

**A STUDY OF THE CHANGE PROCESS:
THE IMPLEMENTATION OF THE USE OF COMPUTER TECHNOLOGY
IN CLASSROOM TEACHING**

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Abstract

The following study has two purposes. The first is to examine key research concerning the process of change in professional development of teachers. The second is to document the experiences of a group of teachers who have made a voluntary attempt to implement the use of computer technology in their classroom teaching for the year of 1996 to 1997. Foothills School District is attempting to introduce new uses of computer technology in the area of Language Learning for staff and students. The primary goal is to facilitate the collaborative process of professional development with a focus on the integration of computer technology in Language learning instruction from grade 6 to 12. Ideally, all Language Learning teachers involved in the project, 10 teachers, will successfully change their teaching to some degree and apply the new uses of computer technology in the classroom. This study provides qualitative evidence of the process of change in professional development. The knowledge provided is useful for teachers, administrators, and school authorities as a point of reference for implementing change in their division.

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**The Process of Change: The Implementation of Computer
Technology Into Classroom Teaching**

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"The world is complex, dynamic,
multidimensional; the paper is static, flat.
How are we to represent the rich visual
world of experience and measurement on
mere flatland"?

-Edward Tufts

Inspiration

I began teaching in 1989. I felt well prepared to teach in an effective manner and thought I had an adequate arsenal of strategies and theories to last me a career. After the first day of teaching, it became clear to me that this was not the case. From then on I believed in the need for ongoing professional development, but, on reflection, I can see that my efforts were minimal. For example, I attended the Special Education Conference in the Kananaskis each year, as well as the Treaty Seven Conferences, but, in truth, I was forced to attend these events. I recall the Director of Education mandating changes at the beginning of each school year to which I would respond with willing enthusiasm, yet, I rarely followed through with action. Issues were discussed from one staff meeting to the next throughout the year. Actions were seldom taken concerning these issues but we certainly talked a lot about them. Existing in 'survival mode' prevented my progress in the area of professional development. It has been a constant source of frustration throughout my career. Why do I plan to participate in professional development and never actually do it? By undertaking this study, I hoped to address this issue, at the very least, to gain for myself a better understanding of the process of change as it influences classroom teachers.

Secondly, the issue of the successful implementation of computer technology in classroom teaching has been a growing professional concern for me. For 40 minutes a day, for several years, my class would venture down the hall to the computer lab for computer instruction. This much needed, highly expensive, and very popular (at the school board level) instruction consisted of the opportunity for the students to better their scores at numerous games. Willingly, even gladly, I sent my class each day, enjoying the opportunity to mark and edit my students' writing assignments. It also gave me the opportunity to read and respond to my Email messages. My personal computer on my desk was used for Email, writing letters to parents, writing comments on report cards, and

recording attendance, although, it seemed to me, I spent the majority of my non-teaching time looking at the screen on my computer. As I read an article written by Carol Kochhar (1997) recently, it became evident to me that I was not alone. Her article is titled "The Technological Incompetence Principle, or, Please....Help Me Manage The Machines!" The title says it all. We have the technology but not the strategies or skills to utilize the machines to their full effectiveness. How can we use computer technology more effectively in school?

By studying Foothills School District's project to implement the use of computer technology instruction in Language Learning, I hoped to gain a better understanding of both issues. I studied a group of ten teachers who volunteered to commit to the process of professional development through the implementation of computer technology into their everyday teaching of the Language Learning curriculum.

Forward

We are fascinated with technology. We expect it to make a difference in our lives, and particularly in education. We see its effects as beneficent. We look for it to change and improve what we have done before. We await technological improvements in our lives, from better toaster ovens to improved schools and learning. Many of the images of what technology can do for us are peculiarly North American. Perhaps the most troubling is the assumption that, if technology makes it possible to do something, then that thing should be done. So, in education, the possibility and desirability of creating and using technologically - based systems for teaching, learning, and provision of educational services is seen as basically a transparent question. Should we purchase and install large numbers of computers in our schools? Stephen T. Kerr of the University of Washington questions whether children should use commercial software packages (word processors, spreadsheets, and databases, for example)? Should we encourage design, creation, and installation of a variety of new, multi - media instructional programs? Should we connect schools, teachers, and students to the Internet? I believe the answer in all cases is "yes". I answer yes before I can fully comprehend the cost, time, and fundamental issues of learning, development, and social organization that are assumed by my affirmation. I started this study secure in my belief that benefits to public education would be made explicit through my investigation.

Literature Review

Introduction

The examination of literature on the subject of school change through the use of technology reveals a wide variety of beliefs and opinions. Authors discuss thoroughly theories of change and the process of change. Change and the developmental process of change are both well documented, yet little is written about actual accounts of successful change through the use of the suggested theories or processes. Because study of change from an educational perspective seems difficult to research through quantitative methods, I have chosen to use qualitative strategies. The following chapter will define change, establish a method for measuring change, and provide an overview of the research regarding change in education. The role of technology itself in education will also be addressed along with methods for its implementation.

Method of Search

Initially, an ERIC search was conducted. The key words "computers in education" found 19701 hits. The key word "computers" found 23954 hits. The combination "computers, education, and change" found 2114 hits. All articles are dated from 1990 to present. These hits were further reduced manually. Those which did not address the issue of change through the use of technology were discarded. Those which did not address the issue of change through the use of computers within the school were deleted, too. Those which were not accessible through Interlibrary Loan were also discarded. From the remainder, approximately 80 titles relating to school change through the use of technology were

selected. Of the articles selected, none was a quantitative study. All contained theoretical perspectives and opinions. A number of books dealing with school change were located by searching key authors such as Seymour B. Sarason, Michael Fullan, Joyce and Showers, Carl Glickman, Judith Little, and William Bridges. All titles were available through interlibrary loan.

Review

Defining Change

Webster's New World Dictionary defines change on page 100 as; "a) to put or take a (thing) in place of something else b) to exchange c) to make different; alter d) to put on other clothes e) coins or bills that together equal a single larger coin or bill. (p.100)

For the purpose of this study, change will be defined as; to do differently or think differently about something than previously done or thought. The change may be a matter of perception, or a measurable difference.

The terms computer technology must also be defined. Webster defines computer as an electronic machine that performs rapid, complex, calculations or compiles and correlates data. Webster defines technology as the science of the practical or industrial arts./applied science. Therefore, computer technology can be defined as an electronic machine that is used to perform and apply industrial arts or sciences.

Change

Sarason (1993, p. 97 - 98) explains change in the teaching profession in stating,

... I have said that you can count on death, taxes, and being wrong about something you were convinced was right, natural, and proper. Now I must add to the list that

beginning at the time of your entry into a teacher preparatory program, you can count on feeling the need to change, either because something inside you says you should change or because the pressure comes from an outside source. You can truly count on that, which means that when you experience those internal or external pressures - and sometimes they occur at the same time - you should not be all that surprised (par.1).

Sarason (1993) says change is a conceptional redesign. (1993 p.xiii). Carl Glickman (1981) suggests change is always occurring so there is no need to recognize it as such. William Bridges (1980), in his book, *Making Sense of Life's Changes*, refers to change as just 'being.'

Change can be the result of internal pressure, or external pressure, or it may occur unknowingly.

Some examples of internal pressures experienced by teachers, according to Sarason (1993) are as follows:

1. Why do I have trouble managing behavior when other teachers report they have not encountered this problem with these particular students?
2. Why do people say I take myself too seriously? How can I change?
3. Why am I not eager to come to school? How can I change?
4. Why don't I say what is on my mind in meetings?
5. How can I change the way I teach so more students understand the concepts?
6. Students have changed over the years. Why haven't I changed to accommodate them?

External pressures were also present in the examples given by teachers in Sarason's study.

They include:

1. Responding appropriately means you have to go against your own values.
2. You will not always agree with your supervisors' point of view.
3. You will be told to implement a change.

Sarason contends that it makes no difference whether the need to change is derived from internal or external pressures, or both. "People are resistant to change. It is true for people who seek change, and it is even more true for people who do not seek to change but are pressured by external circumstances to change." Sarason (1993, p.103).

He suggests such pressure can be regarded in two ways. The first is to regard your emotional reaction, your resistance, as both an opportunity and a trap. The pressure to change brings out the best and the worst in us. The second way you should regard such pressure for change is to ask and reflect on this question: Independent of my feelings, what are the pros and cons of the substance of the pressure?, i.e. the pedagogical pros and cons? (1993, p.104)

Sarason reminds us that the pressure for change, whether internal or external in source, should never be seen apart from the atmosphere for change. He says atmosphere is not an excuse for not changing and he does not feel that schools are unique in their social, organizational, hierarchical, decision making features.

Sarason (1982) in his book, *The Culture of the School and the Problem of Change*, discusses the goals of change in the classroom. He believes that the "teacher will be the agent of change" (p. 231). He makes the following statement regarding this belief:

The more I have read about and personally observed efforts to introduce change in the classroom, the more clear several things become. First, those who attempt to introduce a change rarely, if ever begin the process by being clear as to where the teachers are; that is, how and why they think as they do. In short, they are guilty of the very criticism they make of teachers: *not being sensitive to what and how and why children think as they do*. As a result, teachers react in much the same way that many children do, and this is with the feeling they are both wrong and stupid. Second, those who attempt to introduce a change seem unaware that they are asking teachers to unlearn and learn. Third,

if there is only one principle common to effort at change, it is that one effects change by *telling* people what is the "right" way to act and think. *Here, too, those who want change do exactly that for which they criticize teachers.* Sarason, (1982,p.232)

Models of Change

Michael Fullan (1993) states, "We keep discovering, as Dorothy in Oz did, that we're not in Kansas anymore." (p.12). He also observes that the unplanned factors that continue to surface and interfere with change efforts are not merely things that get in the way but they are normal. When educators understand that complexity and unpredictability are givens, they approach the management of change from a more realistic perspective.

Fullan offers eight lessons of change based on the last three decades of research and experience:

Lesson 1: You Can't Mandate What Matters

Top down approaches do not work. According to Fullan, what does work are skills, creative thinking, motivation and committed action on the part of those who must change. Change is a highly personal and developmental process that requires a balance between pressure and support. Commitment follows a sense of personal competence and evidence of positive results. It does not occur at the beginning of the process, it evolves.

Lesson 2: Change is a Journey, Not a Blueprint

It is important for those leading change efforts to develop the capacity in individuals and groups to engage in creative and ongoing problem solving throughout the process of implementation of new programs, practices, or structures.

Lesson 3: Problems are our Friends

Fullan states that problems are our friends because it is only through immersing ourselves in problems that we can come up with creative solutions. Persistence, commitment, and capacity to deal with problems as they occur and move along is a necessity.

Lesson 4: Vision and Strategic Planning Come Later in the Process

Fullan suggests vision comes later for three reasons:

1. Under complex conditions, people require reflective experience before they can form a vision.
2. Shared vision is essential for success and occurs through interaction of organizational members and leaders. This takes time and a vision building process which is open minded.
3. Knowledge and skill development are an essential base. Without it, vision remains superficial.

Fullan does not suggest leaders should resist developing a vision of a desired future for their schools. Rather, he believes that the initial vision should be regarded as open - ended and tentative so it can be shaped, reshaped, and refined as a result of the complexity of change and the fact that as knowledge and skill develop, new perspectives on problems and their solutions are bound to emerge.

Lesson 5: Individualism and Collectivism Must Have Equal Power

While the problems caused by professional isolation in schools are well documented, "there is nothing automatically good...about collaboration," Fullan notes. Groups are more vulnerable to fads than individuals.

Lesson 6: Neither Centralization nor Decentralization Works -

"Centralization errs on the side of over-control, decentralization errs toward chaos," according to Fullan. Site - based management fails because groups become too preoccupied with governance. Success is found in two way, top-down / bottom-up solutions with a low

degree of district regulation, a high degree of communication, and interaction with the district and the school.

Lesson 7: Connection with the Wider Environment is Critical for Success

According to Fullan, schools must respond to the issues of the day and contribute to them. Teachers in successful schools value the sharing of expertise and seek to help both inside and outside the school.

Lesson 8: Every Person is a Change Agent

As more people in schools take action to change their environments, they will have greater chances of intersecting and forming the critical thought and action necessary for change.

Fullan goes on to list some assumptions about change:

1. Do not assume your version for change is the one and only.
2. Significant change requires individuals implement to work out their own meaning.
3. Conflict is not only inevitable but essential to the success of change.
4. People need pressure to change.
5. Do not assume that the reason for lack of implementation is outright rejection of, or resistance to, change.
6. Assume that you will need a plan that is flexible and takes into account these assumptions.
7. No amount of knowledge will make clear what action should be taken.
8. Change is frustrating, discouraging, upsetting and somewhat chaotic.

Fullans' eight assumptions about change are important to an understanding of the complexity of the process. Kershaw (1996), illuminates the issue of understanding the need for change from a technological perspective.

Kershaw feels that effective change is not about introducing this or that new technology; it is about encouraging people to change the way they do things and the way they think about their roles in the organizations. He feels the word "encourage" is the operative word.

Kershaw states that the first step in the transformational process is to bring about understanding on the part of the individual staff that there is a need to change. It is essential for the leader to establish a need for change. The second phase, according to Kershaw is to help individuals reach the understanding that they, the individuals, must change. Finally, Kershaw states, the individuals have to change the way they perform their roles in the institution. He states that this will not occur in lockstep fashion. Rather, the flow of acceptance will occur in an S-shaped curve. Kershaw states that leadership should be drawn from the academic side of the institution, not the technical side. This sends the message that emphasis is to be placed on the instructional and learner components, not on the technology itself. As for support provided during the process, Kershaw states that early adopters of the new technologies will be enthusiastic and require little or no support. Provide support anyway so they will have time to demonstrate the uses of the technology and provide peer support for the remaining group. Kershaw believes that the transformation process can be expected to take between five and ten years, and it is easy for people to slip back into the old ways if the organization begins to lose focus on change. For the vehicle to continue down the road of change, the participants in the vehicle must be provided with training, technology access, and encouragement to use the technology in their day to day work. If the commitment is not there, the initiative should not start.

"change has already happened."

William Bridges, (1994) p.4

In his book, Jobshift, Bridges also states that jobs are change inhibitors. Businessmen and businesswomen comment that their jobs have turned into change management positions rather than turning out product and services. He believes it is essential to build the management of change into every organization.

In the 1980's, changes were masked. The general economic expansion hid the fact that jobs were disappearing from organizations. Also, the good times permitted many organizations to carry extra baggage in their job structure without serious penalty.

"Recession ended both of those situations. It did not cause it, though. The loss was caused by technological change and the amplifying feedback loop of responses to that change.

"Kershaw (1996) p.27.

Joyce and Showers (1980), suggest four levels of impact of change as they relate to classroom teaching. They are as follows:

1. Awareness

At the awareness level, there is a realization of the importance of an area and the beginning of a focus on it.

2. Concepts and Organized Knowledge

Concepts provide intellectual control over relevant content.

3. Principles and Skills

Principles and skills are tools for action. At this level, the necessary skills are acquired and used in an experimental setting. The skills to adapt as necessary are also acquired at this point. At this level there is potential for action, awareness of the area, ability to think effectively about it, and the possession of the skill to act.

4. Applications and Problem Solving

Finally, the transfer of concepts, principles, and skills to the classroom can occur. Participants begin to use the teaching strategy they have learned, integrate it into their style, and combine the strategy with the others in their repertoire.

Joyce & Showers (1980) state that only after this fourth level has been reached can an expectation of change occur. "Organized knowledge that is not backed up by the acquisition of principles and skills and the ability to use them is likely to have little effect." Joyce & Showers (1980; p.380.)

Essentially, all of the above authors have established stages or steps to change. They also make suggestions for best facilitation of the change process. Bridges and Kershaw focus on the need for change. Joyce and Showers, as well as Sarason and Fullan, focus on the stages of change and the conditions necessary for change to occur. Sarason openly admits that, at best, these are suggestions. The complexity of the issue is beyond a written formula. Change is part of our culture. Now more than ever, as we become a 'techno - culture', it is true, and technology will not let us ignore the change issue.

Research in Change through the use of Computer Technology in Schools

Initially, the advent of the chalk board stood to revolutionize the teaching profession. Later, films were expected to transform teaching in the 1920's, radio broadcasts would bring the world into every school room in the 1930's, the "new media" of the 1950s and 1960s (television, super - 8 film loops, language laboratories), the wave of programmed instruction of the 1960's the novelties of distance education and dial - access audio and video in the 1970's, all promised revolution. There were enormous expectations about what technology, used in a particular way, might be able to accomplish. Few of these technological approaches were "successes" (perhaps the overhead projector made the biggest impact), although many have been incorporated into traditional teaching to a fair degree. Whereas earlier technologies had either supported the educational status quo (films, television, overhead projectors) or challenged it in ways that were potentially too difficult for schools to handle (programmed instruction), computer technology seems to be about more than simply teaching and learning. It has been more immediately associated with economics (employment prospects for graduates, based on the skills needed for the information age), with politics and even with community pride ("Our school has six networked Mac labs!"). Computers have been around since the 1940s. The first personal or

micro computer appeared in 1975 and according to Erickson and Vonk (1994), its appearance was part luck, part genius, and part necessity. Initially micro computer technology was introduced in the form of a calculator. The railroad lost the worlds' first personal computer. It was called the Altair. It had limited appeal. There was no software to run on it, and it did not even have a keyboard. (Erickson and Vonk, 1994. p. ix)

"Since 1975, microcomputers have evolved from primitive toys for hobbyists to sophisticated machines that far surpass early mainframe computers in both speed and capabilities." (Mandell, 1992, p.189). A growing number of us have a personal or microcomputer in our homes. In addition, the workplace is becoming increasingly computerized. Education, too, has been greatly affected by the proliferation of microcomputers. (Mandell, 1992, p.189). Mandell states that the introduction of microcomputers at all levels of education will soon result in entire generations of students who are computer - literate. Most microcomputers are desktop models. Students may carry a portable computer to a university class in order to take decipherable lecture notes and prepare assignments.

Computers were introduced into schools in North America just over a decade ago. Presently, in the mid - 1990's, computers in schools are now commonplace. Continuing developments in information technology have the capability to lead to radical change in all education sectors. Substantial strategic planning at all levels is necessary to anticipate this, and to prepare the people involved for substantial change. Traditional education systems will face increasing competition from global mass media, information technology in the home, and open learning alternatives. Articulation into vocational and academic tertiary sectors is being restructured. Students' skills with information technology are being emphasized as part of this process. Curriculum changes in Alberta are involving information technology. There is a commitment to develop in students the 'skill of information processing and computing' which has been largely unfulfilled. Given these factors and these intentions, schools may need to revisit their computer policy statements.

This paper does not attempt to forecast the demise of schooling, undermined by education delivered through interactive multi-media. However realistic such a vision might be with current technology, education systems are large and have considerable inertia, especially with respect to installed capital equipment and current skills base. Rather, this paper may be a framework for thinking about technology's use in all curriculum areas, as a precursor to radical change in education systems. Alberta Education has aimed to develop "Skills of information processing and computing." Alberta Education (1995). This important inclusion does not cover the use of computers in schools across all the other curriculum areas. Clearly, it is timely to consider the place of information technology in the curriculum. Information technology is restricted to the area of Technology, but is an important element of the learning process in and between all the learning areas.

The use of computers in high schools is rising very rapidly. In 1989, Alberta high schools had 4 students per computer. By 1995, this ratio had changed to only 2 students per computer, and average computer use in the schools had increased. Alberta Education (1995). In high schools, computer equipment is generally situated in laboratory style accommodation. Its use is often prioritized to certificated courses in grades 9 or 10. This is followed by a general awareness short course structure for all other students in the school. In some cases the computer provision extends beyond the control of a computing specialist, and small numbers of machines are made available in other areas of instruction. Access to the equipment for teaching staff is also a consideration. Just as students record increased self-image from the use of word - processors for their work, teachers increasingly prefer to present well crafted worksheets and assignments using computer technology.

Computers in schools are already failing too often to deliver to their full potential. A clearer view of their place in the curriculum is necessary. The development of information technology resources in a school can follow many tracks. A common developmental path includes equipment, curriculum, connections (in school and beyond), software access, software acquisition and management (including professional development). Information

Technology in schools cannot be seen purely from a technical point of view. There are curriculum, management, architectural and systemic issues. (Kershaw, 1996). In the near future computers may radical change the nature of teaching and learning. The first point is that new technologies in schools operate in a particular environment. The quality of this environment is vital for their effective deployment and successful application to the task of learning. For example, a computer with the most sophisticated software will not be effective without trained teachers to operate it. It is vital in the construction of any new framework for teaching and learning to see that the learning environment extends well beyond the school gate. For example, it is important to include the role of networks, especially external network connections.

The welfare of students is another important consideration, together with their academic achievement. Some schools are utilizing information technology to implement alternative curriculum delivery methods. In such situations, it may be essential to counsel students, along with their parents, about such things as time commitments and the likely effects on students of long periods spent interacting with a workstation. Also, such courses must be able to accommodate the special needs of some students for whom screen flicker is a serious problem, or those with difficulties with vision, or with keyboard operation. (Kershaw, 1996).

It is important in long term planning to remember that the lifetime of equipment is 3 to 5 years. Therefore, equipment acquisition or lease must be done with a clear strategic view or a plan to rotate equipment on a continuous basis. Where will the funding be acquired? (Fluck, 1996).

Professional development for teachers is crucial in all this. Continuous professional development will be needed as computers continue to develop at an increasing rate. Fluck suggests that Inter- active multimedia can actually be used to deliver this training, once a critical level of delivery hardware is in place and accepted. Industrial issues must be faced

as information processing equipment changes the task of teachers as imparters of information and skills. (p. 2).

The education of some students with special needs has already been transformed by the use of Information Technology. This change has been seen in the lives of physically disabled people who now use environmental control systems, as well as in the literacy development of slow readers who use close procedures. (p. 15).

Curriculum mapping is one good way of ensuring that computers are used in a balanced way across all the areas. Fluck identifies five modes in which information technology resources can be used in teaching and learning.

The five initial modes are:

1. Support
2. Exploration & Control
3. Tutorial
4. Resource
5. Link

In support mode, students use the computer to enhance the presentation of work. For example, they use word processors, presentation graphics, desk top publishing, and spelling checkers. In essence, the computer in support mode enables students to create or file information which is usually transferred to paper. The computer increases the accuracy students can achieve. In so doing, the computer has an important role to play in raising the self-esteem of students, and giving them confidence to continue to succeed in their learning.

The exploration & control mode enables students to examine and build situations. This is often associated with adventure games, where an important historical event is encapsulated in software. Students can explore this crucial moment in time and place, whilst making their own decisions about the events that occur. Software exists that allows students to control a real, experimental situation, in a science laboratory. An example of

this is the use of robotics. Examples of environments for exploration control include: Hypercard, Toolbook, Logo, Model Builder, Intellecta, and Sense & Control. Each of these examples provides a framework within which students can explore a situation. Additionally, these applications can be used by students to construct models of the real world, and experiment with variations within these models. Some programs enable students to place information in the computer, which is logically linked and which relates to a specific knowledge domain. Multi-media presentations can be constructed by students. These often require good planning skills, and an ability to anticipate the effect upon an audience of a presentation. In combining graphics, photographs, sounds and texts, students learn to anticipate the likely pathways through a topic, and also learn about the subject themselves. Mullet-media constructions can subsequently be used by other students to explore the topic. In this mode, the students may also create applications which will subsequently be used in any of the other modes. This aspect of computer use is covered to some degree in the Information and Systems strands of the Technology area. However, the emphasis is on the use of data as a resource. In considering modes of computer use, the emphasis is upon the subject matter or topic within the simulation. The Technology area also gives students the important chance to examine the social effects of technology.

The tutorial mode will teach students new knowledge or skills. This mode consists of the information system presenting information at an appropriate level and pace. It gives students the opportunity to develop at their own pace and to receive feedback upon their progress. It is currently being considered technically possible in core areas such as Mathematics, Literacy and Science. These areas are seen as ones in which a judgment based upon the testing of objective principles is possible. It is important to include the possibility of using the tutorial mode for assessment only.

In the Resource mode, the computer is used to access information and other resources. Often used in the school library, this is frequently the way in which information technology plays a useful role. Examples of this are: using a computer - based library catalogue,

accessing the World Wide Web, participating in a Newscast, or using PC-Globe to investigate relative population densities by country and latitude. When using the computer in Resource mode, students are developing questioning skills. As well, they are solving problems by stating them and re-shaping them to fit different resource frameworks.

The link mode allows the computer to be used for communication between individuals. This represents an important role for computers in life for the coming century. It provides personal involvement and relationships missing from the other modes. Examples include the use of Email, and desktop video conferencing for personal communication. The link mode becomes obvious in the Virtual Classroom. Computer - mediated communication can enhance students' motivation to use the technology, broaden their sense of cultural identity, and give them a global context for their thinking. Because of the structure of digitized communications, cost is unrelated to distance. This makes class dialogues between Canada and Australia, for example, both relevant and easy. The use of this form of communication is beneficial to special needs children as well. The screen can form a 'safe haven' for the gaze of disturbed children. In the same way, adolescents can send important personal messages about themselves and others through this medium safely.

Curriculum should be the driving force behind computer development plans. Once the learning objectives have been determined, the software and hardware requirements can be specified. (Fluck, 1996).

Fluck goes on to say a good school will reflect its community, and be an integrated part of it. In a similar way, a school plan for the application of information technology should be expansive and broadly supported. Computer Management Groups, School Councils and related community groups have a part to play in establishing related policies. They should help assure that students who have no computer access at home should not be disadvantaged, and mechanisms can be devised to assist here. Schemes may include preferential access out of class time, library loan schemes for laptops, or even negotiated access out of hours. Leasing and rental schemes have also been used. Schools may

implement dial - in facilities to make their information resources available to the wider community. This service can support students beyond the physical campus boundaries or normal times of operation. The point being made here is that schools have traditionally been the repositories for skills and knowledge. To retain this function, they will need to concentrate resources and effort on doing so in the best possible way. School buildings are now incorporating wiring for individual or wireless networking and the cost and size of computers are dropping to such a degree that it is now possible for a class set to be easily moved from room to room. Therefore, a scenario in some schools might soon be the regular use of individual computer workstations in some lessons. To provide the best learning opportunities, schools will have to adopt the best strategies for their individual needs. As one example, the layout of rooms dedicated to computers requires special attention. Many teachers have commented on the need to have a layout that enables them to have a view of all workstation screens from the focal point of the classroom. In many cases, it is necessary to have a second seating position for every student away from their workstation, to facilitate whole class instruction. (Kershaw, 1996).

Alternative curriculum deliveries are being experimented with. Some courses can now be run without cost disadvantages from any part of the globe. It is predicted that competition to provide basic or core content courses will increase the quality of interactive versions, and that specialization will result. Erickson and Vonk (1994) have provided a framework for analyzing educational media suggesting that an interactive multi-media system has the potential to provide a learning experience similar to that provided by a teacher. The philosophy of schools is moving towards allowing students to determine for themselves what, when and how they are going to learn. This technology can enable much more student - centered learning. Individualized instruction might easily become the norm. Information technology has the potential to make time - tabling and room allocation redundant. This individualized or personalized instruction can lead to the personalization of curriculum. (Erickson and Vonk (1996).

Information technology can not only change the nature of conventional educational organizations, it can also change the content of the curriculum.

It is my personal experience that, in Special Education, it has been apparent for years that computers have enabled students to participate in a much broader curriculum than would otherwise be considered. Students with communication impairments can use personal - assisted communication devices to broaden their educational horizons. Similarly, all students have the potential to tap into a wider variety of educational opportunities. The World Wide Web can soon be expected to be of strategic importance within the open learning and home schooling arenas. A new awareness of copyright and a host of ethical and security issues will be faced when connecting into these areas of service. For example, should learning guides be placed into the public domain or should they be protected from remote anonymous log-ons? (Buckeley, 1996).

There is an urgent need for schools to integrate their use of Information Technology into a coherent framework, at the school, system, and provincial levels. Although an emphasis has already been placed upon the core curriculum, it is vital that radical change in its delivery be addressed. Essentially, the delivery options that technology is now offering might well change the conception of what should be in the curriculum. (Erickson and Vonk, 1994). If the possibility of change is accepted, it needs to be turned into a positive force for the province. It should not become part of crisis management, but must be discussed and explored by all the people involved. (Fluck, 1996). Collaboration with students, parents, teachers, and other educational practitioners must occur. A century ago, as knowledge of such things as industrial strength and material technology traveled around the world, unsuspecting lives were changed. Now, the ideas of change are on fibre-optic cables and travel in seconds. Adaptable as people are, we need to make sure that we plan and control the changes, rather than feeling they control us.

Summary of the Literature

In summary, it is apparent that theoretical knowledge concerning the process of change is abundant. There is also ample information on the theoretical implementation of computer technology into classroom teaching. The literature suggests the following:

1. The process of change follows steps or stages of development. It may also be described as a pattern of development.
2. Change requires leadership.
3. Participants must be willing and committed to change.
4. Adequate funding must be provided.
5. Support and education for those who want to implement change must be provided. This includes time.
6. Change will be mandated from time to time and participants must be willing to accept it.
7. Technology will change the way we think as well as carry out tasks from now on.
8. Change can take many years to be accomplished.

It is important to recognize that change is a personal phenomenon and must be addressed as such. There is no set prescription or formula to ensure successful change. It is essentially impossible to measure change tangibly. Knowledge of this as well as the process of change development can enhance the possibility of success. Change can be a skill in itself.

Purpose of the Study

Introduction

Change in education is inevitable. Often politically motivated,

but sometimes introduced for sound educational reasons, curricular and organizational changes will be introduced periodically and teachers will be expected to implement them. Those who become "jaded" or react negatively can harm themselves and their students. Teachers who accept change and work to ensure that, from their point of view, the student benefits from new programs, will suffer less stress. If teachers can become actively involved in the adaptation and implementation of changes, at least at the school board level, then the experience can be quite satisfying.

-from "Suggestions for Change" King and Peart (1992, p. 185)

in K. Goslin 1996. (p.27)

This quote, taken from *Examining School Culture in Southern Alberta* by K. Goslin (1996 p. 27) as quoted from the Canadian Teachers' Federation monograph, *Teachers in Canada: their work and quality of life*, characterizes the essence of what this study intends to address: change is constant and inevitable.

This study has two purposes. The first purpose is to document some of the relevant research already acquired on the process of change in professional development of teachers. The second purpose is to document the process of change through an actual study of the process.

Senior administrators within the Foothills School District hope that all involved teachers can be encouraged to learn the necessary skills and knowledge that will enable them to adapt computer - assisted instruction to their classrooms. It is anticipated that the participants will respond to the initiative by forming support groups and helping each other learn how to use the programs assigned to them and, subsequently, will be seen to use computer technology in their classroom teaching. The results of this process will be

documented in this paper. All accomplishments and methods of accomplishing the above - mentioned tasks will be addressed in the following pages.

An Overview of the Foothills School District Project to Implement Computer Technology

It is essential to understand the intent of the project to understand the process. The following is an overview of the Foothills School District project to implement computer technology. All of the information was gained through conversations, with Chris Hughes, the creator of the template used for the project; Bob Zerabecki, the principal of Oilfields High School in Black Diamond; and the Handbook describing the project and created by the Foothills School District. The purpose of the site - based Software project is to develop a software tool that enhances the capacity of teachers to increase the engagement of learners such that there is a strong potential for higher quality performance from learners than is presently being attained. The immediate task has been identified as the development of a fully functional prototype for the teaching of Language Arts (grade 6 through post secondary) focusing on the Junior High curriculum of the Western Canadian Protocol, English Language Arts. The secondary tasks are: to upgrade and simplify the Site - Based Software package (called "The Shell") so as to increase its utility in a number of instructional settings (e.g. on site, off site, Distance Learning, Blended Programs, and Internet), to increase the user - friendliness of the Shell so that most teachers could use it as an instructional tool; to develop commercial, marketable software for learners across Western Canada and beyond. The timeline for the project has been divided into the

following three phases: Phase 1. Development of a Language Arts Prototype using ToolBook 2. Phase 2. Extension of SBS Shell (Full Internet Service). Phase 3. Development of commercially releasable SBS software. Phase 1 began in December of 1996, and Phase 2 in May of 1997, while Phase 3 will occur through the 1998 school year.

Site-Based-Software (SBS) was developed by Foothills School Division and has been in use by both students and teachers since 1993. Foothills School Division claims experimental studies have shown that use of the software can lead to improved student performance on standardized tests. Foothills School District expressed the opinion that SBS changes the relationship amongst student, teacher and learning activity. They feel that students using SBS are located in a learning environment characterized by significantly increased contact with the teacher, more opportunities for collaborative work and access to learning opportunities better tuned to their personal needs.

The SBS Language Arts software provides activities that reflect the conceptual framework and address the General Outcomes of the Western Canadian Protocol (WCP) for English Language Arts. The WCP Draft (June 1996) identifies four general outcomes:

- * Explore thoughts, ideas, feelings, and experiences
- * Comprehend and respond personally and critically to literacy and media texts
- * Manage ideas and information
- *Celebrate and build community

These four outcomes are addressed at all grade levels through activities which involve listening, speaking, reading, writing, viewing and representing. The SBS Language Arts software in the Foothills School District proposal is intended to provided a dynamic communication forum which motivates, encourages and supports the use of language skills in a media - rich environment. The software is designed to be extensively customized by teachers and individually responsive to students. SBS is primarily intended to support the activities mentioned above rather than provide a set of content specific exercises. The software is designed to be most effective in a school setting but can be used for off - site

instructional purposes. It also utilizes software that has already been developed and classroom - tested. It is available over a range of systems from stand-alone PC's through LAN's to full Internet access.

The Foothills School District identified the following General Objectives the software will meet for students:

- A stimulating learning environment which motivates them to extend their repertoires in listening, speaking, reading, writing, viewing and representing.
- The opportunity to get more one - on - one time with the teacher.
- The opportunity to access on - line support to help them in reading, writing, listening, viewing and representing activities.
- The opportunity to move through the curriculum at a rate and in a manner that supports their personal learning needs.

The identified objectives the software will meet for the teachers are:

- A high level of flexibility to accommodate and enhance individual interpretations of the curriculum and varied pedagogical practices.
- An open content structure into which a variety of media materials may be imported.
- A core set of built - in activities relating directly to the objectives and outcomes of the Western Canadian Protocol.
- Access to remote data bases (e.g. Gage Canada) containing indexed Language Arts activities (Instructional Event Libraries).
- Off and on-line utilities that significantly increase the time available for one - on - one tutoring and the management of collaborative and cooperative learning environments.

The design of the SBS Language Arts software is based on the following principles:

- Writing is a core process into which the other strands and objectives of the curriculum can be woven. The software will support a three stage writing process: pre-writing, drafting and revision.
- Language learning materials and activities will be available from content providers.

-Teachers will be able to put their own materials directly into the L.S. Shell.

-The software will enable a high level of learner control.

-The software will support a range of Computer Mediated Communication activities.

The hardware requirements to run the software include 486 machines with 8 Meg. of RAM and 10 Mbps wiring. Netscape 2 with the Neuron plug-in is available free from Asymetrix's website. Toolbook 2 Instructor from Asymetrix is also necessary.

The features of SBS software as identified by the Foothills School District are as follows:

-Computer - mediated communication. Student writing improves in quantity and quality when it is read and responded to. An authentic audience can be provided by various real time messaging systems: e.g. Email, chat lines and the embedding of writing tasks in simulations.

-Multimedia capabilities enable students to view and listen as well as read and write. The use of multimedia can broaden and enrich a wide range of language - related activities.

- Students will be able to keep drafts of written work, transcripts of chat line conversations and files of teacher comments. Teachers will be able to access and edit this data.

-Content - specific Language Arts activities need to be archived in data bases on Web Servers (Instructional Event Libraries). Teachers will be able to browse these libraries and import content directly into the Shell.

The design of the Language Arts software will make use of parts of the current Shell v6 implemented in Toolbook v5 from Asymetrix. This has been used for hundreds of hours in Foothills School Division in real classroom settings. The shell structure will be reviewed and redesigned to meet the needs of the Language Arts students. It will include a writing process template.

The Foothills School District will provide project leadership, existing programmers, Language Arts expertise (Classroom Teachers), usability studies, and Beta test sites (classrooms). Gage has made its existing Language Arts material available to the project team in both hard copy and electronic format. Gage has also expressed interest in project

marketing and distribution. The Instructional Event Libraries are of particular interest to the publisher. Foothills School District has also expressed interest in involving The University of Lethbridge in high level design and Beta testing. Alberta Education has been approached for their expertise and financial support. The Alberta Research Council has been informally supporting the SBS project for the last year. A Joint Research Venture is currently being discussed. Alberta Research Council would bring both Instructional Design and technical skill to the project. Their contribution would be in the design and implementation of Instructional Event Libraries, messaging systems and data storage and retrieval utilities. Mount Royal College officials have expressed their desire to be allowed to use the SBS Language Arts Shell for their high school equivalency courses and technical writing courses. They would like to be involved in design of the software, specific content design and implementation, and usability studies.

Foothills School District has divided the software development into two tasks. Task one involves a survey of existing L.A. software, the research literature relating to the use of computers in Language Arts, the requirements of classroom teachers, emerging patterns of blending programs and the opinions of curriculum and educational experts. A functional specification for the SBS software would be based on the findings of this. Task one also includes an identification and clarification of technical requirements to implement some or all of the functionality of the above surveys. Discussions and decisions involving all partners in the project will occur with respect to both functionality and technical implementation.

The second task is to prioritize the functions identified in task one. They will then be sequenced and translated into design specifications which can be implemented. Much of this depends on funding. The second step of task two is to implement and field test the specifications identified. Finally, design and development of activities is to be incorporated into the release version. Design and development of instructional events for the Instructional Event Library would also occur here.

Site - Based Software is a tools approach to the use of Instructional Technology rather than a content approach. The teacher can use the software as a tool to build a customized learning environment. The students can use the software as a tool which responds to their needs as new skills are developed and new meanings are constructed. Offering the software over the Internet creates more educational paradigms as well.

Site Based Software

The Language Arts Perspective

The Foothills School District hopes to create a collaborative environment for its students through the use of SBS in Language Arts. SBS will provide students with frequent opportunities to write and communicate with authentic audiences and receive immediate response and feedback. Language Learning is a set of skills, and knowledge in continual evolution. Writing, as outlined in the Western Protocol, is a core process for exploration, comprehension, communication, and community.

Successful language learning requires:

- Frequent opportunities to write and read, and for students to discuss their thinking and work with others.
- Interaction with audiences using communication for real purposes.
- Exploration of writing and communication in the technical, expository, narrative, and poetic form.
- Ongoing response and feedback regarding writing skills and strategies.
- A community of writers and thinkers sharing the experience of developing language.
- A rich and relevant media context, and motivational experiences which promote listening, reading, writing, and speaking.

- Balanced skills instruction which takes place in a relevant context, such as the use of a theme.
- Targeted instruction that emerges from individual writing and responds to the students' individual needs.
- Opportunities for students to choose their own direction and rate of progression.
- Emphasis on the student developing self-awareness pertaining to the necessary skills to be used at a particular time.
- An approach driven by process rather than content.

These are goals that can be met through a variety of classroom environments, teaching styles, materials, and learning approaches. The design of the SBS will be open - ended, allowing for the varying needs of students and teachers.

Advantages of using SBS in Language Arts as Identified by the Foothills School District:

Efficient management, monitoring, evaluation of individual progress, and needs assessment can be linked to individualized instruction. Use of the software will provide clearer insights into student thinking and group process communication through electronic discussion. Students will have the opportunity to achieve mastery of objectives due to self-paced learning. Students will also have a high level of control and decision-making power. Teachers will provide greater support and direction for some students through the use of such things as planning and revision prompts, and editing assistance. The students will have the opportunity to access information in real time, developing research and critical skills to use these resources more successfully. Communities will develop through sharing ideas and writing between classes. Through this, the written word will become a significant component of communication between students. It will also provide opportunities for students to take greater risks in sharing their ideas with other students. The Instructional Event Library will provide students with access to well-organized sources and resources.

It will also provide the teachers with an opportunity to create their own bank of flexible resources over time. The open - ended software allows teachers to customize and design lessons that suit the needs of their students. Teachers will also have opportunities to share their materials with other teachers. Finally, the SBS will provide teachers with instructional flexibility.

The Foothills School District has stated that given the SBS is intended to be an authoring tool for teachers as well as a learning environment for students, most objectives of the Western Protocol can be met through lessons and material designed by teachers to be used in this platform. The program is not intended to be an all - inclusive language learning package. Rather, it is an alternative method or tool for exploring language learning.

Teachers have the ability to meet curricular goals by adapting computer - assisted instruction to their own classrooms. It is anticipated that the participants will respond to the initiative by forming support groups and helping each other learn how to use the programs assigned to them and, subsequently, using computer technology in their classroom teaching. This process and the results of this process will be documented in this paper.

Development of the Study

Process of Involvement

My involvement in this project began in October of 1996. Chris Hughes came to The University of Lethbridge to present the 'Shell' he had developed. He also aimed to stimulate some involvement on the part of The University of Lethbridge Faculty of Education. It was not clear what involvement was desired on the part of Foothills School District. I immediately became interested in the aspect of professional development for the participating teachers in the Foothills School District. The fact that this professional

development involved the use of computer technology increased my interest in the project. I approached Dr. Frank Sovka with my idea and he provided me with additional direction. I began my participation in the project on October 25, 1996.

Methodology

This chapter presents the methodology of this study. It includes an overview of the process of becoming involved in the study, the questionnaire and the administration of it, highlights from the focus group meetings, highlights from Email conversations with the participants, and highlights from telephone conversations with the participants.

Design

This study began with each participant completing a brief questionnaire identifying the level of technology they were comfortable using. It also identified the participants' personal beliefs and personal strategies concerning teaching and the use of computer technology in the classroom. The questionnaire was created in collaboration with Chris Hughes. Initially, Chris and I each brainstormed for questions we thought would be relevant to the study. We then met and compared our questions. This process continued over several months. It was difficult to reach a consensus. Chris was approaching the project from a technical point of view and I from a professional development point of view. It was difficult to combine the two perspectives, but we did succeed in designing, distributing, and collecting a useful questionnaire. On the basis of questionnaire information, a personal point of reference for

each participant was created. The knowledge was helpful in creating collaborative groups among the participants. It also enabled Chris and me to have a better understanding of the participants themselves. For example, knowledge of a person's teaching style preference or computer knowledge enabled us to see issues from the participants' point of view more clearly.

Profile of the Participants

The following information is based on the responses received from the questionnaires as well as a focus group discussion held on February 25, 1997 at Black Diamond Composite High School. In the interest of confidentiality, the names of the participants have been changed.

Jack has been teaching for eleven years. All of his experience is at the upper elementary and jr. high level. He is interested in the Site Based Software Project because he has a high interest in technology and perceives it to be an effective method of instruction.

Pansy has been teaching for seventeen years. She became interested in the Site Based Software Project because she has a high interest in professional development. She also wants to learn more about computer technology and thought this would be an efficient and productive method of learning for herself as well as her students.

Dave has been teaching twenty - six years. Dave is looking for a new challenge. He has seen many changes over the years and thinks he is able to predict which are 'fads' and which are necessary for education today. He thinks the Site Based Software Project is a good beginning for a necessary change in education. He has some familiarity with computer technology but does not consider himself an expert.

Betty has been teaching five years. She is extremely motivated and energetic.

Shelly has been teaching four years. She is teaching English 9, 10, 20, and 30. She hopes the use of computer technology in class will motivate her students and improve learning outcomes.

Babs has been teaching twenty years. She is teaching English at the junior high and high school level. Her assignment involves a variety of levels and she would like to incorporate computer technology into her classroom to improve her opportunity to work one - on - one with students who require extra assistance to achieve success.

Joe has been teaching eighteen years. Joe has strong computer technology skills and would like to incorporate the Site Based Software Project into his teaching because he wants to appeal to those students who are intrigued by computer technology. He thinks many students have the opportunity to learn more by using computer technology.

Cathy has been teaching twelve years. Cathy is involved in the Site Based Software Project because the majority of the Language Learning Teachers at her level, junior high to high school, are involved and she wants to "keep up" with the advances in the division.

Two other teachers involved are not currently classroom teachers. They are acting in managerial roles in this project. One has been relieved of his teaching duties, as of the end of January, which is the semester break, to work full - time on this particular project. One other participant is currently a school administrator and he, too, has been officially allotted a block of time to work specifically on this project. Half of his time (50%) is allotted to the project.

Method

Through the use of qualitative research methods, data was acquired and interpreted. The following approaches were used:

1. Frequency distributions, and graphic representations of beliefs and values toward the use of computer technology in the classroom were developed.
2. Measures of central tendencies for reasons of successful progress and unsuccessful progress were drawn from the questionnaire responses.
3. Data was collected and themes were inferred from responses in personal conversations, Email conversations, focus group discussion, and questionnaire responses.

Selection of Population

All participants volunteered to participate.

Mortality

It was anticipated that since the participants were volunteers that the mortality rate would be very low. This was not the case. Five out of ten participating teachers dropped out.

Reliability

Personal factors of the respondents could not be controlled for. Administration of the questionnaire was controlled. Comparative reliability could not be controlled for as the study was new.

Validity

a). Content validity. In an effort to judge whether or not the questionnaire items measure what is claimed they measure, the document was circulated numerous times to a variety of experts in the area.

b). Construct validity. If little importance was placed on the questionnaire by respondents, validity would have been diminished. Positive, motivating conversations and a cover letter were provided in an effort to minimize this effect.

This section has examined ways in which reasonable inferences can be made from the data collected. Consideration has been given to many variables in an attempt to reduce their effects.

Limitations

The teachers were not placed in a central location. They were located in many different schools separated by a minimum of 15km each and as much as 80km. The Email system between the participants was often not in working condition. Teachers' time away from the classroom was minimal.

Many teachers had professional commitments that competed with their attention to this study. The dynamic nature of the software itself was a serious variable, as well as the lack of leadership and the fact that leadership roles and responsibilities were never clearly defined. Personal learning styles and preferences were difficult to accommodate at best. Access to assistance with the software was limited as experts were few. Actual instances of the teachers using the computer technology in their classrooms were very limited, most often due to technical difficulties.

Questionnaire Results

Introduction

Profile of Respondents

#1 = Female, 17 years of teaching experience

#2 = Male, 20+ years of teaching experience

#3 = Male, 27 years of teaching experience

#4 = Female, 6 years of teaching experience

#5 = Male, 8 years of teaching experience

The following is an analysis of the Personal Belief questions, followed by the Personal Strategies questions as they appear on the questionnaire. The results are illustrated in graph form on the following two pages.

Personal Beliefs

1. Using a computer for my personal use at school interests me.
2. The computer has a lot of potential for providing improved lesson material for me.
3. Integrating computer technology (C.T.) for content delivery is too time consuming.
4. Using C.T. for management purposes in my classroom is too time consuming.
5. Using C.T. as an instructional tool is just a fad.
6. Most of what I have learned about C.T. I have learned from books.
7. Most of what I have learned about C.T. I have learned from colleagues.
8. Most of what I have learned about C.T. I have learned from courses.
9. Most of what I have learned about C.T. I have learned from computers.
10. Most of what I have learned about C.T. I have learned at professional inservices.
11. Most of what I have learned about C.T. I have learned on my own.

Personal Strategies

12. I believe in using a variety of teaching strategies in all my classes.
13. Usually, younger people catch on to the use of C.T. more easily.
14. I routinely share new information about teaching with my colleagues.
15. My school administration strongly supports my professional development.
16. Technical problems are a serious drawback of the use of C.T.
17. I am constantly changing the way I teach.

18. The majority of my class time is spent with me lecturing.
19. The majority of my class time is spent on individualized instruction.
20. The majority of my class time is spent on cooperative work.
21. The majority of my class time is spent working collaboratively with students.
22. The computer is mainly used for administrative duties such as marking attendance and grading.
23. I enjoy working with other staff members on professional development projects.
24. If things don't go smoothly when I try new ideas, I tend to give up and stick to my tried and true methods.

Summary of Participants Personal Beliefs (Table 1)

The participants were very interested in using computer technology for their personal use at school. This information indicated a high level of motivation on behalf of the participants. Four of the five participants believed the computer had a lot of potential for providing improved lesson material, one other was not sure. This may have been a key motivator for the participants. Only two participants believed integrating computer technology for content delivery was too time - consuming. Once again, this was evidence of strong motivation. Three were not sure if using computer technology for management purposes in their classrooms was too time - consuming. Of the other two, one agreed it was and the other disagreed. This indicates that the participants had not yet implemented the use of computer technology. Therefore, an opinion could not be formed. One person thought computer technology was a fad, two disagreed and two strongly disagreed. The majority of the participants believed the use of computer technology was a long term strategy. Three participants agreed they learned mostly from books, one disagreed and one strongly disagreed. One participant strongly agreed he/she has learned mostly from colleagues, one agreed, one was not sure, one disagreed, and one strongly disagreed. One participant agreed he/she has learned most from courses, one was not sure, and three

disagreed. One participant strongly agreed he/she has learned most from computers, two agreed, one disagreed, and one strongly disagreed. Two participants believed most of what they have learned has originated from professional development, two disagreed with learning from professional development, and one participant strongly disagrees with learning from professional development. Three participants believed most of what they have learned about computer technology, they have learned on their own. Two participants were not sure. The majority of the participants indicated they have learned mostly on their own and, secondly, from books. A conclusion to be drawn from this information is that the participants need to be provided with time and resources to learn independently. Courses and P.D. were not highly recognized as learning situations. This is important in that less time could be spent on these areas of instruction, providing more time for independent learning. It is necessary to keep in mind that this information is based on personal beliefs. Personal beliefs can be far more influential than mandates or agendas. This information has value for anyone making decisions on P.D. issues, even though the sample size is small.

The following information documents results from the personal statements section of the questionnaire. All responses are exactly as recorded by the participants.

25. I rate my ability to use C.T. as:

weak

moderate - #1, #5

strong - #2, #3

expert - #4

26. The educational material I read most regularly is:

#1 -Phi Delta Kappan

-Language Journals

#2 - What comes to hand in a particular area of interest at the time.

#3 - A.T.A. Magazine and paper, books and articles as time permits.

#4 - Computer and technology magazines and journals.

#5 - History and science fiction interest me most. I have little time for reading.

27. What I need most to improve my teaching is to learn more about:

#1 - Technology and cooperative learning.

#2 - Differentiated learning.

#3 - Current integration of C.T. in the class room as an instructional model.

#4 - How to direct or promote student directed learning further. Make the most of it.

#5 - Integrating C.T. into all of the classes I teach as an alternative learning opportunity.

28. My favorite aspect of teaching is:

#1 - Contact with students

#2 - When students: a) turn on b) are interested c) relate to the lessons of the classes

#3 - Developing the writing process in students, so that they may grow and expand and realize their growth as human beings.

#4 - Providing students with the ability to choose their own path for learning.

#5 - Learning from the students.

29. My biggest fear about the use of C.T. is:

#1 - Not knowing enough

#2 - We'll think it is God's final answer because it will be the cheapest way.

#3 - None.

#4 - Loss of the people aspect of life. Isolation from society being promoted.

#5 - The fact that everything put into the computer has the potential to become public knowledge so to speak. The loss of privacy to an extent.

30. My best experience with the use of computers was:

#1 - Writing with students & one another

#2 - 1. Personal publishing 2. Modem -BBS use 3. Students in writing classes.

#3 - Creating advertising slide presentations.

#4 - Starting and running my own Bulletin Board System.

#5 - Finding meaningful material for school on the Internet and using word processing for all of my planning.

31. My worst experience with the use of computers was:

#1 - When it all freezes up

#2 - When they fail / quit / etc./ etc!

#3 - None.

#4 - Losing all of my files and being unable to retrieve them.

#5 - None.

32. The most significant benefit from the use of computers in school is:

#1 - Students feel highly motivated.

#2 - The medium is new enough to excite students. It is important enough to need to be learned.

#3 - Individualizing student growth and learning.

#4 - It increases the amount I can accomplish because I can type faster than I can write. This is true for many students as well.

#5 - The ability to access a wealth of information.

33. The use of the computer will change my job in that:

#1 - Students will become more active in their own learning.

#2 - It is expected now of all teachers.

#3 - I will guide more and lecture less.

#4 - I will have the opportunity to access more information and enhance my lessons with this knowledge.

#5 - No answer.

34. Please list some of the computer programs or software packages with which you are most familiar.

#1- Word, Turbo School, Word Perfect, S.B.S (Site Based Software)

#2 - Windows 95 generally, Microsoft Office & its components, word processors, Integra.

#3 - First Choice, Turbo Class, Word Perfect Works, various games.

#4 - Office 97, Windows 95, Windows 3.11 for work groups, Excel, Powerpoint, Word, 3D Studio, Max, Mavis Teaches Typing, Front Door, SBBS, Proboard, more.....

#5 - Lotus Word Pro, Netcom, Mavis Teaches Typing, Powerpoint, Word, Microsoft.

35. Please feel free to add any further comments.

#1 - Sorry I couldn't spend more time on this.

#2 - No comments.

#3 - No comments.

#4 - It is important for everyone to incorporate computer technology into their daily lives.

We have a responsibility in education to provide all students with this opportunity. My children have been using computer technology their entire lives. I feel it is a necessity.

#5 - No comments.

Summary of Participants Personal Strategies (Table 2)

Three participants believe they used a variety of teaching strategies in all their classes. One disagreed and one strongly disagreed. This may indicate that most participants were comfortable with the use of a variety of teaching strategies and the others recognized the need to add more strategies to their repertoire. One participant strongly agreed that younger people caught on to the use of computer technology more easily, three agreed, and one disagreed. The majority of the participants did not think they would catch on to the use of technology easily. One participant strongly agreed that he/she shared new information with colleagues, two agreed, one was not sure, and one strongly disagreed. This may indicate that most of the respondents were willing to work collaboratively.

Two participants believed their administration strongly supported their professional development, one agreed, one was not sure, and one disagreed. It was clear that administrative support was provided. One participant believed technical problems were a serious drawback to the use of computers, two agreed, and one was not sure. The

significance of this information is that the participants were aware of the possibility of technical problems. Therefore, this was not a surprise or an unplanned occurrence. Four participants believed they were constantly changing the way they taught; the other participant was not sure. This may show that most of them were used to making changes. Two participants agreed the majority of their class time was spent with them lecturing: one was not sure: the other two disagreed. This information indicated to me that lecturing, while it may not have been the preferred method of teaching, was still a commonly used strategy. Two participants agreed they spent the majority of their class time on individualized instruction, three were not sure, and one disagreed. Individual instruction was a priority; for at least two respondents. One participant strongly agreed that he/she spent the majority of his/her class time on cooperative work, one agreed, two were not sure, and one disagreed. One participant agreed that he/she spent the majority of class time on collaborative work, two were not sure, one disagreed, and one strongly disagreed. All of this information indicates that a variety of teaching strategies were already being implemented in the classrooms.

Three participants agreed that computer technology was mainly used for administrative duties such as marking attendance and grading. One participant was not sure about this and one disagreed. This indicated to me that the majority of the participants were not yet confident enough or motivated enough to expand their use of computer technology in the classroom. Two participants strongly agreed that they enjoy working with other staff members on professional development and three agreed. All the respondents in this study appeared willing to work collaboratively. One participant agreed that if things didn't go smoothly when he/she tried new ideas, he/she gave up and stuck to tried and true methods. One participant was not sure about this and three disagreed. This may indicate that most respondents were at least willing to keep trying with projects, even if things became difficult. In summary, the information indicated a fairly high degree of commitment to personal professional development.

Response to Questionnaire Results

The fact that only five of the ten participants successfully completed the questionnaire is a significant finding in itself. All participants were initially willing and volunteered on their own accord. As time progressed and no completed questionnaires were received, I began to encourage the participants to complete them and mail them to me. Two participants talked to me about their need to drop out of the project due to lack of time. They couldn't seem to find any time to complete the questionnaire. The remaining three participants who did not complete the questionnaire did not give any reasons. They maintained they still intended to complete the questionnaire. I received the last of the five completed questionnaires on July 6, 1997. It arrived with an apology note attached to it. The note apologized for the survey being late. Only one questionnaire was returned within the first two weeks of delivery. Two others arrived in June.

The mortality rate demonstrated in this study gives evidence of the difficulty teachers encounter in finding time to follow through on commitments; even when those commitments are made voluntarily. The teaching day is filled with immediacies preventing teachers from accomplishing planned tasks.

The Personal Beliefs identified by the participants revealed that all the participants believed the use of computer technology is important. They also believe the use of the computer can improve their lesson materials. Yet all participants felt integrating computer technology was too time - consuming. I find this an interesting fact. Even though the participants believe the integration of computer technology is too time - consuming, they are still willing to make an effort to implement it. Everyone agreed that computer

technology is not a fad. Perhaps this is the reason they have chosen to make the effort to incorporate it into their repertoire of classroom teaching.

One of the participants indicated that he/she has learned most of what he/she knows from information gained from colleagues. Four participants felt that most of what they have learned, they have learned on their own. Learning from books was rated low by three participants, as was inservice training. This information surprised me. This information suggests that the participants would prefer to have time alone with the task to experiment and learn independently rather than being directly instructed on the task at hand, in this case, the use of the technology. In my opinion, this is the most valuable finding of the questionnaire concerning the participants' beliefs. It illustrates the need to provide teachers with time and opportunity to learn as they wish to, even if that is on their own.

The Personal Strategies identified by the participants placed a strong emphasis on the provision of a variety of teaching strategies in all their classes. I assumed the participants would have a desire to add the use of computer technology to their strategies. Three of the five participants felt young people learn to use technology easier. This may suggest that the participants may hold some doubt as to their capability to effectively learn and apply the use of computer technology. It also may identify the possibility that the participants are encountering difficulty in actually learning to use computer technology although they have never expressed this in other contexts. All participants felt supported by their school administration. As the literature suggests, this is important if successful change is to occur.

All participants agreed that they are constantly changing the way they teach. Lecturing was not identified as a dominant method of instruction. Cooperative work and collaborative work were identified as more desirable and more used. This may suggest the participants have a preference for more student - directed learning. All participants claimed to enjoy working with other staff members on projects. Unfortunately, none of them chose to collaborate on the project, even when given the opportunity. All but one participant disagreed with the statement "If things don't go smoothly when I try new ideas, I tend to

give up and stick to my tried and true methods." This is not so surprising in that the responses were from the remaining five participants in the project.

One participant identified himself/herself as an expert concerning his/her ability to use computer technology. Two considered their skills strong, and two considered their ability to use computer technology as moderate. No participants perceived themselves as having a weak ability to use computer technology. This is important in that no participants stated they had achieved success in implementing computer technology use in their classrooms.

Only one of the participants identified reading concerning technology as his/her preferred reading material. This suggests that the interest is primarily in learning an additional teaching strategy rather than with technology itself. I feel this is useful information in that the opportunity to use the technology may not necessarily be a motivator for the participants. All participants indicated what they needed most to improve their teaching was the integration of technology and or cooperative learning within their classroom. Additionally, facilitating growth and learning in the students was indicated as a favorite aspect of teaching by most respondents. This is important in that it identifies that students are the participating teachers' number one priority. This may clarify why immediate needs were addressed before the goals of the project, as was suggested by participants, ("the days were filled with immediacies and things that 'come up' during the day.")

One participant indicated no fears concerning technology. Evidently, fear of the technology was not a factor in preventing progress concerning the project. Technical problems such as the computer 'freezing up' were indicated as worst experiences. This is definitely frustrating as nothing can be done, as yet, concerning this issue.

All participants agreed the use of computer technology was an effective method of encouraging student learning. Teachers often identify student motivation to be a concern in lesson planning. Clearly, these respondents can see greater student interest in the use of computer technology. Finally, participants indicated the belief that the use of computer

technology would promote active learning on behalf of the students and require them, as teachers, to lecture less. This is consistent with the belief of these participants that lecturing students is ineffective.

One participant apologized for not spending more time on the questionnaire itself. Three others made no further comments. One participant took the opportunity to state the importance of the implementation of computer technology into all our lives.

Summary of Questionnaire Results

The questionnaire identified some important personal beliefs and strategies of the participants. Their responses indicate they believe they should be active participants in the process of change which required learning a new skill, even though they experienced little success in achieving their goal of implementing the use of computer technology into their classroom teaching. Further, the results suggest even though the participants felt they had adequate support administratively, as well as the skill level to achieve success, these things did not seem to propel them toward their goals.

Excerpts from Journal Documentation of the Project

October 14, 1996

Chris Hughes presented his Shell at The University of Lethbridge for anyone in the Faculty of Education who was interested. The presentation was held in the Faculty of Education Computer Lab. In attendance were; Dean Walker, Dr. Marlo Steed, Dr. Gerald McConaghy, Dr. Craig Lowen, Dr. Frank Sovka, Dr. Keith Roscoe, Ken McMurray, Angela Payne, and myself. The presentation began at approximately 4:00 p.m. Chris began by describing how he created the Shell. The terms were very technical and computer 'techie' jargon filled most of the sentences. He continued to explain, in very technical

terms, how it would be implemented into The Foothills School District. Teachers would be using the Shell for curricular instruction on a daily basis. This was the only mention of teachers throughout the presentation. Students were not mentioned. The technical description of the program continued. It meant nothing to me. I found it difficult to stay awake throughout the two hour presentation. By the end of the two hours, four people remained of the initial nine in attendance. Chris continued talking throughout the interruptions and changing attendance. There were no breaks for questions or checking for comprehension. He was extremely passionate about the topic. Why wouldn't he be? He created the program. Of the remaining people in attendance, the only questions came from those who were concerned about their personal involvement in the project. None of the questions concerned the technology itself. I had no questions concerning the technology. I understood little to - nothing of the presentation itself. My interest in the project was strictly from a professional development point of view. How did Chris plan to inservice teachers in the use of the Shell? He avoided my question by ignoring it and moving on with a technical explanation of something I had no understanding of. I repeated my question. Once again, the subject was changed to a technical issue. This increased my interest in the process of inservicing teachers. It was clear to me he had not developed a plan or, possibly, had not yet addressed the issue.

The next day, I met with Dr. Sovka and expressed my interest in the project from a professional development point of reference. My interest did not include learning about the technology itself. Rather, I wanted to know about the learning of the teachers who would be implementing the technology. He agreed it was a relevant and important aspect of the initiative. Subsequently, he invited me to attend a meeting being held at Oilfields High School on October 25, 1996. I began my proposed involvement in the project.

October 25, 1996

This was my initial visit to the site. The principal of Oilfields High School, Bob Zerabecki chaired the meeting. In attendance were: Dr. G. McConaghy, Dr. F. Sovka, Chris Hughes, Dr. L. Grigg, and myself. I presented my proposal to Bob Zerabecki. I proposed to be involved, in a manner beneficial to both him and his staff, by assisting with the teacher development aspect of the project. I was not clear at this point how I would be involved. Tentatively, I planned to document the process as well as provide support and information for the participants. Mr. Zerabecki expressed interest and welcomed my involvement in the Foothills School District Site Based Software Development Project. Chris was not so receptive to my involvement. There appeared to be a communication problem between Chris and me. He did not understand my intentions and I could not find a way to explain them or write them to create understanding for Chris.

I agreed to return to Oilfields High School in November to meet with Chris and gain understanding of the Shell itself by observing the use of the Shell within the school. I explained to Chris, once again, that my interest was only in the area of teacher development, and the teachers' use of the computer technology, not the technology itself. Again, he did not seem to understand. It was evident that Chris held strong feelings concerning the direction and involvement of the project, but did not reveal what those feelings were. Chris and I agreed to develop a questionnaire together to administer to the participating teachers. It seemed as though we were making progress in that we had reached an agreement to work together on the questionnaire.

November, 1996

I encountered difficulty with Chris in the questionnaire construction. He did not like any of the questions I proposed and I did not like any of the questions he proposed. We did not have the same goals. I was beginning to wonder even if I had to collaborate with him. I could easily have contacted the participants without his input, even though this would

defeat my goal to work collaboratively with him. He constantly changed the subject to something I knew nothing about whenever I attempted to discuss my intentions or goals. He seemed fearful. He did not respond with direct answers to anything I asked him. It was as if he had a secret agenda. I felt that Chris did not want the participating teachers to have any information concerning the project. I also felt the project lacked leadership. Who was the leader? Chris? Mr. Zerabecki? Both?

December, 1996

I decided to end my involvement in the project. Chris and I were failing to communicate effectively. No progress was being made. He was neither supportive of nor receptive to my intended involvement. This made it impossible for me to collaborate with him or any of the other participants. I still had not yet met the participating teachers and time was moving on. If I could not meet the participants, how could I be involved in the documentation of the project? I was not willing to accept Chris' word or descriptions as data. I needed to work directly with the participants. I notified Chris by telephone that I no longer wished to participate in the project. He was surprised. He began immediate attempts to accommodate my goals and showed signs of collaborative skills. He gained a sudden understanding of my intentions. It was decided I would meet the participating teachers in the new year and we would move forward with our project.

January, 1997

I became aware of the involvement of the Language Learning teacher or, district 'expert' in Language Learning, in the project. There was no prior mention of her involvement. It was a great idea. She was a teacher who will ultimately be using the technology in her classroom. She had been teaching at a small school approximately 50km. from Oilfields High School but was freed of her teaching duties for a few hours each week to join Chris on the construction of the Language Learning Shell. They had been working together

during their free time for some time. I was not aware of this. The priority seemed to have been heavily shifted to the Language Learning curriculum. It was a productive meeting and the Language Learning teacher was willing to work collaboratively for the good of the project. She seemed to have a positive influence over Chris. He appeared more motivated and open to suggestions.

February 25, 1997

Finally, I met the participants. We had the opportunity to talk informally before the meeting began and established the beginnings of a collaborative relationship. Chris and the Language Learning teacher had created some concrete material to present to the participants. Everyone was excited to see the developments and were motivated to begin their participation in the project. Chris had four issues to present to the participating teachers. They were:

1. He was thinking of management issues. Managing the software that is. Can it be set up to handle the routine stuff so that teachers are freed to do meaningful teaching and not so many housekeeping tasks?

2. It had to have content.

3. The computer technology had to make time for one - on - one tutoring because it was known that this method of instruction improves learning.

4. The teachers were using the computer technology for managing, not teaching with it. There was no direct instruction using computer technology.

Some of the things Chris hoped to develop over the next few weeks for the language learning software structure were:

1. A writing space

2. A response space

3. Lesson space

4. Testing and diagnostic component

5. Free writing space
6. Bulletin board (queuing and management)
7. A calendar utility

Chris felt that this would work well with multi-aged schooling. He also informed the group that Gage had agreed with him to work together on this project. The Foothills School District did not have permission to use the anthology works because there was no permission from authors. After the meeting had extended two hours, Chris then took the group through a prototype lesson on the computer. Discussion concerning the process continued throughout the sample lesson. The participants were eager and willing to try the lesson in their own classroom. Everyone left the meeting with two disks, one of the program itself and the other to add their own material to. There was no opportunity for the participants to try the program themselves at the meeting. There was also no formal instruction showing how to open the program functions. I wondered what progress would be made when they attempted to use the program in the isolated setting of their own computer in their own classroom. They were instructed to document one feature at a time, to start with a chat line, and come back the next week having experimented with a chat line in their Language Learning class. The participants also agreed to video tape a typical class before implementation of computer technology, and again later in the year, when it was implemented. Mr. Zerabecki agreed to organize and set up the installation of Netscape for each of the involved schools. 50% of his time had been formally designated to the project.

March 23, 1997

The group of participants met again only to discover that all of them had failed to reach their intended goals which were set at the meeting on February 25th.

Reasons for not meeting the goals varied from technical malfunctions to lack of knowledge concerning the program itself, to lack of time to create the necessary material for implementation.

April, 1997

The teachers were very reluctant to admit they had not made progress on the project. They were also very reluctant to ask me to assist them with anything that would have required me to gather information for them or collect materials for them. They did not want to appear 'incapable' in any way. They were each fearful that they were the 'only one' not achieving progression. They also did not want the other teachers to know about their lack of progression. Even though I was an outsider, not affiliated with the Foothills District, the participants still did not feel comfortable sharing their issues with me. Fortunately for some teachers, they had established partnerships within the group. Unfortunately, their collaboration only consisted of discussions identifying such problems as lack of time, incidents that occurred during the day, and other classroom dilemmas. They did not carry this process further to reach a solution, or even discuss a possible solution. I made plans with each teacher to meet with him or her on an individual basis at their classrooms and observe and document their progress.

May 8, 1997

Time was not enabling the participants to meet their goals within the Site Based Software Project. I tried assisting by giving the teachers key issues to focus on for a week at a time. These were almost always superseded by technical problems or immediate classroom issues which took precedence over the project. I had been telephoning and Emailing the two teachers who were fortunate enough to have Email. Their Email was at

home, not at school. I asked them if their videotaping had been completed. No video tapes had been produced, not even tapes of classrooms from the 'beginning' of the project. It was clear to me little to no progress had been achieved.

June 12, 1997

I thought I should encourage teachers to complete the questionnaire since the end of the school year was quickly approaching and none had come in yet. I found myself listening to teachers give lengthy explanations as to why they had not yet completed the questionnaire, followed by an even more lengthy apology. Why did they feel the need to apologize for doing their jobs?

July 1, 1997

I feel I was successful at developing and maintaining a positive rapport with about three of the participating teachers. I do not feel Chris, the Language Learning teacher, and myself ever achieved successful collaboration. I was hopeful at times, but it never really amounted to anything productive as far as working together was concerned. I did Email the Language Learning teacher at home (she didn't want me to Email her at school) but it did not evolve into anything that resembled working together.

Summary of Journal Excerpts

The journal is valuable in that it provides a personal perspective of the project throughout the year. Unfortunately, it is only one perspective, that of an outsider, so to

speak. The journal identifies events (or a lack of events) over the months that shed light on the difficulties surrounding the implementation of this change.

Summary / Findings

This study's examination of the process of change, through the - implementation of computer technology into curriculum instruction, has provided valuable information concerning the process of change. Results clearly indicate that even when teachers, administrators, and outside support are supportive and positive toward the change, it is extremely difficult to cause change to occur successfully. Although the participants were supposedly willing to work collaboratively and time was allotted, on paper at least, real change did not materialized for a number of reasons.

First, study results suggest that clear, consistent leadership is required throughout the process.

The literature and the findings of this study further suggest that those who find themselves in a leadership position, as change agents, would be encouraged to have a firm understanding of the process of change and stages of development in the change process before implementation begins. Examination, assessment, and the firm commitment of all participants from the initiation of the change to the completion is a necessity if success is to be achieved.

Finally, this study's findings show that the possibility of failure is a reality in the change process even if the participants are willingly and are provided with some degree of support. Educational leaders must recognize the possibility of this outcome and adjust to it appropriately. The study provides some verification of relevant theories.

Mainly, it supports Sarason's view on the issue of change, as stated in the literature review. The dynamic nature of computer technology and the development of software is an added variable to the successful implementation of change within this project. Even though

participants in this study were willing and motivated, successful change presented to large a challenge for them to overcome.

Implications

This study's examination of the process of implementing change has provided a realistic case study for teachers, principals, school division administrators, and provincial education authorities. Results clearly indicate that implementing change is a complex process which requires a significant amount of time and support. All of the participants were professionals who have maintained a current knowledge of professional development practices and are recognized as initiators of change yet they did not accomplish their goals.

Recommendations

The need for leaders and other participants to remain flexible throughout the process is of great importance. All participants need to remain open to suggestions and alternate plans. All participants need to be assured that a reasonable amount of ambiguity is "normal". As well, they need to know they can admit they are encountering difficulties without suffering repercussions. **I recommend small steps, clear expectations, more time, and greater support.**

Conclusion

There were two purposes for this study. The first was to examine the research concerning professional development and the process of change. The research revealed that change is a difficult process, often resulting in a low success rate. However, at the same time as formal change initiatives may be occurring, a constant state of change exists within all classrooms. Teachers have difficulty dealing with different sets of expectations relative to change, especially when they appear to be in conflict. It seems that theories of change do not take sufficiently into account the many variables that influence the change process.

The second purpose was to document a voluntary attempt on the part of the teachers to implement change in actual classroom settings. It is the conclusion of this study that even though the participants volunteered to participate in the process of change and were completely willing, they were not successful in meeting all their desired outcomes and goals.

The major goal of this study was to provide a starting point for the implementation of computer technology into the language learning curriculum. I believe this goal was achieved. It remains the responsibility of concerned educators to use this information in appropriate ways to pursue the successful implementation of computer technology in education.

This study has contributed to knowledge of the process of change in professional development through the use of computer technology in the classroom. It offers researchers, teachers, administrators, and school authorities a point of reference making future decisions about the implementation of computer technology into instruction to enhance student learning. This study has attempted to link some of the findings of other researchers with evidence derived from a small pilot project to create a starting point for

future projects. Additionally, it has provided qualitative support for broadly accepted theory and research. However, before generalizations could be made, the examination of alternate explanations for results or outcomes would need to be conducted through additional studies, especially studies involving larger samples in a greater variety of settings.

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TEACHING WITH COMPUTER TECHNOLOGY

A Pre-Project Survey for Teachers
all information is confidential

The following survey was constructed in an effort to establish and identify your personal beliefs and behaviours as they relate to your use of computer technology in the classroom. Please feel free to be as candid as possible as all information is anonymous and confidential. Thank you for your participation.

MALE / FEMALE (please circle one) NAME (OPTIONAL) _____

NUMBER OF YEARS TEACHING _____

TEACHING AREA (SUBJECT AND AGE LEVEL) _____

Please circle the most appropriate response to each statement based on the following ratings:

- 1 strongly disagree
- 2 disagree
- 3 no opinion
- 4 agree
- 5 strongly agree

Personal Beliefs

	strongly disagree		strongly agree		
1. Using a computer for my personal use at school interests me.	1	2	3	4	5
2. The computer has a lot of potential for providing improved lesson material for me.	1	2	3	4	5
3. Integrating computer technology (C.T.) for content delivery is too time consuming.	1	2	3	4	5
4. Using C.T. for management purposes in my classroom is too time consuming.	1	2	3	4	5
5. Using C.T. as an instructional tool is just a fad.	1	2	3	4	5
6. Most of what I have learned about C.T. I have learned from books.	1	2	3	4	5
7. Most of what I have learned about C.T. I have learned from colleagues.	1	2	3	4	5

	strongly disagree		strongly agree		
8. Most of what I have learned about C.T. I have learned from courses.	1	2	3	4	5
9. Most of what I have learned about C.T. I have learned from computers.	1	2	3	4	5
10. Most of what I have learned about C.T. I have learned at professional inservices.	1	2	3	4	5
11. Most of what I have learned C.T. I have learned on my own.	1	2	3	4	5

Personal Strategies

12. I believe in using a variety of teaching strategies in all my classes.	1	2	3	4	5
13. Usually, younger people catch on to the use of C.T. more easily.	1	2	3	4	5
14. I routinely share new information about teaching with my colleagues.	1	2	3	4	5
15. My school administration strongly supports my professional development.	1	2	3	4	5
16. Technical problems are a serious drawback to the use of computers.	1	2	3	4	5
17. I am constantly changing the way I teach.	1	2	3	4	5
18. The majority of my class time is spent with me lecturing.	1	2	3	4	5
19. The majority of my class time is spent on individualised instruction.	1	2	3	4	5
20. The majority of my class time is spent on cooperative work.	1	2	3	4	5
21. The majority of my class time is spent working collaboratively with students.	1	2	3	4	5
22. Computer technology is mainly used for administrative duties such as marking attendance and grading.	1	2	3	4	5
23. I enjoy working with other staff members on professional development projects.	1	2	3	4	5

24. If things don't go smoothly when I try new ideas, I
tend to give up and stick to my tried and true methods.

1 2 3 4 5

.....

Please circle one answer for the following question;

25. I rate my ability to use C.T. as (circle one) **weak moderate strong expert**

.....

Please complete the following statements.

26. The educational material I read most regularly is:

27. What I need most to improve my teaching is to learn more about:

28. My favourite aspect of teaching is _____

29. My biggest fear about the use of C.T. is:

30. My best experience with the use of computers was:

31. My worst experience with the use of computers was:

32. The most significant benefit from the use of computers in school is:

33. The use of the computer will change my job in that:

34. Please list some of the computer programs or software packages with which you are most familiar with.

35. Please feel free to add any further comments.

THANK YOU FOR YOUR PARTICIPATION



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FACULTY OF EDUCATION

Dear Teachers:

I am conducting a case study of the collaborative project involving the participating teachers in the Foothills School District who are actively involved. The purpose of the project is to facilitate effective classroom use of computer technology. The purpose of this study is to document the process of the project. I anticipate that your students, as well as yourself, will benefit from participation in this study. The opportunity to utilize the schools' technology to its' full capacity is a wonderful opportunity for professional development. I would like your permission to analyze your participation in this study.

As part of this research you may be asked to complete a questionnaire as well as participate in a video taping of the classroom. Please note that all information will be handled in a confidential and professional manner. The questionnaire is anonymous. Your participation in the videotaping is optional. When responses are released, they will be reported in summary form only. The results will be presented at a national conference. Further, all names and any other identifying information will not be included in any discussion of the results. You also have the right to withdraw your participation from the study without prejudice at any time.

If you choose to do so, please indicate your willingness to participate by signing this letter in the space provided below and return that portion of the letter to me.

I very much appreciate your assistance in this study. If you have any questions please feel free to call me at 329 - 2451. If you wish to acquire any further information, feel free to contact the supervisor of my study Dr. D. Townsend at 329 - 2731 and or Gerald McConaghy of the Faculty of Education at 329 5140.

Yours sincerely,

Marissa Enns, University of Lethbridge tele:329 - 2451

I agree to participate in this study.

Jerry S Blake
Name Teacher

J S Blake
Signature

June 20/97
Date