a profound impact on the North American way of life. Bolter (1984) calls the computer a defining technology because of the impact it has had in taking control over other technologies and in redefining our relationship with nature. "By promising (or threatening) to replace man [sic], the computer is giving us a new definition of man, as an 'information processor,' and of nature, as 'information to be processed'" (Bolter, 1984, p. 13). The changes brought about by the computer and related technologies have created new industries and have changed the ways people work. It is illuminating to consider the origins of the modern computer and the fields of study it has engendered because it gives us some insight into the biases inherent in this form of technology.

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The U.S. military has been the largest source of funding for American artificial intelligence research, with $900 million spent between 1983 and 1993 (Edwards, 1990). The military has been able to shape many technologies according to its own perceived needs. The military's need to understand human problem solving processes and to develop appropriate training techniques has had its effects on education through the introduction of computers and the "cognitivist educational discourse accompanying them" (Noble, 1988, p. 254). Although it would be an overstatement to say that students using computers are adopting military priorities, an understanding of the origins of the present thinking about computer technology and the underpinnings of the accompanying cognitive models of human problem solving can help us realize whose interests are served by these models of thought.

Noble (1988) traces the history of computer technology in the military and how that has affected the use of computers in education. He demonstrates how the post-World War II imperative of military preparedness led to the development of new theories of human thought and society in which everything could be understood in terms of "information." The development in the 1950's of "weapon systems" reduced human beings to one component (and the weakest one) of a human/technology complex. Research began to centre on human decision making, focusing on people as information processing systems. Because of the limited capacity of people to process information rapidly in military situations, researchers began to seek ways to represent human problem-solving skills on a computer. This was the

beginning of artificial intelligence, which gave rise to the field of cognitive science. The study of the mind, once disparaged with the dominance of behavioural psychology, became a legitimate field of study. But the genesis in the military of the study of human thought, as well as the fierce competition for government grants, led to one dominant view of the mind as a problem solving computer.[3]

This view of the mind as a computer has become a common viewpoint as witnessed by some of the phrases and metaphors in common usage. People talk, for example, of being "hardwired," or of being "programmed" to behave in certain ways, of receiving "input" and of "accessing information"— expressions from the computer world. At a dance festival I attended recently the adjudicator advised the dancers to "process the information" they were gleaning from their participation and to "store the information in their memory banks." As she spoke of memory banks, she made gestures with her hands, appearing to plug computer chips into her scalp. This metaphor seemed strangely out of place in the context of a dance festival, but it demonstrates the degree to which computer metaphors have infiltrated our thinking. Weizenbaum (1976) asserts that the public believes that nearly everything may be understood in terms of computer models and metaphors.

The field of Artificial Intelligence (AI) has had a large impact on the way in which people think about computers and on discussions of the nature of the human mind. Great debates have erupted over conceptions of the

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[3] An alternate approach to artificial intelligence was suppressed for thirty years and has only recently re-emerged after disappointment with the dominant problem-solving approach. For a history of the fortunes and setbacks of AI and its alternatives, see Crevier (1993).

mind proposed by AI researchers and supporters. Although AI is currently undergoing a shift in its focus from a problem-solving approach to one emphasizing neural nets, the viewpoints proposed in the past are instructive of the mindset of computer technology enthusiasts.

The Turing Machine was proposed in 1950 as a test to determine whether a machine could imitate human thought. Turing proposed a machine that could fool a person asking it questions into thinking that it was a human being. Turing believed that, by the end of the century computers would be able to "play the imitation game so well that an average interrogator will not have more than 70 percent chance of making the right identification after five minutes of questioning. The original question, 'Can machines think?' I believe to be too meaningless to deserve discussion" (Turing, 1981, p. 57).

Searle (1981) points out the extremes to which AI enthusiasts will take their claims by quoting McCarthy (1979) who writes, "Machines as simple as thermostats can be said to have beliefs, and having beliefs seems to be a characteristic of most machines capable of problem solving performance" (in Searle, 1981, p. 361). Searle counters that a significant difference between humans and machines is that people have intentions, while machines and computers do not.[4] The notion that is promoted by the Turing test is that only the output is relevant to evaluating the computer's mental state. This treats the brain as a "black box" and ironically leads back to a behaviourist-like stance that only behaviour can be interpreted.

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[4] It is interesting to observe how often people say things like, "The computer wants you to press a key." (I must admit to having said things like that, myself.)

By taking the attitude that humans will be able to create machines that think, we redefine ourselves as machines (Bolter, 1984). An indication of this stance can be seen in this statement by one of the most prominent AI researchers:

> It is scarcely a century since people started to think effectively about the natures of the brain-machines that manufacture thoughts. Before that, those who tried to speculate about this were handicapped on one side by their failure to do experiments, particularly with young children, and on the other side by their lack of concepts for describing complicated machinery. Now, for the first time, mankind has accumulated enough conceptual tools to begin comprehending machines with thousands of parts. However, we are only beginning to deal with machines that have millions of parts and we have barely started to acquire the concepts that we'll need to understand the billion-part machines that constitute our brains. (Minsky, 1986, pp. 322-3)

The interesting feature of this statement is the mechanistic conception of the brain. What is lacking is any sense of humanity and connection with humanity. Such a viewpoint exalts the objective, rational world and demotes the subjective world of social relations and emotion. Rather than attempting to create computers with human capabilities, this view threatens to reduce human thought and abilities to the level of machines.

Not Just a Tool–The Non-Neutrality of Computers

Many proponents of computer technology insist on the neutrality of the computer, maintaining that it is "just a tool." Roger Schank, a prominent researcher in artificial intelligence, maintains that computers should not be the objects of praise or scorn; computers should not be the issue, but rather the uses to which people put them (1984). Schank promotes an attitude roughly analogous to the slogan used by gun owners that "guns don't kill—

people do"[5]; thus, computers don't change society—people do. However, many cultural critics and feminist writers point out that the computer promotes a particular world view. Although the computer is an inanimate object, it embodies potentials and certain ways of operating that force its users to conform to specific sets of procedures. Thus, it can be argued that the computer is not "just a tool," which is inherently flexible and which requires the intervention of a human to direct it. Tools are extensions of the human body, become "invisible" as we attend more to the intentions we use them for, and can be put to a myriad of uses. Thus, we become aware of the kitchen knife we are using only when it is dull; attention then shifts from the task to the tool. Furthermore the knife may be used for cutting food, poking holes in things, stripping insulation from wire, scraping wax off a floor, prying a cap off a bottle, paring excess plastic from an ill-fitting model airplane, or for loosening the lid of a jar by hitting it with the knife handle. On the other hand, a machine in the sense that Mumford (1934) defines it, is generally restricted to one purpose, operated independently of human beings, and with an agenda of its own, quite separate from its human operator. Streibel (1988), also maintains that computers are not neutral in delivering curriculum. "Microcomputers are environments within which certain values, biases, and characteristics are played out; for example, calculation and logical operations are central within a computer-based environment" (p. 259).

Although the computer is used for a number of purposes such as word processing, providing drill and practice of skills, video games, and business applications, it can be said to be a machine in Mumford's sense in that it

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5 Ihde (1990) coincidentally uses the same example.

encourages particular ways of working with the material at hand. Thus, an experiment to see how the variables of light, warmth, and water affect plant growth will be qualitatively different on a computer than with seeds and soil. The computer encourages conceptual knowledge of the subject matter, whereas the physical materials encourage a practical knowledge, similar to the personal practical knowledge that Clandinin (1985, 1986) and Connelly and Clandinin (1985) speak of with reference to teacher knowledge.

Bowers (1988) points out that computer technology reinforces attitudes such as the value of technological innovation, the desirability of change and progress, the primacy of abstract reasoning, and the view that only the observable or quantifiable counts as knowledge. Computers reinforce the view that the only knowledge worth having is that which can be made explicit and reduced to manageable bits of data—in other words, "objective" data. An indicator of this value occurs when only data which is conducive to computer storage is recorded as history (Weizenbaum, 1976). Computer technology makes it easy to measure and record certain types of information, but in the process ignores others. What is measurable becomes important and what is not measurable is devalued (Norman, 1993). As an extension of these ideas, reason and language tend to be reduced to instruments for affecting things and events in the world (Weizenbaum, 1976).

A technicist values discrete, context-free data and universal models that can be applied regardless of context.

> The technicist mind-set devalues the importance of context.
> The technicist reflects upon the situation as a theoretical
> exercise, establishes what constitutes the essential component
> parts (and their working relationships), and reconceptualizes the
> components into a more rational system that can be utilized in a

variety of contexts. The overriding ideal of this mind-set is the creation of a model or program that is not context-specific but has universal application. (Bowers, 1988, p. 9)

Positivist researchers isolate variables for study, often outside the context of the phenomena in which they occur.

Individualism is another possible attribute of a technicist viewpoint (Bowers, 1988). Papert emphasizes individual achievement in which students "build their own intellectual structures" (1980, p. 32). While a constructivist viewpoint of education exhibited by the teachers who took part in my case study acknowledges that students build their own knowledge, the attitude suggested by Papert downplays the importance of tradition and context. People who believe that computerized "expert systems" can embody the wisdom of a physician, a judge, or a counselor see the computer "as a means of empowering individuals who are supposedly disconnected from the past" (Bowers, 1988, p. 72).

> Traditional practices, beliefs, technologies, and architectural forms that have evolved over time may simply be replaced by a new technology that is disconnected from context, which includes implicit forms of knowledge that sustain both the everyday lives of people and a sense of historical continuity. (Bowers, 1988, p. 9)

In most forms of computer assisted instruction, learning is treated as an individual activity rather than a social one. The competitive format of many of these programs further reinforces an individualist conception of learning. In addition, the strong attraction that the computer screen holds for students' attention encourages individuals to consider their thinking in relation to the computer's content rather than in relation to others.

A related concept, individualization, can refer to individual pacing, the diagnosis of individual needs, or the prescription of individual educational outcomes (Streibel, 1988). Streibel contends, however, that the form of individualization embodied in computerized instruction refers to "generic outcomes for generic individuals rather than to personal goals for unique individuals" (p. 265). This view is most appropriately associated with computer assisted instruction (CAI) in which the software determines the content and pacing of the material presented, but does not take into account the different learning styles, interests, or needs of students. Individualization through computers is based on algorithms, reducing teaching to a technical activity. Teachers are more inclined to view teaching as an art, involving feelings and intuition.

Computers and Gender

Turkle (1984, 1988) explains how males and females tend to approach and experience computers differently, and how they interact with them with different styles, assumptions and beliefs. Most boys learning to write computer programs, she says, try to impose their wills over the computer and use procedural thinking to break down problems into smaller pieces, while most girls use a more negotiated and holistic approach to programming. Franklin (1990) points out that the sciences that shape technology are most often defined in terms of the way men operate, with a clear separation of the subject and object of study. Modes of thought that are syllogistic, involve formal logic, a view of knowledge as objective and discoverable, and a morality built on abstract principles is more often associated with men (Edwards, 1990). Most men are socialized to absorb the technicist world

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viewpoint that emphasizes objectivity, rationality, control over nature and distance from emotions (Benston, 1988). Most women, on the other hand, are not expected to be technologically competent, and are socialized to be good at interpersonal relationships and to focus on people and emotions. Control over the world is not an issue for most women (Benston, 1988). According to Turkle, "different people use the computer in different ways, and the issue of *control* is central. Not surprisingly, in our culture girls tend to have different control orientations than do boys. The approach of '*Ah, a machine; let me dominate it!*' is not something that many young women share in quite that form" (in Rhodes, 1986, p. 15). The technicist mindset that is dominant in the world thus reflects male interests and logic. This is not to say that computers are inherently masculine. Rather, they are culturally identified with male values (Turkle, 1988).

Computers and Controlled Environments

Control over an environment is an attraction for many computer users. Programmers can be drawn into the machine to the extent that they ignore their own bodily needs and shun social contact (Turkle, 1984). Users of word processors have remarked to me on the control they feel when producing text on a computer versus their previous work with pencils or typewriters: the computer, they say, gives them unprecedented power over the details of expression and the look of the finished product. Some educational computer programs create their own simulated worlds which the users can manipulate. In one such program the user can manipulate world climatic conditions to observe their effects; in another, the children take certain actions to see if they can survive the rigors of a simulated trek across

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the wilderness. The sense of power such programs impart to their users is often far greater than can be experienced in the real world.

Many educational computer programs give only illusions of control to students. Such programs have predetermined goals and expectations, and the student is restricted to achieving certain skills and understandings. Of course, this can also be said of textbooks and teachers, but they seldom convey the feelings of power and control that computer programs provide. Control of student learning is transferred from a present teacher to an absent programmer whose intentions we cannot be sure of (Streibel, 1988). In many computer programs control by the programmer is further exerted through the pacing and presentation of material.

Simulations are never complete representations of the world. They are created for particular purposes and represent particular viewpoints. Those viewpoints often reflect the program creator's biases. For example, Bowers (1988) points out that the simulation "Oregon Trail" (MECC, 1985) encourages students to think of the nineteenth century Oregon wilderness as uninhabited and hostile, needing to be opened up and settled—a viewpoint that ignores the native presence and their view of the landscape. Other simulations involve students managing ecological systems, wildlife reserves, and animal reproduction. These programs carry with them the assumption that human beings have the right to "manage" natural systems. Whether or not humans have this right is not treated as problematic in these software programs. Rather, the programs proceed with the assumptions unstated. The software is thus conveying a set of values which are not part of the stated

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objectives of the program and perhaps not even understood by the creators of the software.

Computer scientists acknowledge that different programming languages encourage particular programming styles with their attendant ways of thinking (Edwards, 1990). The languages force the users to interact with the computers in certain ways, usually in sequential and precise form. Although most computer users are not programmers, the nature of the hardware and the software available to the general public forces people to interact with computers in certain ways, using commands designed by programmers. Thus, there are several layers of restrictions: the hardware restricts how programming languages can be created; the languages encourage certain programming conventions; and programmers creating software within those conventions determine what is possible for the end users. Learning a new computer program may be regarded as an exercise in learning to adopt the thinking patterns of the programmers who created it. Although the selling point for many computer programs is an "intuitive interface," it can be argued that there is little to do with computers that is actually intuitive in the sense that one can know about them without reasoning or past experience. My work with training novice adult computer users suggests that even the computers and software described as most intuitive are not. There is nothing truly intuitive about using pull-down menus or about pressing a particular combination of keys to invoke a command in a word processor. What is more accurately represented by the term "intuitive" is that more people are able to guess what the programmer had in mind—in other words, to think like the programmer. Once one learns a set of conventions for using a program, provided those conventions have been standardized to other

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programs, succeeding programs appear to be intuitive. This is why the claim that computers are "just a tool"—neutral and free from particular ways of thinking—rings hollow.

Technicism might not be an issue if it could co-exist with other forms of thinking. Menzies (1989), however, asserts that technicist ways of knowing "foreclose on other avenues of knowing and doing" (p. 44) by forcing particular languages on discourse. Similarly, Franklin (1990) states, "One has to keep in mind how much the technology of doing something defines the activity itself, and, by doing so, precludes the emergence of other ways of doing "it", whatever "it" might be" (p. 17).

Phillips (1985) points out that "during the last few centuries of Western intellectual history, educated people typically have held an exalted view of science" (pp. 37-8). In this century it seems to me that technology has achieved an equally exalted status. People look increasingly to technology to solve the problems of the world and absolve themselves from personal responsibility and agency: where once we had no choice but to reap the ill harvest of a destructive lifestyle, now medical technology can prolong the lives of the economically privileged; many people expect technological fixes to the environmental problems that confront the world, for example, adding more and more pollution-control devices on cars rather than reducing reliance on automobiles.

I do not believe that people who hold these values (consciously or otherwise) are necessarily morally deficient. I trust that most people who seek technological answers to human problems are attempting to improve conditions for people. Various technologies have many benefits. But I agree

with Joseph Weizenbaum (1976) who argues against the notion of technological inevitability. Instead, individual citizens as well as elected decision-makers should consider the consequences of decisions, and choose solutions that will improve conditions for people over the long term. Weizenbaum asserts that the fact that we do not have safe cars, decent television or good housing for everyone represents choices people have made.

Summary

In this chapter I argued for the need for this study by pointing out that little qualitative research exists on teachers' thinking regarding the use of computers. One way of conceptualizing teacher thinking is through guidelines and beliefs, often operating at an unconscious level, which have been termed by various researchers "perspective," "practical knowledge," "personal practical knowledge," and "images." These constructs have been built in past studies through qualitative research methods (Janesick, 1982; Elbaz, 1983; Clandinin, 1986). Gilligan's (1982) work is useful in illuminating my research participants' thinking. She proposes a contextual and narrative mode of thinking based on care and responsibility rather than on abstract, hierarchical principles. Belenky, et al. (1986) extend Gilligan's work to propose the concept of the "connected teacher" who works with the assumption that students bring knowledge and skills which can be drawn out.

Computer technology has many potential benefits to education, and these were summarized briefly. But any form of technology has both benefits and detriments; this refutes the notion that computers are neutral. The history of the development of computer-based models of thinking is far from

neutral. Models for the use of computer technology tend to promote a particular world view, or technicist mindset (Bowers, 1988). The characteristics of this mindset include the following:

- an attitude that technological solutions are the best way to solve many of the problems that face humans

- an adoption of computer metaphors for thinking and for discussing the human mind

- the view that computers are neutral in terms of cultural bias and gender

- the valuing of separate, objective knowledge that can be generalized regardless of context

- an emphasis on the individual

- a belief that humans have a right to exert control over the world.

Although a person might hold any number of these beliefs, perhaps the one that most characteristically represents a technicist mindset is the belief that humans have the right to control the world. Bolter (1984) defines technology as "the controlled application of power to manipulate the environment" (p. 37). According to Mumford (1934) the first wave of transformation of civilization by machine technology "was an effort to achieve order and power by purely external means" (p. 4).

In the next chapter I present the method used to conduct the field research and analyze the results for this study.

Chapter III

The Research Design for the Case Studies

Introduction

This chapter presents the research design, deals with several issues regarding the methodology and introduces the teachers who were the research participants. First I provide a rationale for a qualitative approach to the study and briefly describe the research design. I then briefly introduce the teacher-participants, a description of whose work forms the bulk of my study. A more complete introduction will be presented in Chapter IV. Next I outline the research methodology of the study, explaining the format for the observations and interviews, the categories used in the analysis, and how validity and ethics were addressed. Finally, I present my own background as a reference for the reader to consider the effects and biases of the researcher.

A Qualitative Approach

In the field study I wanted to approach some of the understandings of the contexts in which the teacher-participants work, and the beliefs which shape those contexts. I knew that such understandings of beliefs cannot be accomplished using traditional research methods "that test relationships among variables without regard for the complexities of sociocultural context" (Marshall & Rossman, 1989, p. 29). Hammersley and Atkinson (1983) also argue that surveys and other artificial means "are incapable of capturing the meaning of everyday human activities" (p. 2). I believe that the ways teachers respond to students and to curriculum decisions are shaped by their individual perspectives or world views. It seems to me that some teachers do

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not simply respond to the world as it is, but to their own conceptions of it and with their own priorities. As Britzman (1991) puts it, "our concern is with *how* the activity of teaching expresses something about the subjectivities of teachers" (p. 2). Qualitative research embraces the notion that the teacher is actively working to make sense of her world, and rejects the notion that she is a passive "cog in the educational machine" (Elbaz, 1983, p. 10). Qualitative research methods can help researchers show how teachers work to balance the competing demands of students, parents, administrators, curriculum documents, and their own beliefs and priorities.

Qualitative research shifts the authority of interpretation to a joint endeavor of the researcher and the research participants. It is common in qualitative research to treat the meanings that research participants make of their situations as significant in shaping their responses to the phenomena under study. This assumes that the participants are able to treat their world views rationally and "to describe them in their own terms, rather than forcing prior categories on them" (Hammersley, 1977, p. 52).

I recognise, however, that the social world—no matter who is representing it—is not an objective entity, but depends on the observer for interpretation. "Social facts, including native points of view, are human fabrications, themselves subject to social inquiry as to their origins" (Van Maanen, 1988, p. 93).

Research Design

This study consisted of observations and interviews with two primary teachers, Pat and Rachel[1], in two different schools in a large suburban school district in British Columbia. The fieldwork for this study took place between October, 1993 and April, 1994. Because I regarded my research participants as co-researchers in this study, both teachers were informed of my purposes before they agreed to participate. I kept them aware of my tentative conclusions and solicited their reactions as the study progressed. Their feedback was valuable in making me re-examine my conclusions. Both teachers were extremely flexible in allowing me to arrange observations on short notice. However, interviews were generally arranged as far in advance as possible, at the convenience of the teachers, recognising the tremendous time pressures that classroom teachers work under.

Agar (1980) suggests that the main data collection device be the interview, with observations used to support statements made in interviews. Observations and interviews were used in conjunction to provide complementary information. In this study I view inconsistencies not as deceptions on the part of the participants, but as indicators of struggles that teachers go through when dealing with difficult issues. This further reinforces the notion that people's belief structures are not necessarily logical and consistent (Schutz & Luckmann, 1973).

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[1] The names of the teachers and students are pseudonyms.

The Teacher-Participants

The following is a brief introduction to the teachers who took part in my study. More complete introductions will be presented in Chapter IV.

Pat

The two teachers I chose to work with were identified through different means. I have known Pat, the first teacher in my study, for several years. Pat is an experienced teacher, with seventeen years experience at the time of this study. She is highly regarded by district staff and school colleagues. I chose her as a participant because of her knowledge of teaching young children, her ability to reflect on her practice, and her ability to articulate her thoughts. This is consistent with the practice of purposive sampling in which the most important criterion in participant selection is not the number of people involved, "but rather the potential of each person to contribute to the development of insight and understanding of the phenomenon" (Merriam, 1988, p. 77). I felt that her classroom would be a comfortable environment for me to work in since we already knew each other from working together on a district committee.

Rachel

In contrast to Pat, I did not know Rachel at all before the beginning of this study. She was suggested to me by a former district consultant and friend of Rachel's. I first approached her through a letter outlining my intentions and requesting her participation (see Appendix A). After two weeks she called to agree to participate in my study. After over a week's delay on my part, I dropped by the school one afternoon to introduce myself and provide

more details about the purpose of my research. Teaching is Rachel's second career. She was a nurse before deciding to stay home to raise her children. She took teacher training once her children were in high school, and, at the time of this study was in her fifth year of teaching.

Observations

When using observation as a research tool, evidence of a teacher's world view must come from behaviours and infrastructures created by the teacher. "An assumption is made that behavior is purposive and expressive of deeper values and beliefs" (Marshall & Rossman, 1989, p. 79). Connelly and Clandinin (1985) maintain that "any set of curriculum materials, teaching act, or learning situation embodies, consciously or otherwise, modes of knowing" (p. 181). It was for this reason that I placed heavy emphasis on observations in the early stages of the fieldwork for this study. Observation can also be used to confirm reports made in interviews (Merriam, 1988). Understandings of statements made in interviews can be made clearer by witnessing the practices that are referred to.

Observations were handled somewhat differently in the two schools. Marshall and Rossman (1989) advise that the first criterion for selecting a research strategy is "informational adequacy" (p. 75)—that the strategy will provide the necessary information. I began my study with observations in Pat's classroom. Since I am a primary teacher and know many other primary teachers and their classrooms, I felt that I could get the information I required as an observer rather than as a participant. The myth of the silent observer having no effect on the subjects of study has been discredited (Hammersley & Atkinson, 1983). Although my presence undoubtedly had an effect on the

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class, I spent most of my time in Pat's room quietly sitting, observing, and writing notes. In Rachel's classroom, in contrast, I played a more active role as a participant observer, helping the children as I circulated around the room, at one point introducing the children to the care of their new classroom fish tank. In addition, at the request of Rachel, I worked with the class in the computer lab, introducing the students to word processing. The approach of participant observer was more comfortable—I felt less conspicuous when I was involved with the children—and provided a way to do something for Rachel in return for her taking part in this study. In addition, Rachel felt that a positive male role model would be helpful to the children in her class who come from families without fathers. As a result, Rachel's children more rapidly became comfortable with my presence and many of them felt free to approach me for help.

A list of observations and other interactions with Pat is provided in Table 1 and with Rachel in Table 2.

Table 1. List of Observations and Other Fieldnotes for Pat

Date	Type	Label	Time
October 8, 1993	Observation	P.C. 1	9:00 a.m. - 11:15 a.m.
October 19, 1993	Observation	P.C. 2	9:00 a.m. - 9:45 a.m.
November 2, 1993	Observation	P.C. 3	1:30 p.m. - 3:30 p.m.
November 8, 1993	Meeting	P.C. 4	5:15 p.m. - 5:30 p.m.
November 12, 1993	Observation	P.C. 5	1:20 p.m. - 3:15 p.m.
November 29, 1993	Observation	P.C. 6	1:00 p.m. - 2:15 p.m.
January 10, 1994	Phone Call	P.C. 7	12:20 p.m. - 12:25 p.m.
January 14, 1994	Observation	P.C. 8	11:20 a.m. - 12:00 p.m.
January 21, 1994	Observation	P.C. 9	1:00 p.m. - 2:00 p.m.
February 9, 1994	Observation	P.C. 10	12:30 p.m. - 2:00 p.m.
March 1, 1994	Observation	P.C. 11	9:15 a.m. - 12:00 p.m.

Table 2. List of Observations and Other Fieldnotes for Rachel

Date	Type	Label	Time
October 25, 1993	Visit	R.K. 1	3:30 p.m. - 4:00 p.m.
November 1, 1993	Visit	R.K. 2	3:15 p.m. - 3:30 p.m.
November 3, 1993	Observation	R.K. 3	8:45 a.m. - 12:00 p.m.
November 8, 1993	Phone Call	R.K. 4	8:30 a.m. - 8:35 a.m.
November 10, 1993	Observation	R.K. 5	1:00 p.m. - 3:40 p.m.
November 16, 1993	Observation	R.K. 6	8:40 a.m. - 9:45 a.m.
November 25, 1993	Observation	R.K. 7	1:40 p.m. - 3:00 p.m.
November 30, 1993	Observation	R.K. 8	1:30 p.m. - 2:40 p.m.
December 7, 1993	Observation	R.K. 9	1:40 p.m. - 3:30 p.m.
December 14, 1993	Observation	R.K. 10	1:40 p.m. - 3:00 p.m.
January 10, 1994	Phone Call	R.K. 11	12:30 p.m. - 12:35 p.m.
January 17, 1994	Observation	R.K. 12	1:00 p.m. - 3:00 p.m.
March 29, 1994	Observation	R.K. 13	1:00 p.m. - 2:30 p.m.
April 5, 1994	Observation	R.K. 14	1:40 p.m. - 2:30 p.m.
April 12, 1994	Observation	R.K. 15	1:40 p.m. - 2:30 p.m.
April 19, 1994	Observation	R.K. 16	1:30 p.m. - 3:00 p.m.
April 26, 1994	Observation	R.K. 17	1:35 p.m. - 2:45 p.m.

During each visit to the classrooms, I kept "scratch notes" (Sanjek, 1990) and wrote expanded fieldnotes later the same day. With Pat's class I took notes for most of the time I was in her room. In Rachel's classroom, because I took a more active role as a participant observer, I took notes during lulls in the activities. When that was not possible I wrote detailed notes immediately after my sessions with her class. In the early part of the study I wrote as much detail as I could in both classrooms. This is consistent with Hammersley & Atkinson's (1983) advice to "record even things that one does not immediately understand because these might turn out to be important later" (pp. 148-9). Toward the end of the study, when I had a clearer idea of what I was looking for, I was able to narrow the focus of my observations to the themes that had emerged from earlier observations and interviews.

The expanded field notes I wrote after observations were used to guide questions during interviews, raising issues regarding practices that needed explanation.

Interviews

Participants were fully informed about the purpose of the interviews. I tried to make each interview as conversational as possible in an effort to make the participants comfortable. Interviews are useful for obtaining information—particularly feelings and interpretations of the world—that cannot be observed directly (Merriam, 1988). When I met the teachers, I asked questions about practices I had observed within the classroom and about the teachers' beliefs about education.

Although I came to the interviews with lists of possible questions (see Appendix B), I used them only as guides to the issues I wanted to raise. Hammersley and Atkinson (1983) state that "ethnographers do not decide beforehand the questions they want to ask, though they may enter the interview with a list of issues to be covered" (p. 113). Similarly, Agar (1980) advises against a written list of questions: "rather, you have a repertoire of question-asking strategies from which you draw as the moment seems appropriate" (p. 90). Conversely, Merriam (1988) recommends against completely unstructured interviews since the researcher "may feel lost in a sea of divergent viewpoints and seemingly unconnected pieces of information" (p. 74). Instead, she advocates greater use of a semistructured interview in which a list of questions or issues is prepared, but "neither the exact wording nor the order of the questions is determined ahead of time. This format allows the researcher to respond to the situation at hand, to the

emerging worldview of the respondent, and to new ideas on the topic" (p. 74). This is the approach I took in the interviews. Typically, I would start the interview with one of my prepared questions and let the discussion follow its own course depending on the responses of the teachers. At times the interviews had the flavour of conversations across the staffroom table.

Interviews were conducted at times and places at the participants' convenience. A list of interview dates and times for Pat is provided in Table 3, and for Rachel in Table 4.

Table 3. List of Interviews with Pat

Date	Label	Time
October 26, 1993	P.C. 1	12:20 p.m. - 1:00 p.m.
November 29, 1993	P.C. 2	12:20 p.m. - 1:00 p.m.
January 14, 1994	P.C. 3	12:10 p.m. - 1:00 p.m.
April 7, 1994	P.C. 4	12:10 p.m. - 1:45 p.m.

Table 4. List of Interviews with Rachel

Date	Label	Time
January 24, 1994	R.K. 1	3:20 p.m. - 4:10 p.m.
January 31, 1994	R.K. 2	3:20 p.m. - 4:15 p.m.
March 7, 1994	R.K. 3	3:20 p.m. - 4:10 p.m.
April 18, 1994	R.K. 4	3:20 p.m. - 4:10 p.m.

In both cases the teachers wanted to be interviewed at their schools despite my suggestions that they might be more comfortable and less distracted at another location. Each teacher was interviewed four times with time between interviews to allow for reflection. I tape recorded and later transcribed each interview. The presence of a tape recorder can potentially

have an inhibiting effect upon people. After experimenting with bulky machinery and microphones, I opted for the less obtrusive, but lower quality sound, of a standard issue classroom tape recorder, using the built-in microphone and operating on batteries. Although this resulted in a few moments of unintelligible or inaudible recording, the unobtrusiveness of this arrangement was a worthwhile trade-off. Both teachers spoke freely and at length, and did not show obvious nervousness about being recorded. The tapes were transcribed to computer the same day, or in some cases over the next two days, since transcribing is a long, tedious, and physically tiring process. Transcribing the tapes soon after the interviews enabled me to recall with some clarity the circumstances surrounding and during the sessions. The transcripts are verbatim representations of the interviews. In the next chapter, slight alterations to quotations for the purposes of clarity and readability, where tone and meaning are not altered, are indicated by square brackets ([ ]) for added words, and ellipses (...) for omitted words.

Analysis of Observations and Interviews

The process of analysis of observations and interviews was a recursive one, with each session prompting me to ask how what I had observed or heard reflected the world views of the teachers (Agar, 1980; Hammersley & Atkinson, 1983). Once a substantial portion of the fieldwork had been completed, I read the fieldnotes and interview transcripts with a view for repeating themes. Each reading, particularly of the interview transcripts, revealed something new. Thus, Marshall and Rossman's (1989) advice to read and re-read one's notes and transcripts has proved valuable. Examples of

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practices and statements relating to these repeated themes were noted, thus building an index of evidence.

I identified the following themes and sub-themes:

Images of Teaching

Child-Centred Education
    The Role of Context, Subjectivity, and Relationships

Control
    Shared Control and Shared Responsibility
    Choice
    Self-Reliance/Solving Social Problems

Social Responsibility
    Inclusion of Special-Needs Students in the Regular Classroom

Social-Emotional Growth/Self-Esteem

Computer Usage and Attitudes Toward Computer Technology

The ways in which these issues are played out in the teachers' practices will be discussed in Chapter IV.

While some of the themes were chosen specifically because they related to my research interest (for example, the issues of control, the context of knowledge, and attitudes toward computer technology), the others came from the research participants themselves and were not decided upon prior to the study. They reflect, I believe, essential aspects of Pat's and Rachel's world views. A reading of my fieldnotes and interview transcripts by another researcher with a different research interest might reveal other themes, but I have attempted to avoid theoretical imposition. I am aware that the significance of the evidence I have collected must not be overstated in order to fit my framework. I agreed with Lather (1992) when she called for the

creation of theory "in a way that keeps preconceptions from distorting the logic of evidence" (p. 62). A brief rationale for each of the themes follows.

Images of Teaching and Changing Beliefs and Practices

My readings of Elbaz (1983), Connolly and Clandinin (1985) and Clandinin (1986) raised my awareness of how teachers use images to define their personal knowledge of their practices. The ways in which teachers view their practices can be seen in the ways in which they conduct their lessons, the arrangements of their classrooms, the ways they describe their work, and the ways that they perceive their beliefs and practices have changed over the years as a result of their experience. The interviews clarified for me the ways in which Pat and Rachel view their jobs and how those views have changed. The commitment to their profession, the continual refinement of their beliefs and practices, and the depth of their feelings for affecting children's lives in positive ways are evident in their words and actions.

Child-Centred Education/The Role of Context, Subjectivity, and Relationships

Neither teacher in this study believes in a model of teaching in which the teacher predominantly transmits knowledge to the students. They see their jobs as finding ways to draw out knowledge from each student. This approach permeates their practices and is important in understanding their view of teaching. Embedded in this approach is the understanding that the teacher must work with the experiences that the students bring to the class. Patience is a necessary attribute of a teacher working with this approach since each student's experience is different. Students are not rushed for quick

answers. Integrating subjects is a strategy that these teachers use to help draw connections between the knowledge they acquire in math, reading, social studies and science. This approach attempts to put knowledge into contexts that the students understand to make the subjects being studied more meaningful. The relationship between students and teacher is not as rigidly hierarchical as that of a traditional "discipline-based" teacher (Hammersley, 1977).

Control

My interest in the issue of control arose from the conception of a technicist viewpoint. As discussed in Chapter 2, control can be viewed as one of the principal purposes of technology. Some people, it seems, use technology to give them greater control over the world. In this study, I wanted to see what Pat's and Rachel's attitudes toward control were. Is control over students and their environments important to them? Did they use overt control or more subtle methods? What does this say about their world views? Although every teacher exerts some form of control over students in order to accomplish the curricular goals, a key question concerns how the control is used. In a classroom in which the teacher wishes to transmit knowledge to the students, control may make transmission more convenient for the teacher, although it could be argued that control ensures that students have an orderly environment in which to learn. An alternative view of control might be that it creates the conditions in which students can develop social responsibility within a community of learners. That is, students would be expected to learn from each other as well as from the teacher, and the control exerted by the teacher would serve those ends.

Control, however, has subtle dimensions, some of which will be discussed in Chapter IV.

Shared Control and Shared Responsibility

From my observations it became apparent that Pat and Rachel often share some control and responsibility for the functioning of the classrooms with their students. For example, this occurs by putting students in charge of certain classroom operations, sharing in solving class problems, and negotiating the themes to be studied. I wondered to what extent this was a genuine desire of Pat and Rachel to share control, as opposed to a manipulative technique which co-opts the students' loyalties. If genuine, might this be taken as a counterview to the technicism I have identified which values control? Sharing control conveys the expectation that students are responsible to each other, not just to the teacher.

Choice

Closely allied with the issue of shared control is that of student choice. The extent to which students choose their activities can be taken as an indication of the degree that the teachers are willing to "let go" and share control with their students. In both classes student choice was readily evident through such practices as activity centres and free seating during work periods. Of course, choice is only allowed within the parameters defined by the teacher. The types of choices offered may therefore be a significant indicator of how closely the teachers protect their control.

Also related to the issue of shared control and responsibility is the degree to which teachers intervene to solve problems that children could solve for themselves. These teachers try to place much of that responsibility on the students themselves. This is not to suggest that students are turned loose to fend for themselves; rather, they are taught the skills of negotiation and are expected to apply these skills when appropriate. When teaching academic skills, the students are often shown ways they can check their own work rather than relying on the teacher.

Social Responsibility and Inclusion of Special-Needs Students

This theme became immediately apparent in my observations in Pat's room (with whom I began working first). The inclusion of two special-needs students[2] in her class provides a focal point for developing social skills that Pat feels are important for all her students. This issue permeates her practice and much of her thinking. Many of our conversations dealt with issues of inclusion. Since I began my work with Rachel almost a month after I had started working with Pat, it seemed natural to compare their two approaches. Rachel also has two special-needs students in her class, and social responsibility was also a major concern of hers, though Pat spent more time talking about this issue. In the interviews Pat identified social responsibility as one of her highest priorities for all her students.

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2   Special-needs students have been identified by the school district as requiring extra attention because of physical, mental, emotional, or behavioural challenges.

During my observations both teachers emphasized the promotion of positive self-images within their students. Actions such as spontaneous student applause for classmates' accomplishments and comments such as "Everyone in the world has brilliant ideas" occurred frequently. They are intended to create a climate of security in which students feel free to take risks and express themselves. Rachel identified social-emotional growth as her top priority, saying that nothing else can take place unless that issue is dealt with. Similarly, Pat identified social-emotional security as a prerequisite to intellectual development.

Computer Usage and Attitudes Toward Computer Technology

It might seem obvious to begin this study by exploring the teachers' use of computers and their attitudes toward computer technology. However, I approached these subjects later in my fieldwork, preferring instead to look at broader issues relating to Pat's and Rachel's teaching. Recalling that stated beliefs and practices do not always coincide, I wanted to explore the teachers' priorities before discussing computer technology. But since computer technology is central to this study, I did eventually observe and discuss with the teachers their use of it with their classes.

Ensuring Validity

Member checks (Guba & Lincoln, 1981) were conducted in the form of returning my analysis to the research participants for their comments. Although I returned transcripts of the interviews to them, both participants refused to read them. When I first asked Pat if she wanted to read the

transcripts (naïvely assuming that she would enjoy reading her own words) she replied with the emphatic "No" of a person who is self-assured in her beliefs and in the knowledge that she expressed them adequately. I gently suggested that it might be useful for her to read it, and I gave her a copy in case she changed her mind. She glanced at the first page and was embarrassed by the way her speech appeared in print. Despite my explanation that I was only interested in the content, and not in the expression, she avoided reading it. Similarly, Rachel only laughed when I suggested she read the transcripts of our interviews, indicating that she did not want to see her words in print. Both teachers expressed confidence in what they had said in the interviews and did not feel the need to check the transcripts for accuracy; however, they were interested in reading my interpretations of their practices and interviews.

Toward the end of my fieldwork I gave preliminary copies of my analysis to each of the teachers for comment. Their comments helped to revise and further shape the final document.

The issue of power relations must be considered in this study. Because I chose to work with teachers in the school district in which I hold a leadership position, one might question whether the lessons I observed and the responses I got from the interviews were different than they would have been had I chosen to work in a different district. I would point out, though, that my position holds no supervisory authority and that the participants were reminded that they were free to withdraw from the study at any time. The question of my position came up only once, and it was in response to a description of the lack of commitment by some teachers to using computers.

In addition, I attempted to create a climate of trust that would ensure that both teachers would be able to express themselves freely.

Ethical Issues

I was open with Pat and Rachel about the purpose of my research. I provided each of them with copies of my thesis proposal, and tried to make explicit my assumptions. My intentions of respect for their privacy, as well as their acknowledgment of their rights to withdraw, is reflected in their signing an informed consent form (Appendix C). This, however, does not render the issue of ethics unproblematic. There is a delicate balance between proceeding on the authority of signed agreements and observing the limits of a participant's right to privacy and the use of their time (Whittaker, 1981). I felt acutely aware that the amount of access to the classrooms, the imposition on the teachers' time, and the depth of probing into personal matters must be constantly negotiated. Whenever possible I left avenues for withdrawal open to the participants.

There is an inherent problem in one person representing the viewpoint of another, particularly in the case of the gender difference between researcher and participants (Alcoff, 1991). Care must be taken to avoid appropriation of people's stories, changing them to suit a researcher's needs. Sensitivity must be extended to participants regarding "ownership not only of one's experience, memory and attitudes but also of the understandings and reflections one has about one's self" (Whittaker, 1981, p. 443). I also felt an obligation to return to the teachers their words and my analysis for member checks, though, as previously mentioned, neither teacher wanted to read her interview transcripts. By doing this I am not

adopting a relativist stance that the participants must have the final word on interpretation, but I am committed to the principle that negotiated interpretation has the potential of leading to more authentic knowledge (Borland, 1991).

The Researcher

The role of the researcher cannot be regarded as unproblematic (Van Maanen, 1988). Just as the research participants have points of view, so does the researcher. "Fieldwork is an interpretive act, not an observational or descriptive one" (Van Maanen, 1988, p. 93). Furthermore, the researcher is unavoidably a member of the social world under study and cannot avoid having an effect on it. "Rather than engaging in futile attempts to eliminate the effects of the researcher, we should set about understanding them" (Hammersley & Atkinson, 1983, p. 17). With this in mind, I present my own background so that it may be taken into account.

At the time of this study I was working as a school district technology consultant, a position I held for seven years. Before taking this position I taught mostly primary grades for eleven years. Six of those years were in an open area classroom, team teaching with two other teachers. My undergraduate degree is in English; I took only two university science courses and none in Computer Science. I became involved with microcomputers in the school system through a district-sponsored workshop. As my interest and expertise grew over the following five years, I became more involved in providing inservice for other teachers. In my district role I gave many workshops on computer use in the schools, presented at provincial conferences, and wrote and edited several publications distributed by the

provincial government. My background is therefore one of contradictory tensions: with no formal training in technology, I found myself in a role promoting the use of computer technology. My fascination with computers has been balanced with an awareness that a technology's benefits also have some significant costs.

While reading works on technology and society in the summer of 1993 I was particularly affected by writers who proposed ways of viewing technology that I had not considered before. Among others, Franklin (1990), Bowers (1988), Turkle (1984, 1988), and Benston (1988) had a profound effect on my thinking about technology. After reading their works, I could no longer look at computer technology in the same way I had previously—as neutral tools which could be used for the betterment of humankind. It was then that I began to think that a person's world view could have an effect on one's inclination or disinclination to use computers in the schools. If computer technology promotes a world view that is different from a teacher's beliefs, then it may be unwise to promote the computer as "just a tool."

In the next chapter I present the beliefs, goals, and some of the instructional practices of Pat and Rachel. I also give some indication of the struggles they face in working toward their goals.

Chapter IV

The Beliefs, Goals, and Instructional Practices of Two Primary Teachers

> So we talk about things like that all the time—what their
> social responsibility and responsibility to one another [is] as
> well—that we are here together and basically our class has to
> ensure that the rest of our class is secure...and happy and
> therefore learning as well.
>
> —Pat

Introduction

In order to examine the relationship between the values I have ascribed to computer technology and the values of Pat and Rachel, it is necessary to understand the viewpoints, the beliefs, and the practices of the teachers being studied. To accomplish this, it is necessary to explore the world views of the participating teachers in some detail. Such an undertaking is an adventure since, in a qualitative study, a researcher does not have a complete idea of what will turn up.

These are the stories of two primary teachers. As described in Chapter III, Pat and Rachel became involved in this study by different means. I had known Pat for several years (though I had never seen her teach) and asked her almost casually if she would take part; Rachel was suggested to me by a colleague, and I approached her more formally (see Appendix A). My experience as a consultant has allowed me to observe many teachers in action.

Not far into my fieldwork it became apparent that, through good fortune, I was working with two conscientious and dedicated teachers. If the tone of my accounts seems at times enthusiastic, it is a reflection of the respect I hold for these teachers. This is not to say that they are perfect. In fact, each reported some embarrassment about the glowing tone of the first draft of this chapter, thus acknowledging that conscientious teaching is a continual struggle to match one's practice with one's ideal, however that is conceptualized. In my revisions I have attempted to illustrate some of the struggles that these teachers confront. In doing so, my intent is not to dishonour their work in any way, but to show that wrestling with difficult issues is part of a conscientious teacher's practice. There is a fine line between revealing the struggles and contradictions that teachers work with every day, and creating a tone of petty faultfinding. Part of *my* struggle in representing Pat's and Rachel's work has been to balance the esteem with which I hold their ideals with a respectful analysis of the dilemmas they face in putting their ideals into practice. In spite of this, much of my representation of their practices and beliefs still represent the ideals that Pat and Rachel are striving for. Statements of belief are useful in that they reveal the constructs under which the teachers are working; these form the goals toward which dedicated teachers work.

My background as a primary teacher has allowed me to make a few leaps of understanding about their practices. Although this "latent identity" (Platt, 1981, in Hammersley & Atkinson, 1983) could be the cause of some unfortunate assumptions, I have checked the plausibility of my assumptions with my teacher participants. I am aware that the researcher is required to treat familiar settings "as 'anthropologically strange' in an effort to make

explicit the assumptions he or she takes for granted as a culture member" (Hammersley & Atkinson, 1983, p. 8).

One of the characteristics that makes qualitative research an adventure is the discovery of the unexpected. Since it is not clear from the beginning what will turn up, the researcher must be prepared for revelations that will force a reshaping of the work. Thus in my work, the centrality of human values in Pat's and Rachel's beliefs and practices led me to turn much of my attention to this aspect of their work. My attention to the role of computer technology in their lives and teaching became secondary to my desire to understand the way they work to create humane environments and instill values of caring in their students.

After describing my first impressions I present a separate portrait of each teacher's background. Next I focus on the practices and stated beliefs that I feel reveal aspects of their world views relevant to this study. Because there is considerable overlap in their approaches to teaching, I discuss many of their practices and beliefs together, pointing out similarities and differences as the discussion proceeds. Although they are different people, with different backgrounds and different personalities, their approaches to the themes identified in Chapter II are similar enough that they can be discussed together.

First Impressions

The first thing I noticed with both teachers was that they were extremely flexible and welcoming to me. Pat readily agreed to take part in my study and was available on short notice for observations. Similarly, Rachel was gracious in opening her classroom to me at almost any time that suited

me and by inviting me to talk to her about her practice after my observations. Their willingness to allow a potentially threatening observer—one who often sat quietly, taking notes—into their rooms speaks volumes for their confidence and willingness to share their experience.

The second thing I noticed was how busy they are. Rachel, in particular, never seems to stop moving. The day I dropped by the school to introduce myself, she shook my hand and continued to putter around the classroom as we chatted. During my first observation at Rachel's school she continued to be in almost constant motion: she never sat at her desk; she passed quickly through the staffroom at recess but did not sit down; and she dashed off to play the piano for the school choir at lunch time. Pat also puts a lot of time and energy into her work. She mentioned to me during my first observation that she planned to stay late to work in her classroom—until ten o'clock!

Pat's Background

Pat was turning forty years old at the time of this study, and this milestone caused her to reflect on her past. This, and her frequent advocacy with friends and colleagues for her approach to teaching, made her an articulate and focused candidate for this study. Aside from some time off for maternity leave, she has been teaching full time and part time since 1976. At the time of this study she was teaching full time at a large elementary school in the Lower Mainland of British Columbia. She began to become interested in teaching when she was a child, often playing school with younger children in her neighbourhood. By her teens she was sure that she wanted to be a primary teacher. When she was sixteen, Pat was invited to be a camp

counsellor at an outdoor school for special-needs children. It was during this time that she developed an interest in working with physically and mentally handicapped children. However, it took her many years to get to the point where she could articulate the reasons for her strong feelings that these children should be integrated in regular classes.

Pat started her teaching career in an open area, team-teaching, multi-graded classroom with Grades One to Three. Her experience includes two years of teaching straight Grade One classes and six years of Kindergarten, but her preference is now for multi-aged classes. At the time of this study she was in her fourth year of teaching multi-age classes, Kindergarten to Grade Two. Her present Kindergarten students attend in the mornings, leaving her in the afternoons with a smaller class of twelve Grade Ones and Twos. The class includes two special-needs students with mild cases of autism, one in Kindergarten and the other in Grade One. These children have a full-time Special Education Assistant (S.E.A.) to assist with behaviour and instruction.

Pat completed her education degree after she began teaching, by taking night classes at university. She considers herself a generalist, but has particular interest and expertise in reading and writing. Early in her career, after a university course, Pat developed an interest in teaching Physical Education, even though she doesn't consider herself athletic, and she began giving district workshops on it. Her approach was to take on new challenges, including forcing herself to teach math in new ways learned from another university course.

Pat teaches at one of the largest schools in her school district. It is known throughout the district for its early adoption of the British Columbia

Primary Program and for the collaborative work environment of the primary teaching staff. Pat's commitment to this approach is so strong that she enrolled her own two children in the school, even though she lives in a different school district. Most of the children (about sixty percent) who attend this school come from single parent families living in townhouse complexes which surround the school. The school has a lab of thirty computers, acquired through a combination of government money and parent fund raising. The lab was reinstated a year before this study after two years in which the computers were distributed throughout the school when increased enrollment forced closure of the original lab. The previous principal had aggressively procured computers for the school, including approaching a local business for donations, and negotiating with the school board to provide a bank of portable computers.

The Role of Teaching in Pat's Life – "Never really arriving"

There is much evidence when observing and talking to Pat that teaching occupies a central role in her life. Pat's room is full of evidence of a person whose eye is always open for free classroom materials, including a gas pump hose, dressup clothes, a rabbit cage, and a typewriter. To Pat teaching is much more than a job—it is a way of life. In response to a question about the influence of teaching on her life, Pat responded:

> It's totally integrated. It's really integrated. I really believe that once I had my own children—and you certainly don't need to have your own children to be a good teacher—but for *me* a lot of things started to make sense, both in parenting and in teaching. I just had a more complete picture. And when I looked at my relationships with people, my friendships, everything, yeah, is definitely tied into learning. And life *is* learning. This happens to be sort of compartmentalized learning, I guess, in a school situation. But I definitely—the whole thing is linked to me: my

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whole life, my family, my friends, my students in class, my emotions, my moods, my beliefs. You know: what I know, what I don't know. It's definitely all related. (Interview P.C. 2, 3, November 29, 1993)[1]

The words "life *is* learning" were said with the conviction of a person who revels in the joy of learning and in opening the world of learning for others. Home and school life became mutually supporting, with trips to the beach or to the aquarium with her family an opportunity to collect classroom materials and ideas. In this sense, it is difficult to imagine a more suitable vocation for Pat. It is an occupation that allows her to work with young children while keeping alive for herself the excitement of learning.

One of Pat's motivations for entering teaching was that it serves as an outlet for her imagination and creativity. Pat described how teaching allows her to stay in touch with the magic of childhood:

> "I think my imagination was quite vivid, to say the least and I did a lot of creative type play and so that to me—I guess I associate it with younger children and how they think and sort of the magic of being a child.... So I wanted to be a part of that, I think." (Interview P.C. 1, 1, October 26, 1993)

This statement is coincident with the findings of Wright and Tuska (1968) which suggest that a basic motivation for becoming a teacher is to stay in touch with childhood. It is evident from this excerpt, from the physical environment of the classroom, and from the activities she chooses that Pat wants to create an environment that encourages children to be creative and

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[1] I have adopted Clandinin's (1986) convention for transcript notation: The initials indicate the teacher's name; the first number indicates the interview or field note number; the second is the page number of the transcript on which the quotation occurs. P.C. stands for Pat; R.K. stands for Rachel.

imaginative; at the same time, the classroom is an outlet for her own creativity. This outlet for creativity can be a powerful catalyst for renewal and for keeping a teacher's interest in teaching alive (Britzman, 1991) as is evident in this statement of Pat's:

> I never considered myself creative, and almost less than—you know, just not able to do anything. And yet I'm beginning to see myself as very creative. This is where my real creative side comes out, in creating a classroom. I think that's where I really get into it. I don't see myself doing that—not to that degree, certainly—in any other area of my life. So that's kind of a neat aspect of it. Never really arriving and always changing.
> (Interview P.C. 4, 2, April 7, 1994)

In this statement Pat reveals a tension between two views of herself: one as a person of limited resources; the other as a person who has developed and become stronger as she has refined her beliefs and practices. In this sense, teaching has been a catalyst for making Pat more confident of her abilities. This can also be seen in the comparison of her descriptions of her early teaching with her current practice. When she began teaching she relied extensively on more experienced colleagues to provide her with direction. As she observed children and developed her own sense of what works best for children, her teaching became more self-directed and personal. Still, remnants of uncertainty and questioning remain: during my first observation in Pat's room she said to me, "You must hate this," assuming that I would find her classroom life uninteresting.

There is a narrow line between confidence and self-doubt. At the beginning of my second observation I met Pat in the staffroom just before class began, when she made a self-deprecating remark, suggesting that her work was not worth observing. A month later she again downplayed the

worth of her practice by suggesting that the math lesson I was about to observe was not ready for visitors. This is consistent with Fullan's (1991) statement that "one of the predominant feelings that characterize the psychological state of teachers and teaching is *uncertainty*" (p. 121, emphasis in original). In many cases this uncertainty is a source of stress (Lortie, 1975, in Fullan, 1991), but it may also potentially have the positive effect of keeping a teacher questioning and refining her practice.

With regard to her practice Pat said, "I'm always talking about it...with parents, with my own friends, with other colleagues—always talking about *something* related" (Interview P.C. 2, 2, November 29, 1993). Constant discussion and debate keeps the major classroom issues at the forefront of her consciousness, making her a strong advocate for her point of view. At one point during a discussion about the inclusion of special-needs students Pat complained to me that I was not challenging her thinking, suggesting that challenge is a catalyst for her growth.

Child-Centred Education – "How can I capture their imagination?"

Pat's enthusiasm for the childhood imagination is closely allied with her dedication to child-centred education in which the needs and interests of children shape the activities and the environment she creates for them:

> When I say...going from their interests, I guess—and thinking about how they think and how they learn and what's important to them—I still think a lot of things can be covered through starting with the child. In other words, I'm not delivering things to them. I'm coming with curriculum, but I'm figuring out where they're at and how can I capture their imagination about this stuff that we're talking about. (Interview P.C. 1, 2, October 26, 1993)

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Pat sees her role as a teacher to find the interests of the children and engage them in activities that capitalize on these interests while teaching the skills expected of that age group. Pat further invests confidence in children's abilities through such techniques as the use of a writing program called "Writer's Workshop" in which the students are encouraged to write at levels that traditionally would have been considered too difficult. Rather than concentrating on the mechanics of correct spelling, children are encouraged to guess at spelling, and experiment with language as they did when they were learning to talk.

Pat's Classroom Environment

Walking into Pat's classroom is an adventure of discovery. When I began this study nearly every wall surface was covered with colourful paper, displays, and student work. (Later in the year, the fire marshal ordered much of the paper taken down.) An aquarium, home to two large turtles, is by one door; a large rabbit cage is by the other. An older model computer is on the other side of the door; a scrounged typewriter is tucked into a corner. A printer occupies a small table behind Pat's desk, ready for use with the portable computer she uses for writing reports. The entire room is divided into activity centres, with tables and shelves sectioning off the space. The shelves are stuffed with materials for the activity centres: puzzles, dressup clothing, art materials, puppets. There are no rows of desks, no chalkboard at the front of the room, no signs of a traditional classroom. Spaces are child-sized and it is difficult for an adult to manoeuver around the room. It is impossible to walk in a straight line from one side of the room to the other. The message conveyed by the room setup is that this is an active, lively, and

exciting place to be. It also conveys the message that the teacher has put a great deal of care and attention into the design of the room, and suggests that she sees learning as constructed more than it is transmitted.

In Pat's classroom, there is no division between "work" space and "play" space. Although some spaces such as the dressup centre tend to be used less (although, by no means never) during work times, the space is fully integrated. No student has personal space in the form of a private desk. Students may choose to work anywhere in the room during teacher-mandated exercises. Similarly, supplies such as pencils and erasers are shared. This was a conscious decision of Pat's to create spaces that will encourage cooperative groups:

> Nobody has their own space. And that's done purposely....It's done so that we're all in this together...Certain spaces are used for certain things, and the kids know what that's all about. But it is deliberately set up so that there will be cooperative groups and there will be sharing all day long, no matter what they're doing.... What basically happens is, when it's center time, there's specific activities or materials there and they know what they are—it's all introduced and gone over in quite a detailed way in how you might use these materials and certainly what some of the expectations are as well.... But then later on in the day when we're doing a writing activity or cooperative group or whatever it might be—those centers become work space or—you know— play space or whatever—with probably more focus. (Interview P.C. 1, 2, October 26, 1993)

Thus, it is not unusual to see a child working on a math drill in the puzzle center. All space in the room is multipurpose space. Although Pat has a definite philosophy behind this undifferentiated use of space, there is a practical dimension to this practice, as well. The classrooms in this school are much smaller than most classrooms in schools built before the 1980's. This was a result of new building specifications from the provincial government.

The small classrooms force teachers to make the most efficient use of the space available. King (1992) points out that the physical space available for play has a significant impact on the types of activities that can take place. Physical space thus becomes a controlling factor in directing the type of play that can take place: "For example, the size of the block corner will determine both the nature of the construction activities and the number of children who can use the blocks simultaneously" (p. 48). Thus available space, along with teacher rules and expectations work together to provide control over the activities.

A carpet at the front of the room[2] provides a place for students to gather for class meetings and instruction. Even though the classroom is carpeted, the recycled house carpet defines a space where meetings take place. As I will point out in the discussion later, the carpet is a key part of the classroom, serving an important social function, as well as one of control.

Pat's Image of Teaching – "Growth"

I see two images of teaching in Pat's practice[3]. The first one is the metaphor of growth. Pat often spoke of child development in terms of growth. She even spoke of her own development with this term. She would make statements such as "I want them to learn and grow" (Interview P.C. 3, 2,

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[2] "Front" in this room is perhaps an unsuitable term since it implies the place where the teacher stands—and the students direct their attention—to deliver the curriculum. In fact, since the carpet was moved from one side of the room to the other midway through the study, it can be said that there is no front of the room. I use the term here to define the class meeting area.

[3] The concept of teacher images was discussed in Chapter II. See Elbaz (1983), Connelly & Clandinin (1985), and Clandinin (1986) for complete discussions of teacher imagery.

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January 14, 1994); "I want all children to change in the sense that they grow and exhibit growth" (p. 5), and "everybody learns and everybody grows" (p. 6). Speaking of her own professional development, Pat feels she has undergone tremendous personal growth over the years. She characterized her early practice as undeveloped to the point where she was unable to articulate her philosophy of education. Through what she terms growth, she is now more confident about articulating the reasons for her practices.

> I definitely have been constantly changing, and I wouldn't have
> been able to say...as a beginning teacher...[my] philosophy of
> education—I've never felt comfortable with that.... I just sort of
> thought I was faking my way through. I mean, I think I was
> doing my *job*, but I couldn't, as I said, articulate. I didn't have
> the philosophy behind everything. And it's really taken me
> until the last few years to feel that I have *some* handle on exactly
> what I believe. Why I believe it and why I do what I do. So it's
> been a very long process for me.... I've evolved, I've changed and
> I expect that I will continue to do so. But I do feel more
> comfortable in talking about where I'm at philosophically and I
> do within myself feel a lot more strength behind what I'm doing
> than I ever have before. (Interview P.C. 2, November 29, 1993)

Growth is a metaphor which is at the core of Pat's approach to teaching. It is even echoed in the environment she creates for her children by filling the room with growing plants and animals.

The other image that permeates Pat's practice is that of a community. Pat has tried to build an ideal community within her classroom, one in which people take responsibility for each other. To Pat "a healthy [community] is a balanced one where there are a variety of people" (Interview P.C. 3, 6, January 14, 1994). This includes students with physical and learning difficulties. The importance of this image of community is that it requires other people besides Pat to make it viable. Without the cooperation of the students, the community will not be productive. Pat puts this in terms of how she needs

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the help of her students to include the special-needs students: "It seems obvious now when I look back—I can't build a community just by myself" (Interview P.C. 3, 2, January 14, 1994). Thus, Pat regards herself as only one member of the community, and she tries to enlist the understanding of the other students to help socialize the special-needs children. I will return to this issue later in this chapter.

I now leave the discussion of Pat's background and classroom to introduce the second participant in this study. Pat's practices will be examined in more detail later in this chapter when I examine common practices of the two teacher-participants.

Rachel's Background

Rachel is a relatively new teacher. At the time of this study she was in her fifth year of teaching. Teaching for her is a second career.[4] Formerly, she was an intensive care nurse before she resigned to raise her children who are now adults. During this time Rachel took a music degree and taught piano. As her children entered the school system she volunteered in her children's school and thought that she "may as well be working here" (Interview R.K. 1, 1, January 24, 1994). This prompted her to re-enter university to earn her teaching certificate. Although she later commented that her decision was not quite as simple as that, it reveals the contradiction that Britzman (1991) points out that "we have all played a role opposite teachers for a large part of our school lives. It is taken for granted that we all know what a teacher is and

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[4] If counting her parenting experience, teaching is actually Rachel's third career.

does" (p. 3). Later Rachel admitted that the job was nothing like she imagined.

> Really you are fulfilling—trying to fulfill so many roles. No wonder at the end of the week you sometimes think, "What did I do this week? Anything?" ... It's not surprising to me that the school system isn't [highly praised]. The job is unreasonable, I think. (Interview R.K. 2, 6, January 31, 1994)

Immediately following her graduation Rachel continued to take night courses to get a special education diploma so she could be a resource teacher.

Rachel has taught at three schools during her teaching career and has not had the same teaching assignment twice. She has taught Grades Three and Four Math and Language Arts, Kindergarten to Grade Seven Music, combined classes of Grades Two-Three-Four and Grades Four-Five-Six, and split assignments of Kindergarten and Resource, and Grade Two and Resource. Throughout the many changes in teaching assignment, her philosophy was grounded in the primary approach she learned in her student-teaching practicums. Her sponsor teachers emphasized the principles and practices of the British Columbia Primary Program (B.C. Ministry of Education, 1990). At the time of this study Rachel taught four days per week, three in her Grade Two classroom and one as a school-based Resource Teacher, assisting children having difficulties in school. She works closely with a teaching partner who took the Grade Two class for two days per week.

Like Pat, Rachel has two special-needs children in her class. Rachel also works with a full time Special Education Assistant (S.E.A.). Rachel readily agreed to have these children in her class because "it sort of melds the experience that I've had and I like the challenge, and I think it's a good place

for them to be—with people that are comfortable" (Interview R.K. 2, 8, January 31, 1994). It is interesting to note that in both her careers Rachel chose to work with some of the most challenging clients of the institutions she worked in: intensive care patients and children experiencing difficulties in school. Although Rachel had always believed that integration of special-needs children was "the way it should be," she is starting to question that position as she considers the possible future for these children in less supportive and less flexible classroom environments.

Rachel's School and Classroom Environment

Rachel teaches at a medium sized school of approximately 350 students in a relatively stable, mixed socio-economic neighbourhood. About two-thirds of her students come from two parent homes; some live in a low income apartment complex. Rachel's classroom is a large room on the second floor of the building. A carpet defines a meeting area for group lessons and discussions, and this piece of recycled furnishing is a significant social tool, as I will show later. Desks are arranged in clusters. Around the perimeter of the room the shelves contain materials for centres time, a daily period after morning opening exercises when children choose from selected activities. A piano at one end of the classroom forms a wall for the house centre. A table with a tape recorder and headphones provides a listening centre. A computer provided for one of her special needs students (but shared by all the students in the class) is near the door. Later in the year, an older model computer was added to the room, by the listening centre.

Although my first impression was that space in this classroom was clearly differentiated, with work space defined by the desks and play space by

the centres, it became apparent that the children use the available space flexibly. Students move about to choose a workspace as the need arises, depending on the current activity. Sometimes they work on the carpet or in the house centre. In fact, students often sit at each others' desks to work with particular groups. Rachel provides a rationale for this policy, reflecting her own work style:

> Rachel: I, personally...wouldn't like if I was one of them, always having to work in the same place. I like to spread out, and I know some of them do. If they're doing writing, some of them find little holes that they like to [work in]. And as long as they do...I would encourage that.
>
> Tim: Then their desks really just become a storage spot?
>
> Rachel: Pretty well, except for times...that they...talk to one another, "Would it be okay if I sat in your desk to do something with so-and-so." And so they are a work area, but they don't always use just their own.
> (Interview R.K. 1, 5, January 24, 1994)

Child-Centred Education

Many of Rachel's actions suggest a commitment to child-centred education in which the perceived needs of the children are central in her decision-making. When she gives an assignment to the students, Rachel moves around the room speaking to each child individually, giving encouragement and help where needed. Children are allowed to talk to each other during work periods and there is usually a low buzz of voices during these periods; as a result, I was seldom able to hear Rachel's voice as she privately chatted with the students. In this way, consultations between students and teacher are private, respectful, individually tailored events. In some cases, such as in a math lesson I observed, this includes getting down at

the children's level and crawling around on the carpet to visit each student as they work with counters.

Rachel uses the Writers' Workshop strategy with her students. The children I spoke with displayed their stories with pride, and were eager to show their own words and stories. In a further validation of children's language, the stories and collections of vocabulary that are produced daily on large sheets of chart paper, and which fill the walls of the classroom, are predominantly collections of children's words.

Rachel's emphasis is on attending to all her children's needs, not just the academic ones: "I do think that our emphasis is probably more on the child as a whole than their reading and writing scores...and arithmetic" (Interview, R.K. 3, 2, March 7, 1994).

Influences on Rachel's Teaching – "Nursing and teaching are quite similar"

Several factors strongly influence Rachel's approach to teaching. One is her background in nursing. To Rachel "nursing and teaching are quite similar except you're working in different buildings" (Interview R.K. 1, 2, January 24, 1994). Although the tasks involved in the two jobs are different, both involve caring for others, and when dealing with the special-needs children in her class Rachel feels that her nursing background is valuable. Rachel points out, however, that she finds teaching more consuming than nursing, and she is unable to leave teaching work behind, as she could with nursing, when she leaves the building.

Rachel's sponsor teachers during her student teaching practicums were another strong influence on her approach to teaching. Both were early

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primary teachers and both emphasized the use of literature, drama, and hands-on learning. These influences can be seen in Rachel's teaching style, and it coloured her approach to working with older children in her first teaching assignments.

Another factor influencing Rachel's teaching is her own parenthood. Her own children are now grown. She did not have the experience of dealing with other people's children all day and then going home to raise her own. She mentioned on several occasions that she could not imagine dealing with young children at home after a day of teaching: "I think about how tired I am at the end of the day. I'm glad I wasn't teaching when my kids were small because I can just imagine how hard it must be" (Interview R.K. 2, 15, January 31, 1994). It is interesting to note the contrast with Pat's history. Pat felt she became a more complete teacher once she became a parent. Pat's children were a developmental influence on her teaching. In a sense, she was learning to be a teacher as she was learning to be a parent. Rachel, on the other hand, had completed one of the most demanding parts of her parenting before she became a teacher and therefore entered the profession with her parenting experience already in place. Being the parent of grown children gives Rachel a broad perspective of childhood.

The Image of Motherhood and Family

Rachel's preference is to work with primary students because she has a greater rapport with the younger children and, in part, because she feels she is "probably more like a mother, sometimes than I am a teacher" (Interview R.K. 1, 2, January 24, 1994). Rachel admits that hers is a "traditional" family and her image of ideal motherhood emanates from the model of an ever-

present and caring person who provides gentle guidance to her children. Nurturing and supporting come more easily to Rachel than does disciplining students. She spoke of the difficulty she has with discipline, being drawn into involvement with the children, then believing that she should be more authoritarian, a role she is not comfortable with. Rachel spoke of the difficult home circumstances that some of her students come from, and the lack of family support many of them have. She feels the lack of extended families limit the assistance young parents have available for raising their children. Rachel identifies the source of her concern for these issues as "the mother part of me" (Interview R.K. 2, 5, January 31, 1994).

She addresses these concerns, in part, by striving to provide a stable and secure environment for her students: "If there's something solid in the family you can make mistakes and they aren't going to be crucial" (Interview R.K. 2, 1, January 31, 1994). Rachel tries to create a place for her students that is "safe and a place that they'd want to come, and a place that they can trust the people here and know what to expect. All the things that you would hope that happens in the home for kids" (Interview R.K. 2, 6, January 31, 1994). In some ways, she is creating a family within her class. For example, during class discussions Rachel often sits on the floor in a circle with the children "so it's more like being around a dining room table" (Interview R.K. 2, 14, January 31, 1994), something she feels does not take place as often in today's rushed families.

Rachel's concern for her students' family lives is genuine and well-intentioned. It does, however hinge on the "traditional" family model in which she grew up and of which her own family is now an example. The

changing face of the family with all its variations is a phenomenon that Rachel acknowledges but finds lacking. Nevertheless, these conflicting images of the family are a reality that she must deal with, though not always happily.

Rachel's Commitment To Her Profession – "It can just consume you"

Despite Rachel's preference for working with primary children, she and another primary teacher coach Grade Six and Seven basketball. Coaching is, in part, a way to become a part of the internal community of the school. The notion of building a community is another of the images around which Rachel organizes her work. This image is one which begins in the classroom and extends to the school and the larger community. The image of community draws from the issue of "connectedness with people" that is so important to Rachel, as I will describe later. She talks of building a community within her own classroom, having the class sit together on the carpet as a way to build a sense of community (Interview R.K. 2, 13, January 31, 1994). As well, she wants to be part of the school community, dismissing the idea that the school is just a building where she works for five hours a day.

> And like probably in lots of schools, there are people who do lots of stuff and people who don't want to do anything extra. And to do extra things does take time, but to me you get to know the community better. It's much more pleasant to work in a place that you're not just checking in and out of. Especially when it's so involved with people. (Interview R.K. 1, 13, January 24, 1994)

This level of commitment to integrating her school life with her personal life is evidenced by small gestures that indicate a blurring of the boundaries of personal and professional life. Rachel brought to school a

Remembrance Day poem she had received at her church; she took the time to take school aquarium equipment to a pet store to find out how to set it up in her room; she has sewn book bags for each of her students so they can borrow school books overnight. We talked about the amount of private time that she spends thinking about school issues:

> I do, for sure, think about school a lot when [I'm] not here. ... I do more of the thinking about kids and how I could do this. And trying to solve these problems we have with these kids [with behaviour problems]. And I would say both [my teaching partner] and I spend time talking to parents at night that are working. I would say we spend quite a bit of time. (Interview R.K. 1, 10-11, January 24, 1994)

Later, Rachel again spoke of the amount of personal time schoolwork consumes:

> Lately I've been spending even more time on school-related [work].... My husband and I were walking over to get a movie on Friday night. ...On the way I said, "I'll probably just do a few of my report cards while we're watching this....You know, I'll just make a few notes." And he said, "Couldn't we just watch the movie? You spent all week"—I was off Friday and I spent Friday at basketball games.... But I just feel myself getting on the bus, and I can't get off. He said, "Couldn't we just watch the movie?" I said, "Oh, yeah." It can just consume you. (Interview R.K. 3, 3, March 7, 1994)

This passage reveals that Rachel, like many other primary teachers I know, constantly carries an awareness of her classroom in the back of her mind. At the end of January Rachel indicated that her concern for the well-being of her students was strong enough that she would be willing to babysit children while a parenting class she hoped to arrange took place in the school. By March this had been arranged, and periodically over the next six weeks Rachel donated her time to babysit children whose parents were attending the class.

An issue that Rachel considers a major area for her personal development is that of personal assertiveness. This is one reason she attributes for her different assignments each year she has been teaching. Aside from moving through the stage of being a beginning teacher who had to accept whatever teaching assignment was offered, principals also "requested" that Rachel take specific assignments because of administrative needs. She would think:

> "Well he thinks I should. And he wants me to." Instead of stopping and thinking, now what is it that I would like to do?... I think, "Oh, sure. It might be great." And then next year I think, "Why did I say that?" But it's worked out okay. And I've certainly had a variety of experiences now. (Interview R.K. 1, 3, January 24, 1994)

In spite of the feeling that she was pressured into accepting assignments for administrative convenience, Rachel feels that changing jobs helps her stay alive as a teacher, making her work interesting and challenging.

Rachel also feels that she must be more assertive with some of the students in her class who have severe behaviour problems, following through and letting them know that "No" means "No" (Fieldnotes R.K. 3, 1, November 3, 1993). Rachel indicated that establishing firm discipline at the beginning of the school year is something she finds difficult. In her personal life Rachel spoke of being approached to work on a church committee, but decided that she needed time for her own renewal rather than to always give up her time for others. This issue of asserting her own will seems particularly significant at this stage in her career because Rachel is beginning to question some of the assumptions she has worked with since she began

teaching. She is beginning to question the fairness of including special-needs children in regular classes, a position she had previously taken for granted: "This year I feel a lot stronger about wondering" (Interview R.K. 2, 8, January 31, 1994). Her experience is starting to cause her to question some of the beliefs regarding inclusion, math instruction, and spelling instruction that came from the authority of her student-teacher practicum advisors. Her statement was made with the tone that she was giving herself permission to wonder, almost confronting these issues as if they are moral dilemmas.

I have given brief descriptions of Pat's and Rachel's backgrounds and the contexts in which they work. I turn now to consider common themes and practices identified through my readings of the fieldnotes and interview transcripts. These themes were identified in Chapter 3 and are elaborated upon here. The themes are the importance of context and subjectivity, control, social responsibility and the inclusion of special-needs students, social-emotional growth, and computer usage and attitudes towards computer technology. I give particular attention to the issue of control since it is a central feature of a technicist viewpoint.

The Importance of Context and Subjectivity

I have already discussed in previous sections Pat's and Rachel's belief in using the knowledge that children bring with them to school. A related idea is the way in which knowledge is treated in their classrooms, whether as something to be handed down from teacher to student, or something that is socially constructed and dependent on the people involved and the contexts in which they work. I examined my fieldnotes and transcripts to see how Pat and Rachel treat knowledge.

Both teachers try to put knowledge into contexts that their children are already familiar with. Pat uses a variety of activities with the calendar each morning to reinforce reading and math skills. Rather than treating these as separate subjects to be studied during special periods, reading and mathematics are embedded within any appropriate context. Pat uses singing and chants to provide a context for students to use their reading skills as they follow along in their poetry books or on a chart. Cooking is used to integrate subjects such as math and science, as well as to create a homey atmosphere. Teaching her students the importance of including all children—particularly the special-needs children—is woven into the activities of the day rather than showcased in a decontextualized manner: "You don't have to have a preplanned set of lessons to teach about belonging, or inclusion, or happiness, or positive self-esteem. You react to what the kids are doing—deal with it in a real, practical sense" (Interview P.C. 2, 8, November 29, 1993).

A student's announcement of a visit to her grandmother in Alberta provided Rachel with an opportunity to remind her class of their lesson the previous week in which they learned the location of the provinces. Rachel believes that holidays for events that children do not understand are pointless, and that holidays such as Remembrance Day need to be put into terms the children understand. For Rachel, themes are a useful way to integrate subjects, but only as long as they remain meaningful:

> "I think sometimes if you just want to do everything to [do a theme] you're just contriving it to make sure it fits. And to me that doesn't make sense. I want things to be meaningful so that if it's better to connect it to what we do every day than the theme, then that makes more sense" (Interview R.K. 1, 7, January 24, 1994).

The priority to put information into context for children permeates Pat's and Rachel's approaches to traditional subjects. Although there are times designated for the study of the different subjects, other subjects are almost automatically integrated. For example, on the day before Remembrance Day the children's perceptions of peace were woven into Rachel's writing and art activities. When studying dinosaurs, Pat had her class do reading, art, and math activities relating to dinosaurs.

Context becomes problematic when considering the diverse backgrounds of the students in these classrooms. Students come from a wide range of family and cultural backgrounds, making it difficult to relate learning to every child's experience. Rachel spoke of the overwhelming differences between children and the difficulty in meeting their various needs. What tends to happen is a compromise in which the mainstream Canadian (primarily Christian) cultural events are celebrated. Sometimes, as in the example of the Remembrance Day lesson, the focus is adjusted somewhat. In other cases the teacher must decide how far she can adapt the lesson. Although not everyone in Rachel's class celebrates Christmas, much time was given to preparing Christmas tree ornaments, and everyone took part, regardless of cultural background. Balancing the demands to adapt material to everybody versus doing what is comfortable and convenient is a dilemma that teachers increasingly face.

For Pat, meaningful context is important to strive for, not only for her students, but for herself, personally. Something must be interesting for her to be able to learn it. She talks about her lack of success in high school math, history, and science classes because these courses, to her, consisted of little

more than memorizing unconnected facts. Information must make a connection with her and be relevant to her life to capture her imagination. For Pat, "it [is] the connection with myself or with people that interests me" (Interview P.C. 1, 7, October 26, 1993).

Personal contact—knowing the context of others—is important to Rachel, and she cannot understand a friend's attitude, whom she believes spends too much time engaged in computer mediated discussions via the Internet:

> I think that...one of the real dangers with [the Internet is] that you can instantly have this intimate kind of discussion. But it isn't at all [intimate] because you haven't even laid eyes on the person. You don't even know the person. So it's an interesting way to...communicate with people, isn't it...without even having to know them? It's so important that I know who you are before I [talk to you]. (Interview R.K. 3, 9, March 7, 1994)

Personal context is as important to Rachel as the context of knowledge. Even though she is aware that there are other people with whom her friend is communicating, the mediation of a computer makes the contact unsatisfactory to her. To Rachel, without knowledge of the other person and their experiences there can be no intimacy; without intimacy there can be no meaningful exchange of ideas. What makes her friend's actions even more disturbing to her is the feeling that he shies away from personal contact with people despite the fact that he works in a helping profession: "To try to establish any kind of rapport or relationship with people, I'm sure it doesn't interest him because you have to go through that 'getting to know you' stage, whereas when you're doing it on the computer you can just get right to the idea" (Interview R.K. 3, 9, March 7, 1994). In fact, Rachel suspects that he spends more time working on his computer than he spends with people:

"Well, what good is he if a computer is more useful to him than a person?...His computer is *absolutely* the most important thing to him" (Interview R.K. 3, 8, March 7, 1994).

Rachel's views on the dangers of computer mediated communication stand in contrast to what is often cited as a benefit of this form of dialogue: that factors such as race, culture, religion, physical disability and age are invisible; people are therefore judged on what they say, not on their appearance. This is not to suggest that Rachel judges people by their appearances. Bowers (1988) points out that each technology "amplifies certain aspects of human experience and reduces others. The telephone can thus be seen as amplifying our voice over distance while simultaneously reducing our ability to use our own or the other person's body language as part of the message system" (p. 32). Computer mediated communication amplifies the written word, while eliminating the effectiveness of non-verbal messages and inflection carried by the voice.[5] The computer can only transmit forms of knowledge which can be made explicit (Bowers, 1988), giving computer communications the appearance of objectivity. As a person who recognises the value of subjectivity in communication, personal contact is Rachel's preferred method of communication: it embodies ambiguity and subtle, non-verbal messages that cannot be discerned through a computer message; it acknowledges that language is not merely a conduit through which objective information passes (Bowers, 1988), but, rather, a means to make connections

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[5] People using computer mediated communications often use "emoticons"—typographical faces—to indicate body language that cannot be sent over the telephone lines. For example, an ironic statement might be followed by ;-). Viewing these characters on their sides reveals a winking face. Dozens of these symbols exist, but the most frequently used are the smiling face :-), the frown :-(, and the wink.

with people. That is, the information is secondary to the interaction with the other person. In the same way that people often do not go to a restaurant just to eat, Rachel does not talk to people just to convey information. Just as eating at a restaurant is often secondary to the social contact, talking, to Rachel, is a way to make connections.

A commitment to child-centred education and to context-rich instruction would suggest that these teachers would be willing to work with the experiences that children bring to the classroom. This implies a patient approach would be necessary—one which gives children the mental space to think reflectively rather than reactively.

Quick responses in which only correct answers are accepted are not a feature of Pat's classroom. Rather, Pat allows the children the time to be sure of their answers. Some exchanges during a reading lesson shows the extent to which Pat is willing to work with the responses of the students. Pat replied to students' responses that I interpreted as distracting:

> After recess the students gather on the carpet again to continue working from their poem books. They sing a song from the book while pointing to the words. The teacher asks what the first word is on one of the pages.
>
> Student: 'This.' [Reading the first word of the poem]
>
> Another student: No. 'The.' [Referring to the title of the poem.]
>
> Teacher : The first word not printed by me.
>
> Student: My first word is 'his.' [The 'T' of 'This' is hidden in the binding of the notebook.]
>
> Teacher : Yes, the 'T' is hidden, isn't it?
> (Fieldnotes, P.C. 1, 3, October 8, 1993)

Rachel similarly waits patiently for students to think and answer in their own time. During one lesson I observed, she waited patiently for one of her special-needs students to give an answer while other students tried to give the response for him. On another occasion she allowed time for a student to think about the answer he wanted to give rather than move quickly on to a student who had a ready answer. Although the teacher still has the control in this situation, allowing plenty of "wait time" provides the opportunity for thoughtful and unhurried responses. This may be regarded as a form of shared control since the discussion does not continue until the student has answered or declined to answer.

Control

As discussed in Chapter II, control is a central issue in a technicist orientation. It is also a major concern of teachers. The ability to exert control on the external world may be a major preoccupation of people with a technicist outlook. Ways of improving the human condition are often proposed as technological solutions. With this in mind I present here an examination of some issues involved in classroom control. I looked for Pat's and Rachel's approaches to control within the classroom. Specifically, I looked for their control techniques, the degree that they share some control, the amount of choice they offer to children, and how self-reliance and social problems are handled. Each of these issues will be discussed in turn.

Control Techniques

When observing expert teachers like Pat and Rachel, the techniques of control are almost invisible unless they are specifically looked for. Control

techniques are subtle and woven into the fabric of the current activity. A touch or a look is often all that is needed to convey the teacher's intent. Attitudes of the teacher toward work and behaviour are conveyed as part of the assignment. Control of behaviour is facilitated through physical seating.

More explicit forms of control are also used. Both teachers use modeling and highlighting desired behaviour to solicit their students' cooperation. For example, comments like "When you are sitting like Kelly we can start" (Fieldnotes P.C. 6, 1, November 29, 1993) let the students know the teacher's expectation without giving a direct command. This technique, designed to use peer pressure as an aid to classroom management, was referred to as the principle of "power sharing" by Marland (1977, cited in Clark & Yinger, 1977). I observed this technique on numerous occasions in both classrooms. Embedded in a statement like this is a reinforcement of the teacher's authority since she alone decides when the class is ready and what the next activity will be (Hammersley, 1977). Control is thus built into the common interactions of the class. "Clearly, the teacher is continually invoking and enforcing certain conventions regarding teacher-pupil interaction and assuming their intrinsic legitimacy and their applicability to this particular situation" (Hammersley, 1977, p. 53). As pleasantly as it is done, by continually reinforcing the social conventions in this manner, the teachers ensure that other forms of interaction can take place. Without some form of control, interactions might become chaotic, and the purposes of the teacher become lost. This is not to suggest that the teacher should not have this authority, but it is instructive in that it points out the subtlety of control and the messages that these techniques convey. This form of control also imposes a norm of behaviour to which students are expected to aspire.

Seeing students sitting ramrod straight so they might be chosen for a particular activity suggests that this is the ideal way to behave under these circumstances. This notion is further reinforced when a student who is accidentally not named to move to the next activity remains sitting in that manner even after everyone else has left.

The carpet in each teacher's classroom is a significant social tool. There are two distinct formats used when students sit on the carpet: the circle and the cluster. The students are often asked to sit in a circle during class discussions. During these times, both Pat and Rachel sit on the floor with their classes. A circle allows all members to see each other. Discussions can range from the sharing of books brought from home that I observed in Pat's classroom, to the voicing of children's fears about "getting stolen" while going to the washroom, as Rachel discussed personal safety with her students.

When I asked Rachel why she had her class sit on the carpet she quickly replied, "So that we can sit together." When asked what the purpose of sitting together is she said that it creates "more of a sense of community" (Interview R.K. 2, 13, January 31, 1994). There is an implicit assumption here that the children will consciously or unconsciously adopt this sense of community. As previously mentioned, sitting together in a circle also creates for Rachel a sense of family that occurs when sitting around a dining room table (Interview R.K. 2, 14, January 31, 1994). It is unclear whether the image of family and community led to Rachel's use of the circle, or whether her use of the technique preceded the rationale, but it is clear that she consciously uses it as a social tool.

The cluster is used for direct teaching, for reading stories to the class, and whenever the students' attention is wanted on one person (most often, though not always, the teacher). Both Pat and Rachel have clear criteria for having the students sit in a cluster. As well as providing a means for closeness, the carpet in each classroom provides a measure of control:

> Well, with young children, I mean, a lot of the techniques of control, if you want to put it that way or attention—drawing their attention and so on—are about being physically close. Physical closeness is really important to get their attention. You need eye contact. There's some very young children in there. And if they were sitting at tables and chairs, I mean, there's just so many distractions for them. Just having them right there. The visibility. (Interview P.C. 2, 5, November 29, 1993)

The seating arrangement on the carpet—cluster or circle—also conveys a message: "When they're sitting in a cluster and I'm in front of them I can give up some of the power to the kids—or the child may be actually in control of the meeting—like a special person.[6] But there is a message there. You may not have a voice in this" (Interview P.C. 2, 6, November 29, 1993). There is a curious tension in this statement between the sharing of control and the maintenance of the teacher's authority. This tension always exists even when control is consciously shared.

I observed other forms of control that are unobtrusive but effective. Both teachers used a variation of one technique when their children sat with their writing folders on the carpet. In one case the students were asked to put

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[6] The term "special person" is used to denote a child who is selected for the day to help with various classroom duties such a taking attendance, running errands, and leading the class down the hall. One of the purposes of the role is to promote self-esteem. Each child is given turns being the special person.

the folders behind them once they were finished using them; in the other, the students were asked to sit on their folders.

Both teachers use the technique of unobtrusive intervention, quietly moving beside a student to control distracting behaviour or to remove a distracting object. Discipline is generally handled in a low-key manner which minimizes embarrassment for the students. In Rachel's class, for example, she often goes over to a student whose behaviour she wishes to change, and speaks quietly to him or her: "That's the way I like to handle them rather than make a big deal about them" (Interview R.K. 2, 3, January 31, 1994).

Occasionally control in these classrooms takes the form of directives. On one occasion when students had prepared vegetables and dip for a class snack, a student declared that he did not like vegetables. The teacher said, "You have to try" (Fieldnotes P.C. 11, 2, March 1, 1994). On another occasion a student said something quietly to the teacher; the reply was, "That's rude!" More often, however, control is subtle. Sometimes it takes the form of appeals to reason such as, "I can't think when it's this noisy," or statements of "objective" facts such as, "It's too noisy."

Control becomes most noticeable when it is either blatant or lacking. My second visit to Pat's room was a difficult one for her. One of her special-needs children, an autistic five-year-old, was having difficulty coping with the classroom. He wailed constantly, and was removed from the room for a "time-out" period; he continued when he returned to the room. Adding to the confusion, a steady stream of adults entered the room and interrupted the activities; at one point there were six adults in the room and Pat felt she was losing control. Her frustration was evident, later saying it was "the worst day

of her life" (Fieldnotes P.C. 2, 2, October 19, 1993). Despite Pat's perceptions of the day, she realized that "the [other] kids were fine. ... As much as I was uptight and Colin was just having a terrible day, the kids carried on--basically [this] is what happens: they carry on" (Interview P.C. 1, 3, October 26, 1993).

Control within a classroom is necessary if curricular goals are to be met. But the quality of control can be seen in whom the control benefits primarily. In traditional models of schooling in which the teacher is regarded as the sole source of knowledge and discipline, control allows the teacher to teach more efficiently, with fewer distractions. While it is true that an orderly environment is also necessary for students to learn, a controlled atmosphere has the main function of enabling the teacher to deliver the curriculum. Control in this case is the responsibility of the teacher. In a classroom which emphasizes all members of the learning community sharing knowledge and being responsible to each other, control is for the benefit of everyone. In this scenario each member has a responsibility to ensure that other members of the class have the physical, social, and emotional conditions necessary for learning to take place.

Space Allocation as a Means of Control

Space allocation is one means by which a teacher can exert control over students. The arrangement of a room carries with it a tacit set of expectations regarding behaviour and acceptable activities (King, 1992).

The presence of activity centres conveys the expectation that part of the day will involve student choice. While students regard all teacher directed activities in a classroom setting as work (Kessler, 1992; King, 1992), activity

centres allow a level of self-direction that is frequently absent from more formally structured classrooms.

Although Pat wants to make the classroom a second home to her students, their input into the creation of the classroom environment is limited to decorations.

> They create the artwork and sometimes make things like signs, and sometimes they come up with ideas. I think I basically control that. I'd say that's pretty teacher-controlled. I set it up physically the way it works best for me and what I believe is to be the best for the kids. I try to think about what they'd like. But I don't really ask them, you know, "Where would you like this or that", or "What would you like in here?" (Interview P.C. 2, 4, November 29, 1993)

Shared Control

Pat is often willing to share some of her control and give choices to her students. Her willingness to step back from the spotlight and from the position of authority by frequently passing the pointer (and control of her lessons) to students indicates an expectation that children will learn from each other and treat each other as valued members of the class.

> After sharing, the teacher initiates a series of activities involving the calendar. A student is handed a pointer to lead the activity. The teacher stands back. Most of the activity is led by the student: group reading of the days of the week, counting of days. The student chooses the next student for the next activity. (Fieldnotes P.C. 1, 2, October 8, 1993)

This practice also gives the students an idea of what it is like to be in control.

The following exchange shows that, to Pat, the students' perceptions are important in learning, and she tries to return the responsibility for learning to the students:

A student is counting the children in the class for the daily tally. Some children question the student's accuracy.

Another student: "Did you count yourself?"

Teacher: "Do you want to count again and check?"

The student counts again until she is sure of her result. (Fieldnotes, P.C. 1, 2, October 8, 1993)

This exchange also demonstrates the role patience plays in allowing children to take more control of their learning. Pat could have verified the count herself so the class could move on, but she chose, instead, to return the responsibility for the count to the student.

The ultimate goal for both teachers is to instill in their students a level of self-control. Self-control, however, must be understood in terms of what is acceptable to the teacher. The very term "self-control" can be regarded as contradictory since it is always measured against the external standards of an authority. Students could not, for example, decide for themselves that it is acceptable to settle disputes in class with violence. Setting standards for self control entails a concerted effort on the teacher's part to train her students to accept her standards. Pat describes how she creates a climate early in the school year in which everyone can work:

> As things are introduced at the beginning of the year, or if they're new or whatever, there's very definite rules about how we behave, and how we use things in the classroom. And I do go over that in a fairly rigid way. You know, we practise using voices that are appropriate in the classroom and we go over that and a lot of kids will get it just from that, and sometimes it needs more repetition, but we practise how to behave and talk about the reasons why. That if it becomes too noisy and if people are shouting, you know, how does it feel? We might even role play it. So there's a definite emphasis and a lot of really blunt talk, you know. I feel really comfortable saying, you

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know, I'm feeling really frustrated or irritated today. It's, you know, too noisy. And I can't function. And they listen, and they may or may not change their behaviour but it's just pretty honest. (Interview P. C. 1, 3, October 26, 1993)

By practising the behaviours consistent with the teacher's standards, the children begin to adopt those standards as their own, reducing the need for continual teacher intervention. In addition, as the standards become their own, students begin to enforce these standards on each other. A key technique for making people regulate their own behaviour is to create a system of surveillance in which people eventually police themselves. Foucault (1979) describes Jeremy Bentham's circular panopticon prison as a means "to induce in the inmate a state of consciousness and permanent visibility that assures the automatic functioning of power" (p. 201). The constant awareness that one is under the surveillance of a disciplinary power causes the prisoner, in turn, to become co-opted by the power structure and thereby reinforce it. Although Pat and Rachel are attempting to instill an ethic based on respect for others, the subtle relationships in the power structure ensure that authority is reinforced.

Rachel feels that self control can be attributed to the students' motivation and that the level of involvement the children feel is often built into the activities she assigns. Seldom during my observations did she need to intervene to keep students on track with their assignments.

> Generally speaking, they're motivated. They're keen. If they don't get into it...the activity wasn't a very good one. [Laughs]. Then I take responsibility for that sometimes.... If you have one or two kids that don't get into it...that's more of an individual thing.... Generally speaking, if it's a good activity, at their level, doing what it's meant to do, they'll do it. But if not—you need

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to have more than one or two objecting before I take the blame.
[Laughs]. (Interview R.K. 2, 12-13, January 31, 1994)

The onus is still on the teacher to design and assign activities that will ensure
this form of "self control."

Choice

Closely allied with the issue of control is choice. To Pat, choice is an

important part of her program:

> Into the program I've built a lot of choice—a lot of freedom—as
> far as movement goes, how to use materials, who to work with.
> There's a lot of freedom and choices going on all through the
> day. (Interview P.C. 1, 3, October 26, 1993)

Choice and freedom under these circumstances are always within

guidelines provided by the teacher, and these privileges tend to occur during

particular times. Freedom of movement, for example, is not allowed during

a group lesson on the carpet; choice of activities permitted during free play is

generally limited to those activities designated as acceptable by the teacher. It

is not a choice in Pat's room not to engage in social relationships. So the

challenge is to create a delicate balance in which choice can exist under

guidelines provided by the teacher. The guidelines tend to be heavy handed

at first, as Pat alluded to above, and become more subtle as the year progresses,

depending on how the students respond.

Student choice is highlighted most during the daily activity centres

time. During this time students may choose from any of a number of

independent activities, such as a writing centre, house centre, painting,

puzzles, and art. Students may choose whom they work with and where they

work during the activity centres period. The assumption is that students will benefit from self-directed activities, choosing from a range of activities provided by the teacher. In doing so, students take a level of responsibility for their actions and for their learning.

Centres time is a busy period in which every member of the class is independently or cooperatively engaged in an activity. During a typical centres time in Pat's room some students will be playing in the house centre, dressing up and role playing; others will be creating a play in the puppet theatre; a student will be working independently on jigsaw puzzles; several children will be working on an art project Pat has prepared for the day; and a few selected children will work with a parent volunteer to cook a treat for the class. Despite the many different activities, this is not a chaotic time. Pat has definite expectations for the students' behaviour, and the period proceeds with the children moving about as needed, interacting with each other in quietly productive ways, with only occasional intervention by the teacher.

Providing choices for students is also a high priority for Rachel. When asked why choice is important, she replied:

> It's important because we're all different and I would feel like I was in a can if every day somebody told me what I had to do and what I had to read and what I had to write. I wouldn't like it. (Interview R.K. 2, 10, January 31, 1994)

Providing choices for students is a way to accommodate the almost overwhelming differences that Rachel finds among children in her class:

> That's one of the things we know more about now. We respect [that] everybody comes with such different experiences and come from such different backgrounds.... I can't believe how different they all are. (Interview R.K. 2, 11, January 31, 1994)

Providing choices allows students to be aware of their own abilities and to create challenges for themselves when appropriate:

> I've heard kids say, "I can read this. I'm not going to read this kind of book any more because I know how to read better and I can choose this." Or, "I'm interested in this or I want to learn—" Carrie said to me today, "This book is really good because it has words in it that I've never seen before." So, to me, the way we used to do it, we'd all be in this reader forever—why would we all read that if half of us already can and half of us don't have a clue where it is.... If I notice that...you're reading stuff that's way too easy and you keep repeating and repeating and repeating— well, that's okay for a few days, but then I might say, "John, now I notice you've been reading that book for a week and let's try something that's a little bit [harder]. So, there's choice with guidance, and to me I think that that's...really important. (Interview R.K. 2, 11, January 31, 1994)

Allowing students choices is having faith that they will make good choices. Rachel's attitude is that "they're pretty wise at choosing" (Interview R.K. 2, 11, January 31, 1994). But making wise choices comes about only through practice, and Rachel sees in some of her students the effects of being in an environment that allows little choice:

> Some kids...haven't ever experienced [choice]. There was one of the Grade One classes that some of them have come from that... their day is mostly all...structured. There's a couple of those kids that still have difficulty choosing. (Interview R.K. 2, 11, January 31, 1994)

Self-Reliance/Solving Social Problems

Sharing some control means trusting students to be able to become more self-reliant. This means that the students will learn to rely less on the teacher for guidance in their learning and behaviour. Regarding behaviour, self-reliance can be equated with self-monitoring, which involves adopting the social norms the teacher models and teaches. Both Pat and Rachel believe

in having students, whenever possible, solve their own problems. This takes the form of becoming independent learners, capable of finding and checking their own information, and solving their own social problems. This does not, however, imply the kind of individualism referred to in Chapter II. Self-reliance refers more to reduced reliance on the teacher and more sharing of concern of students for each other. Rather than expecting the children to reduce their need for others, students are encouraged to look to each other for support in their learning. The teachers expect the children to resolve social problems through negotiation rather than through teacher intervention, though it must be kept in mind that training and modeling are necessary before children can do this on their own.

The presence of activity centres in both classrooms suggests that students will be engaged for a part of the day in independent learning activities. These activities, although organized by the teacher, tend to be more open-ended than traditional lessons. Pat encourages students to find information for themselves. On one occasion, when two students wanted to draw some musical notes in their books, they asked to go to the music room to see from wall displays what musical notation looks like. It might have been more expedient for the teacher to refuse, and just draw the notes for the students. Pat allowed them to go, however, confirming that personal discovery is more important to her than teacher-provided information. On another occasion Pat's class was working on a place-value exercise. Two students were unsure of the numbers to put in the counting chart the class was building. Seeking ways to encourage self-reliance, Pat asked the class, "Is there a way to check?" This question is significant on two levels. First, it seeks a way in which students can be sure in their own minds about the

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validity of their responses. Second, it was directed to the rest of the class. Again, it would have been more expedient for Pat to have provided the answer, herself. Instead, she created an atmosphere of enquiry and mutual responsibility for the class's learning.

Rachel feels that it is most important for her students to concentrate on questions such as "how do you learn to find information; how do you learn to read? For all sorts of reasons, I would say the process [is more important] than the content. At this level, for sure" (Interview, R.K. 3, 2, March 7, 1994). Of course, there is no process without content, but Rachel's priority is to reduce her student's reliance on her as the only source of knowledge.

In the area of resolving social conflicts both teachers strive to have students solve their own problems.

> I learned after quite a few years of being the negotiator and hearing kids telling on each other over and over and I couldn't figure out *what* was wrong—and I would solve it (or try to) every time—and realize that I didn't want to do this, like I don't want to tie shoes all day and I don't want to solve problems all day. It's not my job. Or certainly not the bulk of my job. And it was too big. So—and then I started watching, and listening and thinking about it and realized that...a lot of them are...trivial problems: like "he took my pencil" or whatever. So basically, what I do, depending on the child...I will basically just say, "You go and solve it". And if it's a very small problem it usually takes them 2 seconds and it's done. You know: "That's not something that involves me. You go and solve it." (Interview P.C. 1, 4, October 26, 1993)

> I really initially encourage them to handle it themselves. And we're also doing Second Step.[7] And I think that it's crucial for them to learn how to do it. But what I'm finding is, that some of

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7 Second Step is a conflict resolution program. It is a kit of activities designed to teach children techniques to handle anger and conflict in non-violent ways.

them are good at it because they've been doing it at home. But in homes that don't do it..., obviously someone rushes in and fixes everything every time something happens, it's almost impossible for them to do it themselves. (Interview R.K. 1, 11, January 24, 1994)

Two incidents in Rachel's room confirm this approach. On one occasion Rachel asked the class to get into pairs to practise spelling. One girl was left out, so Rachel asked her to join an already established pair. The two protested that that would make a group of three. Rachel responded, "The thing I know about you girls is that you'll be able to handle it" and she walked away. (Fieldnotes R.K. 4, 7, November 25, 1993). On another occasion two students got into a tug-of-war over a toy. Rachel sat patiently, monitoring the situation until the children resolved the dispute themselves. The incidents had different origins, with the first instigated by Rachel, the second only observed by her. Both were occasions for the children to put into effect whatever skills they had for resolving conflict.

Obviously, children need to learn the skills of conflict resolution, and both teachers work on this with their classes. Rachel's class is using a conflict resolution program. Pat uses classroom problems as they arise to teach these skills.

Social Responsibility

One of the most significant parts of Pat's and Rachel's practices is making connections between people. This arises from both teachers' personal commitments to the importance of connections with people. Social development is a major goal of both teachers. In fact, according to Pat, "it's the backbone of everything we do" (Interview P.C. 2, 7, November 29, 1993).

She sees the development of good interpersonal relationships as necessary to creating a healthy learning environment.

> And that comes in social interactions and social relationships. It's woven into everything and it's made very clear, and some of it in very much a teacher-directed way, that this isn't a choice. (Interview P.C. 2, 7, November 29, 1993)

Morning sharing of personal news is a standard feature of both teachers' opening exercises, and appears to be an important way for the children to let the teachers and each other know what is going on in their lives. The fact that both teachers have this built into their days suggests that this form of social connection is a priority for them. Sharing creates connections between people that help them understand each others' needs:

> I see them more as a person as soon as I know a little about the family or know that there's a parent out there who loves them or a parent out there who's having some struggles with whatever. It really makes connections for me—the human aspect. (Interview P.C. 4, 4, April 7, 1994)

The foundation of social responsibility is the notion that "we're all in this together" (Interview P.C. 1, 2, October 26, 1993) and that all members of the class are responsible for the well-being of the others:

> So we talk about things like that all the time—what their social responsibility and responsibility to one another [is] as well—that we are here together and basically our class has to ensure that the rest of our class is secure and—and happy and therefore learning as well. (Interview P.C. 1, 3, October 26, 1993)

The preparation of a class snack during centres time is used to reinforce responsibility to the group:

> [We] prepare food in the classroom and share—share food.... We're all responsible for preparing each others' snack. It sort of gets away from the individual feeling—you know, this is my

snack, my time, kind of thing. (Interview P.C. 2, 7, November 29, 1993)

This is an extension of the concept of shared supplies and shared space in Pat's room that was described earlier. Thus individualism is de-emphasized through the infrastructure of the room and some of the class activities.

A vehicle by which social responsibility is taught in these classrooms is through an emphasis on the inclusion of all children. Inclusion is a fundamental guiding principle in Pat's practice. Pat defines major conflicts as incidents when students are not included. This is particularly relevant to her class since she has two autistic children whom she is trying to ensure are included in all activities. When students are unable to resolve these kinds of issues, "it becomes *our* problem" (Interview P.C. 1, 4, October 26, 1993). It is unacceptable to Pat that children feel left out: "everybody in this class is responsible to everybody else....[E]verybody has to have friends within our class" (Interview P.C. 1, 5, October 26, 1993). She believes this so strongly that she is a member of a teacher research group studying the issue of inclusion. To Pat, a healthy social environment is one with a variety of people, and that includes children with special-needs. She believes inclusion thus benefits all members of the class by highlighting "empathy skills, interactive skills, assertiveness training, building a community" (Interview P.C. 3, 2, January 14, 1994). The presence of special-needs students forces the teacher "to address things much more aggressively than you would if everything is just rolling along with no *obvious* differences" (Interview P.C. 3, 2, January 14, 1994).

To Pat, responsibility to one's peers is a prerequisite to learning:

But I truly believe that without a strong social-emotional security within a classroom and a strong sense of what their

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responsibilities are...then as far as I'm concerned, I'm not interested in the intellectual development. Because that's something that's a life skill. The particular academic skill that I'm focusing on—place value, or whatever—at the time isn't necessarily a life skill....You know, it may never come up again in their lives... but I *know* that their social emotional security and certainly social responsibility is essential for their life. So it's not that I want to spend more curriculum time on it or anything else, but it's that it *has* to be there in place before I can really teach in any other areas, and so it's woven into everything else that I do. (Interview P.C. 1, 5, October 26, 1993)

Academic skills are addressed, but they are learned through activities that reinforce the children's social responsibilities to each other.

Encouraging positive interpersonal relations is a high priority for Pat. The best evidence of this was in the other students' treatment of a child with autism. Pat has encouraged the other students to treat this child with respect and care. For example, during centres time, the teacher drew attention to the student's art project:

Karl has been making a pig with his SEA [Special Education Assistant], cut out of pink paper with a paper plate head.
Teacher : "Karl, show Dennis and Brian your pig."
Dennis: "It's good."
Teacher : "What do you like best about Karl's pig? I like the ears."
Two other students come forward, saying, "I want to see Karl's pig." (Fieldnotes P.C. 1, 3, October 8, 1993)

The responses seemed genuine, although the issue of whether the children's reactions were intended to please the teacher (as discussed above) remains an open one since I did not question the students about their intentions. The level of acceptance of this child did not occur by itself. Pat has emphasized positive interpersonal relations between her students, promoting a sense of mutual connectedness and interdependence. I have

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since learned from another colleague that Pat accepted the two autistic children in her class this year, though she was only obligated to accept one. Her attitude was that an additional special-needs child was not a problem for her; she believes strongly that special-needs children need to be included in regular classrooms.

The structure of Pat's classroom also encourages interpersonal relations and responsibility to each other. Students do not have personal workspaces; they work wherever they like, depending on the activity. In addition, students share supplies such as pencils, erasers, and crayons. In this environment, rather than caring for one's own private space and belongings, the teacher expects everyone to care for the space and the equipment of the group.

I have also observed incidents that suggest that social responsibility and interpersonal relations is a priority for Rachel. Some evidence of a priority for social responsibility in Rachel's class comes in the form of children's public behaviour. After a student had finished reading a book to the class he asked if there were any questions. One student said, "This isn't a question, but you did very good at reading" (Fieldnotes R.K. 5, 2, November 10, 1993). It seems that Rachel has encouraged her children to be supportive of each other.

Rachel, also, has accepted special-needs children into her class where they function for most of the day alongside their classmates. Rachel calls on them in class discussions as much as any other student, and shows patience when an answer is not immediately forthcoming. Her encouragement of students to recognise each others' abilities extends to the special-needs children, who also get the chance to demonstrate their reading abilities for the

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class. Following one such session, the class applauded the child for his efforts. The issue of inclusion is not quite as straightforward as it appears on the surface, and I will return to this issue shortly.

One of the most telling instances of Rachel's priority for social responsibility occurred during a class discussion when a student asked what they would be studying after Halloween had passed. Rachel replied that they would be studying celebrations around the world, beginning with Remembrance Day. She went on to explain that Remembrance Day is about "how people get along" (Fieldnotes R.K. 3, 2, November 3, 1993). There was no mention of war. Rather, Rachel had given the day a positive perspective. It struck me from the matter-of-fact way in which she made this statement that I had witnessed an important insight into Rachel's world view. Although in later lessons she did deal with the usual issues of war and peace, she explained to me that young children do not understand the origins of the holiday, but they can understand friendship, getting along with each other and what happens when they get into fights. In one lesson she explained to the children that fights start as misunderstandings. In my reading of this approach, Rachel addresses three goals: 1) a curricular goal—the obligatory instruction about the Remembrance Day holiday; 2) a child-centred instructional goal—putting the day in terms the children can understand; and 3) a social goal—emphasizing people's social responsibilities in the form of peaceful resolution of conflicts.

Despite these good intentions, conflict is something that Rachel must deal with almost daily. At least two of her students present continual behaviour problems, causing Rachel considerable distress. Their disruptive

behaviour results in her having to send for the principal for assistance or to remove these children, sometimes kicking and screaming from the class. It is an aspect of teaching that Rachel finds exhausting and frustrating. It is, in part, in reaction to having to deal with these incidents that Rachel puts so much emphasis on social responsibility.

In a follow-up interview in which we debriefed what I had written about Rachel's practice, I asked if there were parts that represented the core of what she was trying to accomplish. She identified "that part about Remembrance Day", saying that the most important part of her practice concerns "the values I hold about the world and people" (Interview R.K. 4, 2, April 18, 1994). Rachel asserted that "anybody can teach reading and writing" so her fundamental purpose in teaching is "to fight for values that you really care about"—values in which people care about each other.

Social-Emotional Growth

A priority on social-emotional growth contrasts with a technicist orientation that might value an established curriculum comprising objective and hierarchically structured knowledge. Pat and Rachel place a higher priority on social-emotional growth and on developing their students' self-esteem than on academic skills. As well as revealing something about the way these teachers see the world and their roles as educators, this priority may affect their willingness to use new computer-based technologies.

The issue of social-emotional growth is closely allied with social responsibility. This could be seen in Pat's statement cited above which places social-emotional growth and social responsibility as the first priority of her

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classroom. Creating a secure place where students feel self-worth is a prerequisite to learning as far as Pat is concerned.

Rachel places enormous emphasis on social-emotional growth, saying that she spends up to seventy percent of her day working on these issues. Even though she finds this enormously frustrating at times, she feels that social emotional security must be dealt with before other learning can take place. The attitudes of Pat and Rachel are consistent with findings by other researchers who suggest that primary teachers place a higher priority on emotional issues than on intellectual ones (Wright & Tuska, 1968).

Pat's practice shows evidence of this priority in the use of cooking to create a homelike feeling, and in the presence of pets and plants in the classroom. This reflects what her own notion of a home should be:

> I've got to spend a lot of my life in there and so do those kids. Things like animals and plants make it homey. It's a place where you can belong. It gives an immediate message through the physical setting, I think....They may not be able to—especially in this area, high density housing—they may not be able to have their own pets. At least they've got something at school that they can consider their own in some way. (Interview P.C. 2, 4, November 29, 1994)

Frequent praise for students' accomplishments lends weight to the impression that these teachers try to create a healthy social-emotional environment. Statements like "Good for you for noticing", "I think Mrs. S. will be impressed", and "Good job" (Fieldnotes, R.K. 7, 2, November 25, 1993) permeate the interactions with students. Occasionally Pat will announce student achievements to the class. For example, the class will celebrate the accomplishments of a student who does unusually well on a spelling practice.

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One of the more subtle forms of building children's self-esteem is the manner in which the teachers talk to their students. Teacher talk I observed was always respectful and treated the children as intelligent people with the ability to understand real issues. Both teachers confide in their students the experiences of their special-needs students so that they can understand their unusual behaviours. Bringing children into the circle of knowledge about special-needs conveys a message that children are capable of understanding difficult issues.

> I came in and sat down a little way from the carpet. They were discussing the behaviour of a child (Cindy) who had pinched another child. That child was sitting at a desk, looking quite upset. Cindy had been taken from the class by the SEA and was in the hall. Rachel was in the process of telling the class that Cindy didn't understand about hurting people and that the children should say "Don't pinch" or "Don't kick" if she does it again. She said they shouldn't wait 5 minutes to tell Rachel, because Cindy doesn't understand if there's a delay. She has to hear it immediately. Rachel said that Cindy needs help and this is how the class can help her. She explained that Cindy doesn't understand some things in class and gets frustrated and acts out, and that this pinching behaviour has only started in the last week or so. She asks the children to comment and they offer suggestions or ask questions. (Fieldnotes R.K. 8, 1, November 30, 1993)

Rachel explains the behaviour so that the other students can help, and so they will understand that they can express their feelings honestly with special-needs students. "I think sometimes people just back away from even communicating with them...they put up with stuff that they shouldn't. And it's not a kindness...because in the end nobody will want to play with them if they keep bugging them" (Interview R.K. 2, 7, January 31, 1994).

Pat also tries to educate her students about the special-needs of her students:

I have to begin to include the other children in what I know about that particular special area of that child—educate them a little about Downs Syndrome, or autism, or physical handicaps or whatever, and bring it out in the open and talk about it so they have a beginning understanding. And also, I need to teach them how to interact with that child if there are severe social differences—socialization differences—in that child, I have to begin to attack that quite aggressively. I can't just sit back and— 'oh they'll be nice to him'. In fact, we don't necessarily want them to be nice to him. We want them to interact honestly and begin to change the behaviours—help to change the behaviours. (Interview P.C. 3, 3, January 14, 1994)

It is not clear who is implied in the pronoun "we" used in the above excerpt, but it suggests that Pat is representing societal norms.

Issues Dealing with Inclusion

A number of issues arise from including special needs students in regular classrooms. For Pat and Rachel the rationale for inclusion is an outgrowth of issues involving self-esteem and social-emotional growth. But also involved is their view of how society should look, visibly comprised of a variety of people with differing needs and abilities.

Despite Pat's statement above that her goal is to change the behaviour of special-needs students, she maintains that her goal is to encourage acceptance of all students:

Tim: You talked about acceptance. Is a large part of inclusion acceptance—just acceptance of the way people are? Or is it trying to change them so they're more like the rest of us?

Pat: No. Not at all. Not at all. It is about acceptance and putting action to that acceptance and moving on from there.... Every child in the classroom is looked at as an individual and I want...all children to change in the sense that they...exhibit growth and learning and the ability to interact more appropriately socially, or whatever.... So there should be change

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in the sense that there's growth and learning and the ability to function in academic, social, physical areas at a greater level. So *that* would be the change. But not change to be normal. Because there is no norm. Just change to reach their potential. (Interview P.C. 3, 5, January 14, 1994).

A little later I again returned to the issue of normal behaviour to ask Pat if her goal is to change her special-needs students' behaviour to be more "normal."

> Yes. But if we're doing that with two year olds who are having temper tantrums, I don't see why we wouldn't do it with nine year olds who have special-needs. You know, there are some basic society expectations. And I think a lot of special-needs people can fit into a basic—and I think it's fairly well proven, I would say, that a lot of these kids change to the point where it's healthy for them. I mean, if their behaviour is really antisocial, and frightening, and violent and it can be managed, and they can learn how to manage their anger, frustration, or just inappropriate behaviour, or whatever, then they should, because it will be to their benefit in the long run. Otherwise, what are you going to do when they're thirty years old and they're great big people and having absolute fits and being violent? They're going to be thrown into a padded cell. They won't be able to be around people. And I think it's better for them to be around people. It's better for us; it's better for them. (Interview P.C. 3, 7, January 14, 1994)

The societal expectations that Pat refers to serve to normalize behaviour and exert control over people's lives. This is similar to the issue of self control discussed earlier, which can be regarded as a form of self-monitoring. Most children learn these expectations and self-regulate their behaviour relatively easily. Some children with special needs, however, do not internalize these behaviours as easily, and one of Pat's priorities is to encourage acceptable, "normal" behaviour.

On the other hand, Pat wants to encourage acceptance of the children as they are. Asked if she was encouraging a condescending attitude toward her special-needs children, Pat responded:

> I did, in some of my reading, see things that were talking about that issue. The fact that you don't focus on the weaknesses or the problems, or whatever, of the special-needs students. ... And yet, when I...don't do that...it's almost like you're pretending that it's not there. And how can you deal intelligently with something you're either pretending is not there or you don't understand? And then, in fact, I think you get avoidance behaviour, and also more fear and misunderstandings. So I think—I don't want to focus daily on somebody's weaknesses, if you want to put it that way, or differences. But I think we all need to have a basic understanding in order to deal intelligently and fairly and compassionately with this person. ... You know, for example Trudy [a student with one arm missing and several fingers missing from her hand] ...—the kids were like physically backing off from this child. But then you take off her arm and you show them how it works and you talk about why her body is this way, just in a very basic way, and then children—'Oh yeah'—you know—we can talk about this. It's nothing to be afraid of and hide. ... And then I don't think that cultivates sort of a condescending—I think it's a kind of understanding. And then they can begin to relate to that child and their needs and their interests as well—it's not a focusing on what their differences are but who they are as a person, I guess is what I'm trying to get at. And that's part of them. You know, the autism is part of them. Or the lack of an arm—it's part of them. (Interview P.C. 3, 3, January 14, 1994)

Rachel similarly wants to encourage her children to develop as much as they can:

> Well, I guess the biggest goal I would have for all of them is to reach whatever—sort of their potential at this stage. Keep moving along the continuum as far as they can, as well as they can, and help them understand and accept where it is they are. ...These particular kids won't be normal. Like, they aren't ever going to be at their age-appropriate abilities. I think in society as a whole we need to all appreciate each other's differences and

similarities, so that definitely would be one of my [goals]—for them to be where they can be. (Interview R.K. 2, 8, January 31, 1994)

In spite of this, Rachel is unsure whether inclusion in the regular class is in the best interests of her special-needs children. The following excerpts show her struggling with two points of view:

> We can keep moving them along, but they're always going to be [behind] the other kids. They're always going to be behind the eight ball, so to speak. They're never going to be—you know, if they were spending some of their time with a smaller group of people that are having difficulty with some different things, whatever that may be, then there might be areas that they really shine. ... So to me, some of the old classes, like a small group of people some of the time seems more appropriate than always trying to pull them into this big group and feeling badly if they're over there [working separately with the SEA]. But I don't any more, actually, because I know that that's the best place for them. That they aren't always going to be wanting to be with the whole class. It's frustrating for them sometimes. (Interview R.K. 2, 8, January 31, 1994)

> It seems to me that in primary it's a place where we can...help their self esteem and all that kind of stuff. But as they get older, I'm not sure that this is the model that I—I still think that at this age it's a good—I think I do. I certainly used to think it more than I do now. You know, when I see them operate within that—and plus, on the opposing side, what it takes away from the rest of the class while you're doing the things that these kids have all done in kindergarten about getting along and all that stuff. But then, on the other hand, it doesn't hurt them to know that there aren't always going to be—everybody's not going to be the same as them. (Interview R.K. 2, 9, January 31, 1994)

These passages reveal the struggles of a conscientious teacher trying to resolve a dilemma that she confronts daily. It is an indication of her dedication that she continues to work with the issues rather than dismissing them as something out of her control.

At this point, it is interesting to note that both teachers in this study use computers for their personal work, and both regularly take students to the computer lab. This study is basically about Rachel's and Pat's views in relation to computer technology. Neither teacher sees the computer as playing a central role in education. They cited at least five reasons for this. First, their top priorities of social-emotional growth and social responsibility are people-oriented; a computer is not required to address these issues. Second, both see the computer as a tool for producing finished products; neither is gripped by the fascination of the machine itself. This attitude, probably more than the others, incorporates a contrasting perspective with technicism. Third, neither teacher is clear in her own mind what should or can be done with computers to address their academic and social goals. Fourth, logistical concerns like the lack of sufficient hardware, the necessity of using the equipment according to a timetable, and the nuisance of mechanical failures creates restrictive circumstances for computer use. Finally, a lack of time—both school time and personal time—deters the regular use of computers.

When asked if computers have changed the way she works, Pat replied, "Not at all. To me the computer is...a tool" (Interview P.C. 3, 7, January 14, 1994). Although she uses it for her own work and feels it is important to introduce her students to computers, it is clear that the primary function of her practice is the interaction of people. Although they do not preclude a contribution to human interactions, computers are not essential in working toward this goal.

Rachel feels that her practice has been changed somewhat by computers, largely owing to the presence of a computer provided for one of her special-needs students. The computer provides options that were earlier unavailable for reinforcement and extension of skills. She regularly uses her home computer for her own work and enjoys learning about it. But, like Pat, the computer's role is "basically to get me something. It's basically for an end result, I would say. It's not just the fiddling that I like" (Interview, R.K. 3, 7, March 7, 1994). Pat's attitude toward the inner workings of mechanical tools is summed up in the words, "I don't *want* to know" (Interview P.C. 1, 7, October 26, 1993). Rachel concurs with "I just don't want to know how to do everything in the house" (R.K. 3, 6, March 7, 1994). This includes knowing all the features of her word processor.

Both teachers use the computers with their classes, using the skills they have learned from workshops or from personal computer use. Neither, however, branches out to discover new ways of working with computers, owing to the age of the students they work with, their own comfort levels with computers, and their personal priorities. Part of the problem for Rachel is that she is not sure what her students should be working on with computers. As a result, she lets them explore programs:

> There's puzzles and there's matching games and math games, and we've done all that. But I basically have let them explore. Now, when they've got to chess and backgammon I said maybe not. Maybe they shouldn't be playing that. But I wanted to talk to [my partner] because I don't know. Maybe it's okay. I'm not sure. My goal for them is to be familiar and to be able to operate the kinds of things that are there. ... I'd like them to move now to be able to use it to do...some word processing and keyboarding. But I'm not sure how far we should go with that. See, it's not something that as a school we ever talked about—you know,

you'll do this and we'll do this. So I don't have a sense what is expected.... (Interview R.K. 3, 11, March 7, 1994)

Rachel is not alone in her uncertainty. In Akins' (1992) study, a lack of knowledge of how to use computers with students was the third most frequently cited factor discouraging computer use by elementary teachers in a British Columbia school district.

For Pat, exposure to something that interests the children is one of her main motivations for using computers with her students.

> I want kids to be exposed and comfortable and familiar with [computers]. I want them to experience that, which is sort of where I'm at at this level. Now in a couple of years it would be different in my mind. But it's the same as, we go on lots of field trips we have lots of centres, we have lots of hands on activities. It's because I want them to use it, at least at a minimal level comfortably and competently. And also, because they're really highly interested. So it's two things, too. There's a strong child interest, and a desire on my part to have them exposed to everything they're interested in, I guess, or that they could be interested in. (Interview P.C. 3, 8, January 14, 1994)

Asked whether it would leave a dent in her program if the computers disappeared tomorrow, Pat replied:

> It wouldn't really make a dent in my program. Because the kinds of things we're doing on it, like writing or drawing, or whatever, we can do—as far as product goes—we can do in other ways. (Interview P.C. 3, 8, January 14, 1994)

I observed two of Pat's lessons in the computer lab. Her weekly lab time is on Friday afternoons after lunch, a time when many teachers are winding down for the week. Because her Kindergarten children do not attend in the afternoon, they do not participate in activities in the computer lab. Pat said the Kindergarten children have occasional opportunities to use

her portable computer (which is intended for her own use) or the classroom computer designated for the special-needs children. However, neither of these computers was used during any of my visits to the class.

Pat shares her lab time with another primary class, and since she has only twelve students in the afternoon, there are enough computers for every student. During the lessons I observed, Pat introduced a skill on the computer using a graphics program, then had the children go to their computers to apply the skills. Typically, the children would create a picture using the painting tools, then add a caption with the text tool. When they were finished, they printed their work and took it home. Occasionally, a student discovered an interesting technique, which was then shared with the rest of the class. While the students worked at the computers, the teachers would circulate and provide assistance where needed. Pat reported that she preferred open-ended activities on the computer, mirroring her preference for open-ended classroom-based activities.

I worked with Rachel's class in their computer lab on a number of occasions. During the first lesson I observed in November, Rachel had a number of educational program disks which she handed out to students to use. She selected some of the programs for specific children depending on the skills she felt they needed to work on. When the children got bored with the programs they were working on, they requested different ones. Following this lesson, Rachel said she wanted to have her children start word processing, but was unsure of the program. This opened the opportunity for me to work with the class. I worked with the class on word processing skills on roughly a weekly basis in November and again in March and April.

Rachel assigned the children to copy poems that they had printed in their printing notebooks. During this period the school acquired through parent fund-raising new computers, which Rachel found much easier to work with. Because of the preference for the ten new computers, the old computers remaining in the lab were not used. The children therefore took turns using the new computers.

In late March I introduced ten of the children to word processing on their new computers. Rachel was to replicate my lesson with the remaining children during her next computer period. When I returned a week later for another installment, Rachel confided that the second session had not gone very well. She said a parent had come in to help in the lab and had "distracted" the children by encouraging them to play with the fonts and sizes of text. Playing with fonts can be a valuable way for children to learn the capabilities of the word processor, but Rachel's objection perhaps reveals her desire for the children to produce a finished product in a set period of time.

Each teacher displayed a lack of confidence in her use of computers with students. This is a reflection of at least two factors: the lack of time to become familiar with computers, and the lack of desire to play with them, as was noted in Rachel's statement above. This may be influenced, in turn, by an apparent lack of concurrence with the values embedded in the technology. Exposure to computers was the goal striven for rather than fluency and competence.

Neither of the teachers felt any pressure from parents or administrators to use computers with their students. There have not been administrative directives or school-wide plans for their use. Pat mentions computers for

public relations purposes when asked by parents. According to Rachel, there is no pressure from the school administration or parents for the use of computers:

> [On] the first report card we mentioned what we were doing on computers. You know what most parents want to know? Are their kids going to be able to read and write? Can they add and subtract? And do they get along with other kids? They don't ask anything else. And nobody's *ever* asked me about computers. (Interview R.K. 3, 5, March 7, 1994)

In fact, Rachel would prefer a different time slot for her class, but the English as a Second Language class uses the lab at that time because it has large work tables. There is no program for Pat's kindergarten children; she does not take them to the lab, and her attitude is that computers are an experience for her students much like a field trip.

Pat and Rachel use the computers, in part, for reasons consistent with Akins' (1992) factors encouraging use: the perception that computer use is important for the students' future, and the belief that computers have become an inevitable part of the education system. On the other hand, they also exhibited evidence of Akins' factors discouraging use: lack of access, lack of time to learn about computers, lack of knowledge about computer implementation, and a lack of direction provided for their use.

Both teachers cited reasons which make the use of computers difficult. Pat cited difficulty of access: with only one period of lab time per week it is difficult to get involved in sustained projects. Although she has a computer in her room, Pat acknowledges that it is not used as much as it could be because it often does not fit in with the current class activities. Rachel cited the inconvenience of the old computers her school as a deterrent to using the

computers. The unreliability of disks and hardware, and the juggling of program and data disks made the use of these computers inconvenient. During the year of this study, the parent committee raised money for new computers, which Rachel felt were much easier to use. The old ones were then left unused, being regarded as "just a nuisance" (Interview R.K. 3, 5, March 7, 1994). Before the new computers arrived Rachel did not let equipment failures bother her, but it is clear from her change of attitude that reliability and ease of use are major factors contributing to their use.

Another inhibiting factor in Rachel's use of computers is time. To her, "it's just one more thing for me to figure out well enough to be able to teach it. You know, I'm just keeping up with what they're doing" (Interview R.K. 3, 10, March 7, 1994). But of more significance is the fact that "there are other parts of the program that I need to be spending more time on—that I feel...at this age are more important" (Interview R.K. 3, 10, March 7, 1994). Rachel places greater priority on teaching reading, writing, and math; however, she does not think of computers when deciding how to teach these subjects because "we need times to do hands-on kinds of stuff" (Interview R.K. 3, 10, March 7, 1994). She would use computers as a supplement, but her ability to do so is severely restricted by a lack of appropriate software. Again, the time factor Rachel cites is consistent with findings by Akins (1992). Time for learning about computers was the second most frequently cited factor (after availability of computers) discouraging computer use by teachers.

Rachel displays conflicting feelings about using computers with her class. On one hand she "wouldn't feel okay never using the computers because I think they're important that kids are at least familiar with them"

(Interview R.K. 3, 10, March 7, 1994). But she reiterates that computers are not high on her list of priorities: "there are too many other things so it just isn't a priority. At this age. I keep saying that" (Interview R.K. 3, 10, March 7, 1994). In fact, she says it again a month later, this time indicating that the government shows "that [computer use] isn't a priority as far as outfitting schools deeply, financially" (Interview R.K. 4, 5, April 18, 1994). Thus, the lack of government financial support for providing enough computers is taken as a tacit acknowledgment that there are more important ways to spend money and time in the primary program.

Summary

In this chapter I have provided a glimpse into the lived worlds of two primary teachers. I have attempted to demonstrate how they view their practices, often represented in the form of ideals to work toward, and how they struggle with some of the issues that confront them daily. Key issues for Pat and Rachel in viewing their work include their images of teaching, the importance of child-centred education, social responsibility and social-emotional growth. Issues raised through the literature review include control, the context of knowledge, and computer usage.

In the next chapter I draw together some of these issues and examine the implications of these findings for implementing computer technology in the schools.

Chapter V

The Teachers' Beliefs in Relation To Computer Technology—
Conclusions and Recommendations

Teachers usually are interested in people, aren't they?

—Rachel

Introduction

This thesis explores the role of beliefs in the lack of revolutionary impact of computers on primary teaching. The means for doing this is to examine the relationship between the values commonly associated with computer technology and the beliefs, values, and goals of two primary teachers. In this chapter I draw from the findings presented in Chapter IV to highlight some of the teachers' values, and to suggest how they relate to those of computer technology. Although I propose that there are some distinctions that can be made between the beliefs of the teachers and the values embedded in computers, other beliefs regarding the purpose of primary education also have a significant impact in shaping these teachers' responses to computers in education. In addition, practical concerns—notably time pressures—dampen the enthusiasm of the teachers to fully explore educational applications of computers. I will also offer some recommendations for the treatment of computers in the schools, and suggest ways that teacher inservice might be approached. Finally, I will describe the limitations of this study.

I identified in Chapter II a number of values that can be associated with computer technology. Among those, I want to focus on three I feel are most significant to classroom life:

- the way knowledge is regarded

- the role of the individual

- how control is treated.

I will deal with each of these issues in turn; I will also consider the relationships I see between the teachers and computer technology.

The Nature of Knowledge

Neither Pat nor Rachel appear to have as their priority the transmission of knowledge that is objective, universally valid and hierarchically structured. Pat articulated the need for information to be meaningful to her; she extends this approach to the way she teaches her class.

In Pat's and Rachel's teaching I have identified their preferred practices which promote holistic, context-rich knowledge. They consider their roles to be to help children draw connections between people and knowledge. Skills are taught in context, not as isolated drills. This can be seen in Pat's use of the calendar activities each morning in which reading and number skills are brought together, and in both teachers' use of the Writers' Workshop strategy in which children learn to write by writing whole stories about topics that have relevance to them, rather than by the traditional approach of copying sentences from the blackboard. It is also exhibited in activities such as cooking, and the use of poetry and chants to reinforce and contextualize skills

taught in other parts of the day. Whenever possible, new information is put in contexts that the children have some experience with. Subjects are often integrated. The use of themes as a way to organize the curriculum is an attempt to put knowledge into context for students.

Pat's and Rachel's model of teaching closely resembles the practice of connected teaching described by Belenky et al. (1986), which provides a sharp contrast to technicism. They use the metaphor of the midwife-teacher who assists students to "give birth to their own ideas" (p. 217), and who "support the evolution of their students' thinking" (p. 218). Drawing on the metaphor of "maternal thinking", Belenky, et al. outline three concerns that the midwife-teacher focuses on. First, the teacher strives to preserve the integrity of the student's newly emerging thoughts. The second concern is to foster the growth of the child's own thinking. Third, the teacher guides the child's development to a state that is appreciated and accepted by others. This third characteristic, though limiting, ensures a level of social acceptability. The model is reminiscent of the idealized version of motherhood that was referred to in Chapter IV as an image of Rachel's teaching.

Rather than focusing on their own thinking or on "objective" knowledge, Pat and Rachel are concerned with their students' developing knowledge. This is exhibited when each teacher says that her goal for students is to help them reach their potentials. Rachel's insistence that she know the context of people she is working with makes her committed to working with the strengths and weaknesses that each child brings to her class. This priority makes personal contact with her students important.

To Pat and Rachel, curriculum content is the raw material to be adapted to the interests and needs of their students. Neither of the teacher's practices rely much on the transmission model of education in which the teacher tries to impart knowledge to empty-vessel students (Gattegno, 1970). Their view is that students build on the knowledge and experiences they bring to school. This is in sharp contrast to traditional, "discipline-based" approaches (Hammersley, 1977) in which knowledge is possessed by the teacher, who transmits it to the students. Instead, students are seen as partners in the learning process.

Pat and Rachel attempt to see how the students perceive the subject matter and work with that, rather than trying to have the students see the material through their eyes. This can be seen in Pat's statement that she tries to work with the curriculum "with the child's perspective in mind" (Interview P.C. 1, 1, October 26, 1993) and in Rachel's practice of negotiating with her students the themes to be studied. It is expressed daily in the patience each teacher exhibits as she allows her students to make sense of the material and to respond in their own time. This does not mean that Pat and Rachel abandon their own priorities and become totally accommodating to their students' desires and perspectives. Indeed, they have definite goals which they actively work to promote.

These teachers' commitment to context rich instruction suggests that certain types of computer activities which present isolated skills out of context would be deemed inappropriate. Pat, in particular, prefers open-ended activities which relate to her classroom themes. Ironically, in the early part of this study, Rachel used CAI (Computer Assisted Instruction) activities which

did not directly relate to her classroom program. It seems that her limited knowledge of software, and her uncertainty about how best to use computers, encouraged her to use a limited computer literacy strategy. Later in the year, when I introduced the class to word processing and graphics programs, the focus began to shift to activities emerging from classroom projects.

Rachel's need to know the contexts of the people she communicates with, and her resulting reservations about computer mediated communications, suggest that this is one type of computer use she will not readily adopt.

The Role of the Individual

Perhaps no possible characteristic of a technicist mindset contrasts more sharply with Rachel's and Pat's thinking than individualism—the notion that "the individual child is and should be only interested in his or her own thinking, not that of others" (Broughton, 1985). The images that guide their teaching practices almost exclusively involve groups and relationships.[1] Rachel's practice is guided by images of the ideal mother and family; Pat thinks of her work in terms of community and growth. Rachel, with her background in nursing, and guided by her image of family, holds relationships and caring for others central to her work. The ideal classroom community that Pat strives for has at its heart the cooperation, understanding, and interdependence of people. Even growth is seen as a

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[1] As described in Chapter II, images can be a useful and powerful way to describe how a teacher thinks about and organizes her practice (Elbaz, 1983; Clandinin, 1985, 1986).

function of relationships with people rather than as a process one goes through alone.

The theme of social responsibility, which plays such an important role in Rachel's and Pat's classrooms (reflected in Pat's image of the classroom as a community), emphasizes connectedness and responsibility between people. Pat believes social responsibility is "the backbone of everything we do" (Interview P.C. 2, 7). The essence of social responsibility is the relationships between people. These teachers encourage their children to see the world as a subjective place, in which all its members have unique viewpoints and in which differences between people are to be appreciated. These are lofty goals, and difficult to achieve. One way that Pat promotes this goal is through group achievement: the success of individuals is tied to the success of the group. To Pat, healthy relationships between people are an important prerequisite to learning. Individuals are valued, but interdependence is valued even more highly. The responsibility for each other that Pat promotes extends beyond social etiquette to intellectual knowledge. The emphasis is on the individual's relationship to the group. This type of learning is not easily observable, quantifiable or computerized, but, to these teachers, it is highly valued knowledge.

While Pat holds the value of individuals high, the responsibility of individuals to the group is paramount, as is evident from her statement that "our class has to ensure that the rest of our class is secure...and happy and therefore learning as well" (Interview P.C. 1, 3). The individualism that may be embedded in a technicist orientation contrasts sharply with group-oriented infrastructures designed to promote a sense of community in Pat's room—for

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example, the lack of personal space and the sharing of pencils and other supplies.

A goal of Rachel's is to assist students in connecting with each other. One of her purposes behind having the students sit on the carpet in a circle is to extend their realm of concern beyond themselves:

> They become much more aware of each other when they're in a circle. Versus if they're sitting here, they're thinking about themselves related to what they're seeing. And in a circle, they're beside other kids and they're actually seeing each other. (Interview R.K. 2, 14, January 31, 1994)

As was pointed out in Chapter IV, connections with others is a life priority for both Rachel and Pat. Pat's statement that it is the connection with others that interests her speaks to this concern. And Rachel's disbelief that her friend would rather talk to a machine than to people (despite the fact that he is using his computer as a conduit to communicate with people) further reinforces this point. The key for Rachel is that she know the context of the person she is talking to before she can engage in a deep conversation.

Pat believes everyone learns through a social process and that her role as a teacher is to build a community in which the students support each other's growth. This is particularly highlighted in terms of the special-needs children she works with, but applies equally to the other children in her class:

> I need the students to help me work with this child and he or she needs the other students as well. I can't do it on my own. I can't—I mean it seems obvious now when I look back—I can't build a community just by myself. (Interview P.C. 3, 2, January 14, 1994)

The students are thus engaged to work together toward their teacher's highest priority for them.

For Rachel and Pat, inclusion and the fostering of understanding and acceptance of special-needs children are life goals that serve as a metaphor for social responsibility in general. Through inclusion, people who might not normally come together are potentially transformed by their contact.

The ethic of care (Gilligan, 1982) can be seen in Pat's and Rachel's priorities of social responsibility and caring for others. Social conflicts are often posed in terms of how the other person feels rather than in terms of equality or justice.

The orientations of Pat and Rachel are consistent with the findings of Wright and Tuska (1968) who reported that elementary teachers have concerns more related to the promotion of good interpersonal relations. The demands on the elementary teacher, they say, "are less intellectual and institutional, more emotional and personal than those of high school" (p. 257). Similarly, Prawat (1985) reported that elementary teachers place a high priority on affective concerns.

Their emphasis on social development may orient Pat and Rachel away from extensive use of computers. Although computers can be used to promote social goals, a popular conception is that computer use is an individual activity which shuts out others. Just as the presence of a television may shift the social dynamics of people, computers are regarded as changing the way people interact. This is echoed in the reason cited above that Rachel gives for having children sit in a circle. She prefers direct contact between people so that her students will consider themselves in relation to others.

Control

Much attention was devoted to the issue of control in Chapter IV. Although control is necessary to the smooth functioning of a classroom, tight control over people is not a priority for Pat and Rachel. Prawat (1985) found that affectively oriented teachers tend to exert less control over student actions. Teachers who are more academically oriented tend to have more rules regarding student movement, and exert more control over student actions. On the other hand, "teachers who emphasize student independence and self-reliance report significantly fewer rules governing student movement in their classrooms" (p. 595). These findings are consistent with the practices of Pat and Rachel presented in Chapter IV. Their ideals are similar to those of connected teaching, which, according to Belenky et al., "does not entail power over the students; however, it does carry authority, an authority based not on subordination but on cooperation" (p. 227). This represents a goal for Pat and Rachel, though in practical terms, they still retain power in their classrooms.

While a technicist mindset might value control over processes and the environment, Pat readily shares control with her students when appropriate, allowing them to take some responsibility for their own learning. She further shares control by allowing student choice in her classroom. Control and choice, of course, are always extended at the discretion of the teacher. It is significant, however, that choice is offered at all. My observations of primary classrooms suggest that some teachers offer few choices to students. Recall, also, Rachel's description of the children who had limited choices in Grade One, and who had difficulty learning to choose in her class.

Rachel's classroom image of a family as a safe place to make mistakes is inconsistent with a highly controlled environment. In fact, control over people holds no interest for Rachel, as seen in this interview excerpt, in which she contrasts her computer-enthusiast friend's attitude with her own:

> He needs control. And [computers are] neat and tidy.... People don't do what you want them to do always. Do they? ... So, to me, I'm certainly not there when it comes to computers. I find them fascinating and useful, but that's it. (Interview R.K. 3, 8, March 7, 1994)

Rachel also reveals in this passage that control over the machine is not important to her. As noted in Chapter II, some writers have pointed out that control is not a prime motivator for most women (Benston, 1988; Turkle, in Rhodes, 1986). In their own use of computers, dominance over a machine and the control that is possible does not attract Pat and Rachel to computers. It is the end product that the computer can help produce that is the attractiveness of the tool. Pat uses it to type up poems for her class and to write her report cards; Rachel uses hers for record keeping and reports. If there are technical problems, Rachel has her husband and her son help her.

Pat's and Rachel's Views on Computer Technology

There is a fascinating tension in the words of Pat and Rachel between the acceptance of computer technology, and a distancing of themselves from it. Both use computers for their own purposes, but neither gives in to the attraction that so many children (and many men) experience with computers. This is clearly seen in Rachel's attitude toward her friend's early morning encounters with the Internet. Although she recognises that he is communicating with other people through the computer, she sees the

computer as a barrier to genuine social interaction in which the full context of the other person is known. This is reflected in a statement of Rachel's: "I find it interesting that anybody would want to spend time talking to a machine" (Interview R.K. 3, 9, March 7, 1994). Although she is aware that the computer is the means to talk to another person, Rachel's *perception* is that the computer assumes a prominent role in the relationship.

Pat's and Rachel's view of the computer as a tool, as something that produces an end product, is similar to the attitude Turkle (1988) describes of many women who adopt such an attitude with particular conviction. The women Turkle studied rebelled at the idea that a person can develop a relationship with a computer. This puts up a defense against accepting the computer as an "intimate machine", one which has "holding power" (p. 50). "It is a way to say that it is not appropriate to have a close relationship with a machine" (p. 50). Turkle calls this phenomenon "computational reticence." This does not describe people who do not use computers or who are afraid of computers, but rather people for whom "the computer has come to symbolize an alien way of thinking" (Turkle & Papert, 1990, p. 135).

> They learn to get by and to keep a certain distance. One of its manifestations is the way they neutralize the computer through language, which denies the possibility of using it creatively (...dismiss[ing] it as "just a tool"). (Turkle & Papert, 1990, p. 135)

According to Turkle, "when people appropriate the computer in ways that allow the machine to be integrated into their sense of identity...that's the biggest payoff educationally and personally" (in Rhodes, 1986, p. 15). It seems unlikely that Rachel and Pat would adopt such a close relationship with a computer. Their lack of enthusiasm for the machine itself limits the time

and energy they are willing to spend in trying to find appropriate educational uses for the computer.

It would not be unkind to say that neither Pat nor Rachel will lead the computer revolution. To Rachel, the lack of impact of computer technology on primary teaching is not a problem since there is so much that young children need to work on in their personal development (Interview R.K. 4, April 18, 1994). Rachel posed an explanation for the lack of impact telecommunications has had on schools: "But you know, teachers usually are interested in people, aren't they?" (Interview R.K. 3, 9, March 7, 1994).[2] These teachers clearly have other priorities, primarily with the emotional climate of their classrooms and with social aspects of child development.

Conclusions

I set out to study whether the beliefs of two primary teachers could have an effect on the potential of computers to revolutionize their teaching practices. The beliefs underlying the practices of Pat and Rachel appear to differ from the values commonly associated with computer technology. However, caution must be taken in concluding that, because of these differences, they will *necessarily* have an aversion to computers. Rachel and Pat are not computer phobic or anti-technology. The values I have described as embedded in computer technology do not, by themselves, create users and avoiders. They may, however, affect the relative attractiveness of the

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[2] Of course, telecommunications can be a powerful means for making connections between people and for learning about others. And teachers can be interested in people *and* telecommunications.

machine to some people. It is this tendency of the machine's characteristics to attract or repel two teachers that I have been exploring in this thesis.

While Pat's and Rachel's beliefs do not exclude the use of computers, they are clearly centred around the importance of human contact. Although these teachers are open to using computers, their belief in the importance of developing social-emotional growth and social responsibility, coupled with the fact that these goals can be addressed without computers (although computers do not preclude these goals), suggest that computer technology is unlikely to have a significant impact on their teaching.

Teachers struggle continuously with the many demands of the classroom and with outside pressures. By responding to those pressures they gradually build up images about their ideal practice, and of what works for them. For Pat, the images are of growth and a happy community; for Rachel, the image is an idealized version of family and motherhood. When making decisions about their practices, these images are one factor guiding their actions. That computers are not an essential part of these images is significant, and suggests that the computer revolution will not readily find a home in their classrooms.

Beliefs are, indeed, important factors in their decisions to use or not to use computers with their students. But perhaps more significant than their orientations to issues such as the nature of knowledge and control are their beliefs about what is important for young children. This includes the development of responsible citizens who can get along with each other and accept individual differences. It includes developing an understanding that each person has responsibilities to the group. And it includes developing a

sense of self-worth within children along with a sense of their own resources and abilities.

The beliefs and values that guide Pat and Rachel should not be dismissed. While some would argue that the role of the school is to address only academic concerns,[3] I am sympathetic to the values that Pat and Rachel hold. Those values give first importance to the basic human needs of self-esteem and respect for others. In classrooms where the curriculum itself is secondary to the promotion of social responsibility and social-emotional growth, it is unlikely that computers will soon have much impact on the way teachers work unless teachers are helped to find uses that enhance those goals. Without this understanding, mandating computers would have little effect. The teachers in this study pointed out that they would comply with mandated changes on the surface, but continue to promote their values in their own ways. This confirms Cuban's (1986) observation that innovations that are inconsistent with teachers' beliefs result in token compliance.

One of the dangers of a study such as this is the possibility that some will read it and conclude that the "problem" in implementing computers in the schools is the teachers. This interpretation would be grossly unfair. Teaching involves thousands of individuals working to balance competing demands and to make personal meaning of innovations (Fullan, 1991). As Fullan puts it, "change is a process, not an event" (p. 49). Teachers work under pressure and have little time to spend exploring computer technology.

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3   For example, there is a growing movement in the Vancouver area to open public schools which will emphasize individual academic work and discourage cooperative learning.

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This leads me to conclude that it may not be appropriate, desirable, or even possible to try to "revolutionize" teaching in the primary grades using computers. The kinds of goals promoted by the B.C. Primary Program and exemplified in Pat's and Rachel's teaching practices do not require computers for their attainment. This does not mean, however, that the computer cannot be a useful teaching device. But we should consider carefully how computers should be used and thought about. There are also implications for the way that inservice for computer use should be delivered. Answering these questions could take another thesis, but I would like to offer a few brief recommendations.

Recommendations

My recommendations address two areas: one is to look at the way computer technology is treated in schools; the other is to suggest a more effective way to provide computer inservice to teachers.

The Treatment of Computer Technology

It is unacceptable to ignore computer technology as unimportant in education. Increasingly, the school system will find that students come to school with home computer experience, and pressure will be placed on teachers to use the technology. As more information becomes available to home markets in multimedia formats, and as children begin to develop a new kind of literacy, schools will find it necessary to adapt to the different learning styles that children will come with.[4] Just as teachers have had to

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[4]   An example of the ways in which literacy might change can be seen in the "Living Books" series of CD-ROM discs for young children published by Broderbund. These discs present "books" on the computer screen which "read" the text aloud and whose illustrations become

deal with the effects of television that their students watch at home, they increasingly need to deal with students who are immersed in video games and home computers (Cuffaro, 1985). Moreover, critical users of technology are not produced by ignoring computers. If we want critical consumers of computer technology, students will need to know how it is used.

Is it possible to respect the values, beliefs, and priorities of teachers such as Pat and Rachel and still promote the use of computer technology in the primary grades? If the goal is not a revolution, but the effective use of an educational resource, then I believe it is possible to employ computers in ways that promote the social goals Pat and Rachel strive for, and avoid promoting the negative values associated with computer technology. As Ragsdale contends, "just because certain characteristics (both positive and negative) are *inherent* in computers, it does not have to follow that these characteristics are *inevitable*" (1988, p. 17).

Teachers need to be made aware of the values that may be unknowingly transmitted when using computers. Computers can be useful teaching aids, and in my role as a technology consultant, I will continue to promote them as such. But I now believe that it is not enough to promote computers merely as neutral tools. Instead, teachers and students should become aware of the biases and values underlying computer technology and

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animated as the user points and clicks on them with the mouse. As more of these discs become available, and as more children are exposed to them, it is possible that their expectations of storybooks will change. Broderbund also publishes early childhood programs which encourage a non-linear approach to learning. These programs are directed by students who select their own paths through the information presented, similar to hypertext programs for older children and adults. Again, the effects might be to create different expectations for the ways in which information is presented, creating a new approach to literacy.

be encouraged to look at them critically. This can occur only if teachers are sensitized to the social issues surrounding the use of computers, including gender issues, cultural awareness issues, and control issues. Without doing this, biases may be transmitted unknowingly (Bowers, 1988). Thus, in a simulation such as *Oregon Trail* (MECC, 1985) the presence of the native peoples and their feelings about the natural landscape should be placed in contrast to the view subtly conveyed by the program that the settlers were crossing a hostile and unsettled wilderness, opening it up and introducing civilization. In a world surrounded by computer technology—in banks, in offices, in libraries, in cars, and increasingly in schools—it will become more difficult, and more important, to keep the technology "visible" and to articulate the values associated with it.

I should note that this is a significant departure from my previous view. For years I have tried to make computers "invisible" to teachers, so that the focus of attention is on the work to be done rather than on the computer itself. I now believe that some attention must be given to the computer and software, exposing the values and assumptions that go with it.

Uses of computers and related technologies that would be in harmony with the goals of Pat and Rachel could emphasize collaborative work, putting students in touch with each other. By using computer technology in ways that bring students together, some social development goals may be addressed. It may be useful to demonstrate to some reluctant teachers how computers can enhance communications for some people, rather than create an artificial filter which creates distances between people. For example, children who have severe speech handicaps have been helped to

communicate with the use of computers outfitted with special keyboards and synthesized speech. For them, this is their only means of speech. The technology thus allows them to reach out to others.

Some software programs can be used to encourage group reading and group decision making. One company publishes programs of branching stories in which the children must make decisions periodically to alter the storyline.[5] The decision points encourage discussion, negotiation, and different ways of deciding. Students are also prompted to think about the social consequences of decisions made in the software and to retry the program, making different choices. The computer makes the shifting of the storyline easier than would otherwise be possible.

Another approach that could promote connections between people might be to demonstrate the positive communications that can take place through a telecommunications network. One commercial project (but possible without commercial sponsorship) puts schools from around the world in touch with each other. Students exchange artifacts of their communities to establish awarenesses of the people they are communicating with. Over the course of the project, the schools work together via telecommunications, exchanging writing and producing a culminating booklet which is shared with all the participants. Although the amount of writing that primary children can do on computers is limited, it is increasingly easy to exchange non-print documents via modem. The nature of this type of project has the potential of addressing some of the concerns

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[5] I am referring to the *Choices, Choices* series (Dockterman, 1988) published by Tom Snyder Productions.

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Rachel expressed about communicating with people unknown to her. This use of telecommunications differs from that proposed by many proponents—accessing and searching huge online databases to gather information. Reports about the use of online services suggest that most users engage in conferencing rather than searching for information, indicating that "people prefer to communicate with other people, rather than with vast collections of information" (Ragsdale, 1988, p. 16).

Lab activities could also be structured in ways to promote collaborative work. For example, students can use computers to create class books. The printers available today allow for the high quality publishing of student work. This can contribute to students' self-esteem and encourage the sharing of their work. Activities which encourage children to work with and discuss each other's work can be used. In this way, teachers can adapt to the computer lab many of the cooperative activities that they currently use in their classrooms.

The brief examples I have given here are intended to suggest ways to steer computer usage in a direction that promotes self-esteem and connections between people, while discouraging negative side effects. It is incumbent on educators to actively shape the ways in which computer technology will be used in the schools, rather than to take a *laissez-faire* approach. Dewey, commenting on the possible effects of radio, said in 1929:

> The radio will make for standardization and regimentation only
> as long as individuals refuse to exercise the selective reaction
> that is theirs. The enemy is not material commodities, but the
> lack of the will to use them as instruments for achieving
> preferred possibilities. (cited in Cuffaro, 1985, p. 28)

One of the main implications of this study for myself has been a reappraisal of the way I will continue to do my job as a technology consultant. Given the lack of success of traditional methods of inservice in helping teachers make effective use of computers, different strategies must be found which acknowledge teachers' values, take into account their individual needs, and respect the demands on their time.

It is absurd to think that computers can be placed in schools and expect them, by themselves, to change the way teachers work.[6] Cuban's (1986) principle of situationally constrained choice (introduced in Chapter I) recognises that teachers' beliefs and practical concerns must be addressed if teachers are to adopt a new technology. When teachers do not have a clear vision of how computers should be used, they revert to CAI, or very limited computer literacy activities. Recall in Chapter IV Rachel's uncertainty of what to do in the computer lab. The computers themselves, rather than the curriculum, in this case became the driver of activities.

In the same way that Pat and Rachel sought to demystify for their students the differences of the special needs children, computer technology needs to be demystified for teachers. In Chapter IV Pat described how she dealt with the apprehensions of her students toward a child with an artificial arm. She had the child take the arm off and show the others how it worked. This served to demystify the arm and have the students accept the child's

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[6]   Even large chalkboards were an under-used technology in the 1800's until the structure of schools shifted to grouping children by age, making large group instruction more useful (Dockterman, 1991).

differences. The child was not to be feared or shunned; the other students, by understanding her differences, accepted her as a person. This can serve as a metaphor for introducing computer technology to teachers. When they do not understand the technology, there are fears and apprehensions. "Taking it apart" and demonstrating the benefits and limitations of the hardware and software will aid the demystification of computers.

Providing after-school workshops has had little effect other than to teach a few techniques, and has not significantly affected the way teachers work with computers with their classes. Time is a major impediment to teachers' understanding of educational uses of computers. The demands on teachers' time are enormous. They do not have the time to explore software and its possible application to their classes. Werner (1988) reminds innovators that theirs is only one of many demands on a teacher's time. Similarly, Fullan (1991) encourages program advocates to keep in mind that their innovation may not be the most important thing in other teachers' lives. This has implications for the delivery of inservice to teachers. When time is short, and computers are not teachers' top priority, how can instructional use of computers be improved?

A good place to start might be to examine the ways in which the teachers work. The models they use for teaching students might be effective for providing inservice. I wish to consider some of the learning models Pat and Rachel use: student-centred instruction, the social component of learning, and the importance of context.

Student-centred instruction, in which the needs of the student are central to instructional decision-making, has the potential of making

computer technology more meaningful to teachers. As noted previously, teachers have little time to explore computer hardware and software on their own, or to attend after-school workshops. Furthermore, large-group inservice frequently fails to address the specific needs of individuals. An alternative might be to work with individual teachers in their classrooms. This is what happened with Rachel.

After the official period agreed to for observations and interviews had passed, I continued to work weekly with Rachel's class in the computer lab. This seemed a natural extension of the working relationship we had developed. The relationship, however, shifted from teacher and researcher to teacher and consultant. Over the two remaining months of the school year I was able to show Rachel a number of activities and techniques that she could use with her class.[7] By working with Rachel's class regularly over an extended period (rather than expecting her to learn all she needs to know from a workshop), her repertoire of computer activities was expanded, and her time as a busy professional was respected. By modeling lessons with her own class, the lessons and techniques were more appropriate and immediately meaningful than those that could be offered in a workshop. In accepting a child-centred approach to education, Pat and Rachel acknowledge that the same activities are not necessarily appropriate to all students. Similarly, the same uses for computers and the same strategies for implementing them may not be appropriate for all teachers. A mentoring

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[7] It should be noted that a high degree of trust had been built up over the preceding seven months. This may have had a significant role in the success of this arrangement.

approach to inservice has the advantage that the use of the computer can be tailored to the individual teacher's needs.

For teachers whose priority is to place knowledge in context, focusing on their own needs has the potential to adapt inservice to their own learning style and interests. The "objectivity" of information-conveying instructional software can be de-emphasized in favour of uses which enhance connections between people. Where computer assisted instruction is justifiable, the software should be examined for biases.

Just as Pat and Rachel exhibited patience with their students, computer consultants must be patient about the pace of change. Implementation of any innovation requires that the teacher have time to make meaning of the change (Fullan, 1991). Recalling Pat's image of growth and change, it took many years for her to be able to articulate the importance of including special needs students in her classes. Similarly, it may take a great deal of time for teachers to realize the importance and relevance of incorporating computer technology in their curriculum.

It is important to keep in mind that computers and other forms of technology cannot, by themselves, create a revolution in the way teachers work. Those kinds of changes must come from within individual teachers. Computers may play a role in changing the way some teachers work, but only if the teachers are ready to change. The people—not the technology—will drive the change.

Limitations of the Study

Teacher thinking and belief play a central role in the way teachers organize their work. Despite this, other factors such as timetabling restrictions and limited hardware and software accessibility are also significant factors in affecting teachers' decisions to use computers. As noted in Chapter I, there are other explanations for the lack of inroads that classroom technologies have made in transforming teaching. The role of teachers' beliefs is only one of these factors. I do not make any claims regarding the importance of beliefs relative to the other factors, but recalling the works of Janesick (1982), Connelly & Clandinin (1985), Elbaz (1983), and Clandinin (1985, 1986), belief makes up part of the perspective, images, or personal practical knowledge that teachers work with in guiding their practice.

This study outlines beliefs and practices of two teachers. As stated at the beginning of Chapter IV, these are conscientious and dedicated teachers. Their openness, their thoughtfulness and their articulateness were major contributors to the success of my research. It would not be possible to replicate the circumstances of the research since no two settings or people are the same. There can be no claims to generalizability made from this research. It represents the perspectives of two teachers plus one researcher during one period of time. No conclusions can be made about the role of gender in introducing computer technology into schools. This study involved only two teachers and their points of view. Their beliefs and practices cannot be generalized to other female primary teachers.

It is therefore not possible to use the results of this study as a kind of means test to determine a person's readiness to use computer technology. Keeping in mind that human beings do not necessarily hold consistent belief structures, people will respond to computer technology differently. The purpose of this study is not, however, to generate abstract, universal generalizations, but to improve our understanding of a phenomenon at a particular time and place.

Further research that might be useful could include men as well as women as research-participants. Teachers at different grade levels might also be included.

Summary

This study was an examination of the relationship between the beliefs, values and goals held by two primary teachers, and the values that many authors contend are inherent in computer technology. Previous writers (for example, Cuban, 1986; Ragsdale, 1988) have discussed the role of teachers' beliefs as factors when introducing various technologies into classrooms. This study confirms that beliefs and values, along with practical considerations, played a role in two teachers' readiness to use computer technology with their students. The use of qualitative methods to attain these results contributes to an understanding of the thinking behind the teachers' decisions. Their priorities were on the social and emotional development of their students—goals which they felt could be worked toward without the use of computers. Based on these findings, it is suggested that the potential for computers to "revolutionize" these teachers' practices is limited, if at all possible.

Appendix A – Request for Participation in the Study

October 4, 1993

Dear Rachel,

As you may know, I am the computer consultant for this school district. You may not know that I am also a graduate student at Simon Fraser University. I am writing to you on the recommendation of [a colleague] as a possible participant in a research study I am doing as part of my Masters thesis.

My tentative thesis title has the rather imposing title of "The Primary Teacher and the Technological Paradigm: A Case Study." The focus of my research is on the reasons for the lack of impact of computers on primary classrooms. This study has been approved by the school district and by the Ethics Review Committee at S.F.U.

The purpose of this letter is to ask if you would be willing to be a participant in my study. (I am writing (rather than phoning) since it is standard protocol in these kinds of studies to make initial contact through letter in order make it as easy as possible for you to decline participation.) Participation would involve allowing me to observe in your classroom on a mutually agreeable schedule, and to be interviewed by me two or three times of one half to one hour each. Results of my observations, and transcripts of the interviews would be shared with you for approval and feedback. Your anonymity would be assured. You would be free to withdraw from the study, in part or in full, at any time.

If you would be willing to be a participant in my study, please call me, either at work (XXX-XXXX) or at home (XXX-XXXX). If, before deciding, you would like more information about this study and my initial thinking about this topic, I would be pleased to send you the complete text of my thesis proposal.

Thank you for your attention.

Sincerely,

Tim Trivett

Appendix B – Interview Schedule

Note: Interviews took their direction from the responses of the participants, as well as from issues arising from classroom observations. The following schedule provides a guide to the interviews, but the order of the questions varied, and other questions were added.

Reminders:
- Confidentiality
- Free to refuse questions
- Can terminate study at any time

Background

- Tell me about your background:
  Training?
  How long have you been teaching?
  What grades?
  Where?

- Describe the neighbourhood of this school.

- Describe the school: atmosphere, philosophy, collaboration

Issues about classroom practice

- Tell me about how you have divided your classroom space. Why is it arranged in this way?

- What qualities do you try to encourage in the children in your class?

- How would you prioritize the five goals of the Primary Program?

- How do you decide on themes for your class?

- What factors do you consider when planning activities?

- What features of an activity are most important when you consider whether or not to use it? (e.g., student motivation, curricular goals, difficulty, demand on teacher, tangible product)

- Do you feel pressure to get your students ready for the expectations of teachers in the following grade?

- What would you do if the school board, government, or principal mandated a particular practice or approach that you didn't agree with?

- Are there elements to your classroom environment that promote your values? What should I be watching for?

- How important do you rate social and emotional development as compared to intellectual growth? What practices in your classroom reflect this?

- How do you handle conflicts or disputes between children in your class?

- Do you try to encourage a cooperative or a competitive environment? Or some combination of the two? Why do you think this is important?

- How often do you think of using computers as part of a lesson you plan?

- What factors influence your decision whether to use or not use computers in a lesson?

- A different study found that issues such as the number of computers, time factors, and a lack of knowledge were discouraging teachers from using computers. Do these issues affect your decisions to use or not use computers? If so, how?

General viewpoint and views of technology

- Why did you want to become a teacher?

- Why did you choose to be a primary teacher rather than an intermediate or secondary teacher?

- What are your feelings about science? About technology?

- What do you think has influenced your feelings about science and technology?

- Do you feel that today's society is technologically oriented? If so, how do you feel about this?

- Do you think there is a technological viewpoint?
  If so, how would you describe it?
  If so, how would you compare it to your own viewpoint?

- Do you think men and women approach technology differently?

- Many people say computers are "just a tool." In other words, they are value-free and neutral. What do you think?

- What do you think of "hackers" and other people who like to spend many hours playing with computers?

- What do you think of technological innovations? (e.g., microwave ovens, digital clocks, cellular phones, etc.)

- Do you think boys and girls/men and women experience the world differently? If so, how?

Technology and children

- Some critics believe children should not spend time in elementary school using computers. They believe young children would be better off learning about the natural world and about their culture or about social skills. What are your feelings about this?

- Do you see any value for young children to use computers?
  If yes, why? What uses do you think are most appropriate?
  If no, why not?

- What is your approach to using computers in school?

- In another study, nearly all the teachers surveyed said they believed that computers were important in school, yet nearly a quarter of them didn't use computers with their students. Can you think of any reasons for this discrepancy?

- If you had a choice, would you prefer that computers be dropped from school programs?

- Would you prefer having a number of computers in your classroom over having them all concentrated in a lab?

- What are some of the practical problems of using computers in your program?

- What applications do you prefer when using computers with your class?

- For the past ten years people have been predicting a revolution in education driven by computers. This hasn't happened. Do you have any thoughts on why it hasn't?

- Have computers had any impact on the way you teach?

- Do you feel any pressure to use computers with your class? If so, where is that pressure coming from? (Admin., Public, Parents, etc.)

- Are there frustrations with using computers? i.e., practical problems which get in the way? What are they?

- When something unexpected goes wrong with a computer how do you react?

- Do you own a computer?
  If yes, do you use it for personal use? For school work? For what tasks?

- How would you characterize your knowledge or skill in working with mechanical things in general? With computers and other high tech devices (e.g., VCR's, video cameras, etc.)?

- When learning something new about computers (e.g., a new program), do you want to know everything about it, or just enough to get by?

Miscellaneous

- What is your background? training/education; years experience; grades taught; team teaching? Professional development taken/given?

- Can you give a history of your teaching practice? Changes in approaches, beliefs, philosophy, level of involvement, etc.?

- Have you had to defend your approach to teaching? How did you do it?

- How much of your own (personal) time do you think you devote to working on schoolwork?

- How does your personal life affect your work at school and vice versa?

- Why do you have animals and plants in your classroom?

- Do the students have input into the classroom environment? Why or Why not?

- Why do you gather the students on a carpet to instruct them?

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- Why do you sit on the carpet with the students?

- What guides your decisions to use computers for yourself? With your class?

- What is the purpose of cooking during centres?

Inclusion

- You have special needs children in your class. Was it your decision to have them?

- How are they included? Into what activities. With what influence from you?

- How do you try to include them?

- Are there activities that you feel they are best not included in?

- How do you ensure that the rest of the class treats the special needs children with respect?

- Are there problems with inclusion?

- What are your goals in including special needs children in your class?

- How do you think the other children really feel about the special needs children?

- How much control do you exert over the public reactions of the other children?

- Do you think there could be problems with the special needs children being accepted within the environment of the classroom, but not in the outside world?

Appendix C– Informed Consent Form

Simon Fraser University

INFORMED CONSENT BY SUBJECTS TO PARTICIPATE IN A RESEARCH PROJECT

Note: The University and those conducting this project subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of subjects. This form and the information it contains are given to you for your own protection and full understanding of the procedures involved. Your signature on this form will signify that you have received the document described below regarding this project, that you have received an adequate opportunity to consider the information in the document, and that you voluntarily agree to participate in the project.

Having been asked by Tim Trivett of the Faculty of Education of Simon Fraser University to participate in a research project, I have read the procedures specified in the document entitled "Research Proposal: The Primary Teacher and the Technological Paradigm."

I understand the procedures to be used in this project. I understand that I may withdraw my participation from this project at any time. I also understand that I may register any complaint I might have about the project with the chief researcher named above or with Dr. A.J. Dawson, Associate Professor, Faculty of Education and Senior Supervisor of Tim Trivett's research project.

Copies of the results of this study, upon its completion, may be obtained by contacting Tim Trivett.

I agree to participate by allowing Tim Trivett to observe my classroom teaching and to interview me as described in the document referred to above, during the period:

_____ at _____.

Name: _____

Address: _____

_____

Signature: _____   Witness: _____

Date: _____

Once signed, a copy of this consent form and a subject feedback form should be provided to you.

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