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Perceived Barriers To Instructional Use Of Computer Technology In Alberta Schools

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Perceived Barriers to Student Use of Computer Technology in Alberta Schools submitted by Kathy Schwarz in partial fulfillment of the requirements for the degree of Masters in Education in Instructional Technology.

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Abstract

The purpose of this research was to determine what organizational, training and resource needs teachers perceived as existing that act as barriers to the instructional use of computer technology.

The data for this study were collected in the form of a needs assessment survey from 3000 full-time teachers teaching in either public or separate school systems within the province of Alberta.

A review of the literature revealed that organization, training and resource issues were the three main themes. Organizational issues included topics such as teacher empowerment and support mechanisms. Resource needs included physical resources such as hardware and software as well as access to technical help and time. Training needs included two main categories - technical training and teaching strategies.

The results showed that teacher input and access to resources were two key organizational themes. Currently, the majority of teachers have little to no training, except in the area of word processing, but teachers indicated that they are interested in receiving training in the areas of teaching techniques as well as technical training. Key issues include the need for continuous, hands-on, practical training offered during school hours on a regular basis by resource staff either at the school or school board office. Modeling must be a component of training and training must continue until teachers are comfortable using technology with students. Teachers indicated that the equipment they are currently using is, in many cases, out of date and needs to be updated. The quality and quantity of software were also noted as a

concern. Teachers felt that in addition to physical resources, they needed time to learn about computers and their uses, technical assistance, as well as peer and administrative support.

Recommendations includes ensuring strong leadership and vision while addressing the organizational, training and resource needs of teachers simultaneously.

Recommendations for future research include studying teacher training programs to assess how well teachers are being prepared to teach in the Information Age and studying how computers are being used in greater detail.

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Chapter I

OVERVIEW OF THE PROBLEM

In 1979, two men, Jobs and Wozniak, built a machine that would revolutionize our lives and change the future forever; they built a microcomputer. Since then we have moved from the Industrial Age into what is termed the Information Age in which computers are playing an increasingly important role in our society. We now depend on computers for everything from banking services to medical diagnoses to car repairs.

According to the Organization for Economic Cooperation and Development, candidates for jobs between the years 1995 and 2005 will need to be highly literate, have strong math skills, and know how to use computers ("For a job in 2005," 1994).

Few would argue with such forecasts, so it is not surprising that schools have come under a great deal of pressure to meet the societal demand for computer literate citizens who increasingly require computer skills to obtain employment. But are schools succeeding? Not everyone thinks so. Short (1994) stated that "to speak of the revolution in instructional technology as a failure is to invite the charge of overstatement" (p.2).

Sheingold (1991) echoes this stating that "despite the promise that new technologies offer to schools and despite the encouraging developments in some places, the full potential of the technologies is not being widely realized" (p. 20).

This author seeks to determine the extent to which computers are being used and to identify needs that exist that must be met in order to further improve student use of computer technology by conducting a needs assessment.

According to Stufflebeam, McCormick, Brinkerhoff & Nelson (1985), needs assessments are used as a means of addressing future-oriented questions. Stufflebeam, et. al. (1985) describe a need as a discrepancy between desired and observed performance.

Kaufman & English (1979) expands this by stating that needs assessments are

> tools for constructive and positive change — not change driven by controversy, 'quick-fixes' and situational crises, but rational, logical, functional change which meets the needs of citizens, educators, and learners. They represent formal, systematic attempts to determine and close the more important gaps between "what is" and "what should be" (p. 8).

They caution that "a needs assessment is an identifying, harvesting, justifying, and selecting of gaps (or needs) to be closed" (Kaufman, et. al., 1979, p. 8). The gaps must be important and correct, otherwise it will be impossible to achieve the desired outcomes.

This research assessed current computer use which was compared with desired use. It is belief of this author that in order to close the gap between current and desired performance, the organizational, resource and training needs of teachers must be addressed simultaneously.

Research Question

What perceived organizational, training and resource barriers must Alberta teachers overcome to improve the use of computer technology with students?

Organizational Needs

1.1 What organizational needs must be met in order to improve the use of computer technology with students?

1.2 How do the organizational needs of teachers in divisions I, II, III and IV differ?

Training Needs

2.1 What are the current levels of training among Alberta teachers?

2.2 What are the teacher training needs that must be met to improve the use of computer technology with students?

2.3 How do the training needs of teachers in divisions I, II, III and IV differ?

Resource Needs

3.1 What resources are currently available to teachers in Alberta schools?

3.2 What are the resource needs of teachers that must be met to improve the use of computer technology with students?

3.3 How do the resource needs of teachers in divisions I, II, III and IV differ?

Delimitations

This study only addressed student use of computer technology and teaching using computer technology. It will not address non-instructional school uses of computers.

The research only examined the needs of Alberta teachers who are currently teaching full-time in either a public or a separate school system. It did not include private schools, schools situated on Hutterite colonies or other institutions whose primary role is not education (i.e. schools operated in correctional facilities, group homes, etc.)

Limitations

The information collected was based on a self report and represents only the perceptions of Alberta teachers.

Assumptions

1. *The ideal classroom is a learner-centered environment in which technology is used as a tool to solve problems, accomplish tasks, and contribute to the learning process.*

Despite decades of educational reform, students in many classrooms still engage in activities characteristic of teacher-centered environments: lecture, recitation, seatwork. (Apple Computer, Inc., 1991a) Many people seeking educational reform would prefer to see a shift from teachers as dispensers of knowledge to teachers as facilitators, coaches and managers of learning in which students are actively involved in constructing their own knowledge and understanding through interdisciplinary project work that involves the cooperative achievement of goals. (Stoddart & Neiderhauser, 1993; Sheingold, 1991; Willis, 1993; Apple Computer, Inc., 1992)

2. *In order for technology to be implemented successfully, a multidimensional approach must be adopted.*

Fullan (1991) identifies 3 components or dimensions that must be addressed simultaneously when implementing new programs or policies: new materials, new teaching approaches, and the possible alteration of beliefs. This author has chosen to address these three basic concepts under the headings organizational, training and resource needs.

Significance

This research is general enough that it might be used by any school board or department of education in assessing the organizational, training and resource needs of teachers. From this assessment, policies, strategies and action plans can be developed.

Definitions

Needs assessment is defined as process of identifying gaps between what is happening and what should be happening. (Kaufman et. al., 1979)

Outline of Thesis

Chapter #2 provides the theoretical framework for the research. It describes the need for a clear vision and strong leadership as well as the types of organizational support teachers need to achieve the "ideal". Specific training issues such as lack of training, training content, the need for modeling, and continuous hands on training are also addressed. Lastly, the need for resources such as on the spot assistance, support, time, software and hardware is discussed.

Chapter #3 describes the methodology used in this study. This includes a restatement of the research questions, and a description of the population and sample. A copy of the instrument used to collect the data is provided (Appendix A).

Chapter #4 includes a restatement of the research questions as well as a presentation of the data reflecting the findings of the study followed by a summary.

Chapter #5 provides an interpretation of the data, recommendations for changes required to achieve the "ideal", a conclusion and suggestions for further research.

Chapter II

REVIEW OF THE LITERATURE

As stated earlier, the purpose of this research is to identify ways in which to close the gap between current technology use and ideal technology use by simultaneously addressing the organizational, resource and training needs of Alberta teachers.

In 1993, Alberta Education (1994) conducted a study in which surveys were sent to 1,524 schools to assess how computers were being used in Alberta schools as well as how many computers and what type of computers were available. As well, 125 school jurisdictions were surveyed to gather information on the development of computer policies. According to this data, incorporated integrated computer time, "time spent on the computer that relates directly to curriculum objectives" (p. 16), averaged less than 2.5 hours per week as shown in table 2.1:

Table 2.1: Integrated computer time per week (Frequencies)

Amount of time	Number of responses
No time per week	37
Less than 1 hour per week	518
From 1-2.5 hours per week	569
More than 2.5 hours per week	89

Table 2.2 compares the top three uses of computers at elementary, junior high and high school levels:

Table 2.2: Type of Computer Use at Division Levels

Elementary Schools	Junior High School	High Schools
Language arts	English	Business Education
Math	Math	Computer Science
Computer Literacy	Social Studies	English

Notice that computer literacy/science was one of the top three uses at both the elementary and high school levels.

It is the belief of this author and others that technology should be used to transform classrooms from teacher-centered environments into learner-centered environments and that the computer itself should not be an object of study (Apple Computer, Inc., 1991a; Stoddart & Niederhauser, 1993; Willis, 1993; Carey, 1993, Collis, 1988).

In this "ideal" environment, technology would be used not as an add-on, but would truly be integrated. Rather than teaching English in the same way as usual then using a word processor to assist with writing (an add-on), what and how we teach would change in ways that make the technology an integral part of the learning process.

Organizational Needs

To achieve this ideal, strong leadership and vision are required (Willis, 1993; Cory, 1992; Fullan, Miles & Anderson, 1988).

> If educators learn nothing else from the recent literature on America's best run businesses, they should learn the importance of strong and visionary leadership at the very top of the organization...I don't believe that it would be possible to move steadily toward Information Age schools without the superintendent clearly and consistently articulating that vision...Principals...must be able to guide groups of teachers, support staff and parents to move in a consistent direction (Cory, 1991, p. 42).

This clear articulation of vision is critical because as Lee (1986) demonstrated, gaps in understanding and communication can affect outcomes. She described teachers who rated themselves on a survey as being very comfortable using the computer; when Lee observed these teachers she found in fact they were very comfortable because they used only a very limited number of functions of one piece of software. So while the teachers felt they were accurately describing themselves, it may have been somewhat misleading. In another example, she described teachers who followed the activities suggested in a teachers guide, even though the activities had nothing to do with any topic currently under study. They felt that because students were using a graphics program, computers had been integrated into the curriculum. She cites this as an example of teachers being unclear about the

meaning of "integration". Goodlad (1970) cites this lack of understanding as common:

> Since the teachers usually are only exposed to the ideas whatever the intended change, and have not yet internalized their full meaning before being on their own with the ideas, it is not surprising that there appears to be a gap between what they think they are doing and what we saw them doing (p. 102).

The need for clarity of the vision in the minds of educational administrators is particularly important because without it, they will be unable to provide the necessary leadership, guidance and organizational support that many authors believe is one of the greatest obstacles to successful implementation of new programs or ideas (Willis, 1993; Fullan et. al., 1988; Somekh, 1992).

Research on school leadership indicates that effective school administrators must create a positive climate for change by encouraging experimentation, guiding teachers, and providing latitude for risk taking while at the same time holding teachers accountable for change (Fullan et. al., 1988).

Furthermore, they must be prepared to alter school structures that are noted in the literature as barriers to effective computer use in a student-centered environment such schedules (Apple Computer, Inc., 1992), lack of subject integration (Sheingold, 1991; Apple Computer, Inc., 1992), physical layout of facilities (Apple Computer, Inc., 1992), and limited access to equipment (Alberta Education, 1994). Each of these issues can be resolved at least in part by school administrators working together with teachers.

School administrators and teachers may decide to relocate computers from a centralized location to classrooms, to review class length to provide more flexibility to teachers when they are engaged in project based work, or to review how facilities are scheduled. Each of these are examples of ways in which school administrators can support computer use within any given school.

As well, school administrators must be willing to support and assist with classroom changes. For example, the addition of technology to classrooms may require teachers to reassess the physical classroom environment. In 1991, Apple Computer researchers sought to determine the physical impact of adding technology to traditional classrooms, the effects on teaching and learning and ways to improve classroom designs to encourage technology use. They found that "...while they [teachers] said they wanted to encourage collaborative learning, the current arrangement of furniture made that difficult...in a follow-up survey, teachers reported that the changes they made substantially enhanced individual and full-class presentations as well as individual and small-group work." (Apple Computer, Inc., 1991a, p. 10).

In the report compiled by Apple Computer, Inc. (1991a) teachers concluded that some of the physical changes that needed to occur included ensuring access to technology for multiple activities, arrangement of furniture to encourage group work as well as individual projects, increasing visible access within and between classrooms, networking and organizing classrooms to facilitate the placement of technology in the center of the room.

Adding technology to classrooms also increases space demands. Each of these factors may require a reengineering of the "typical" classroom, something that may not be possible without the support of administration.

Lastly, all parties need the opportunity to provide input because as noted by Willis (1993), Fullan (1991) and The New Brunswick Teachers' Association [NBTA] (1995) when change is imposed, resentment may result and resistance may lead to the failure of an initiative. This opportunity for input is critical to staff buy-in and while the vision for computer use in schools may be set for a school jurisdiction or even the entire province, strong school leadership can result in school level input about how to achieve the vision.

A recent report by the NBTA (1995) emphasized this:

> Teacher empowerment must also be addressed in providing teachers with some professional autonomy to make decisions and to research alternatives to adapt the services they provide to students. As teachers move to a facilitator model of instruction, it is critical that those teachers have greater autonomy to manage resources, determine methodologies and develop alternate or expanded strategies to meet the needs of students...it is imperative that initiatives be encouraged and access to potential resources be facilitated (p. 6).

Two key factors not yet addressed, but closely tied to this issue are administrative support for acquiring and maintaining resources and staff development. These two topics will be addressed in subsequent sections.

Training Needs

Training needs are the second area of focus in the quest to close the gap between current technology use and the ideal.

Lack of Training

In Alberta, 43% of teachers surveyed by Alberta Education (1994) rated the level of staff training in the use of microcomputers as less than satisfactory.

Similarly in New Brunswick, the NBTA (1995) lists lack of training and fear of technology as two reasons why teachers are reluctant to use technology. In the survey they conducted, only one third of teachers surveyed felt they were "at or above the level of being comfortable with technology".

The NBTA (1995) report goes on to state that

> While there is a great deal of emphasis placed on the importance of technology, there is a significant shortfall in the availability of convenient access to equipment and in-service by teachers. If technology is sufficiently important to require certification by students prior to graduation, then it follows that sufficient time must be provided to teachers to become properly introduced to its benefits, and to explore strategies for its application in the classroom (p. 6).

Type of Training

Two primary types of training need to occur in order to prepare teachers for technology use. The first type must address the pedagogical implications of the vision being implemented.

> Introducing technology into a classroom involves much more than locating a suitable table for the equipment, plugging it in, and teaching students how to load a program into a computer from a diskette. Integrating technology into the curriculum often requires that the teacher adopt different strategies and take on different roles. The change is often from a teacher-centered, teacher-controlled classroom to a classroom in which the teacher is more a facilitator than a director of learning (Carey, 1993, p. 105).

Simply introducing computers to teachers will not change their approaches to teaching; they need training to help them understand how to transform their classrooms, how to best utilize computer technology, and how to integrate technology into the curriculum. They need to be shown the benefits of computers and taught new ways of evaluating and organizing learning experiences for students.

Futrell (1989) states that "most new teachers have been taught to use computers; they have not been taught how to teach with computers. The difference may be subtle, but it's decisive" (p. 45).

The second type of training, which in many ways is easier to address, is the "how to" technical element of computer use. This includes how to use the hardware and software.

From a staff development point of view, Browne & Ritchie (1991) suggest that there are four key components to staff development: instruction, modeling, coaching and empowerment.

Instruction, as noted by New Brunswick teachers in a 1995 survey, must be hands-on and continuous. One teacher commented that "training in computers and technology will have to remain constant to help keep teachers current" (p. 28). Another stated that "proper training does not mean a 1/2 day or 1-day workshop for 2 or 3 teachers on staff once a year, who then are expected to teach all the others everything they know on their own time, after school, lunch hours, preparation periods, or whenever they have a chance" (p. 30).

Benson (1984), Hasselbring (1991), Showers, Joyce and Bennett (1987), SRI International (1989) and Sparks (1983) also stress the need for practical, continuous training of teachers.

Once teachers have had instruction in the use of hardware and software and have been enlightened about the pedagogical changes that may need to occur in their classroom to achieve the ideal, staff then need to see this ideal in practice. They need to observe peers modeling the ideal.

Browne and Ritchie (1991) believe that modeling is critical because it "provides teachers with the opportunity to observe varying degrees of expert performance" (p. 28).

The next level in the staff development process according to Browne & Ritchie (1991) is coaching followed by empowerment. Coaching, which this author believes is a key component in the successful implementation of computer technology will be discussed in subsequent sections under the topic of resource needs. Empowerment was discussed in the section on organizational needs.

Teachers progress through five phases when using technology: entry, adoption, adaptation, appropriation, and invention (Apple Computer, Inc., 1991b). Researchers noted that when teachers first start using technology, they use it to replicate traditional instructional practices and learning activities, namely lecture, recitation, and seatwork. This continues even into the adoption phase, but as teachers approach the appropriation phase where students have high access to computers and are involved in interactive, project-based, interdisciplinary study, they begin to understand the technology and use it effortlessly as a tool to solve problems. In the last stage, teachers use technology with students when it is needed to encourage active, creative learning. At each stage of use, teachers need training of different types.

Resource Needs

The last need to be addressed by this research are the resource needs of teachers. If teachers are to achieve the ideal in technology use, physical and support resources must be made available in sufficient quantities.

Hardware

In 1994, only 9% of Alberta teachers who responded to an Alberta Education survey indicated that the age and condition of computer equipment in their schools was excellent. That survey revealed that 44% of computers in Alberta schools are the Apple II type. Another 18% were 286 or pre 286 computers. The ratio of students to computers was 9.8:1.

In a 1995 survey of New Brunswick teachers, the NBTA reported that 54% of teachers felt they needed more computers in the classroom and 53% felt they needed more computers in their school. On a likert scale ranging from very important (1) to not important at all (4), the means were 1.73 (for classroom computers) and 1.59 (for school computers).

Fifty percent of New Brunswick teachers also indicated that the equipment available to them was old, not very useful, or unavailable to them.

With regard to student use of computer technology, in an interview conducted by Cox (1987), Seymour Papert made the analogy that "if teachers wanted to teach children to draw, and only brought eight pencils into the school, they would be disappointed with the results" (p. 14).

Similarly, computers must be supplied in adequate numbers if they are to produce substantial results.

Software

Much has been written about the poor quality of educational software (Hasselbring, 1991; Benson, 1984; Fullan et. al., 1988). Common complaints include lack of good reinforcement theory, poor documentation and help functions, few suggestions about how to incorporate software into the curriculum, and narrow ranges of acceptable student input though most of these complaints are in reference to content specific software packages rather than application tools such as word processors and databases.

Other authors feel that software is being used inappropriately by teachers. Hasselbring (1991) cites the example of giving a student software that requires fluency when the student is still at the acquisition phase of learning.

In addition to sufficient quantities of quality materials namely hardware and software, other resources that can be tied back into organizational support must also be addressed.

Collegial Support

Support as defined by Apple Computer, Inc. (1991b) can take four approaches:

1. emotional support in which teachers share frustrations and successes and provide encouragement to one another

2. technical support whereby teachers seek assistance with hardware and software problems or issues
3. instructional support which involves discussing strategies, sharing ideas, and peer observation
4. collaboration which involves joint planning, team teaching, developing new ways of accomplishing tasks and interdisciplinary teaching.

This idea of collegial support is the part of staff development model that Browne & Ritchie (1991) refer to as modeling and coaching (as addressed in the training needs section of this document).

Willis (1993) cites nonexistent, inadequate or inconsistent support as a major reason why technology integration fails and suggests small school-based groups working with consultants and electronic networks as two ways to improve support. He states that qualified support staff, whose only responsibility is support can be beneficial. He goes on to say that technology-assisted innovations are especially sensitive to inadequate support and suggests that instead of spending one hundred dollars on software and hardware for every one dollar on support, that a one to one ratio would yield better results.

Time

The issue of time is one that cannot be understated. It appears repeatedly in needs analysis and implementation studies. Teachers need time to confer, advise, and learn from colleagues (SRI International, 1989), to develop rules,

schedules and procedures for computer use (Garbosky, 1987) and to explore, practice, and learn from each other (SRI International, 1989).

Sheingold (1991) suggests that once teachers begin to use computers they need more time to learn about, get training in and plan for the use of the technology.

> The most precious resource is **TIME**. Without time to experiment, to practice, to make mistakes, and to learn, teachers are not able to maximize the benefit of staff development activities...it is not possible for teachers and administrators to change roles, to create new learning environments, and to build ongoing learning into their jobs without being given sufficient time to do so (SRI International, 1989, p. 22).

Willis (1993) states that "time to experiment, explore and study innovations is essential but rare in schools" (p. 29). He suggests several ways to create the time needed such as providing funding for substitute teachers, allowing teachers to attend training outside school hours, allocating professional development days specifically for computer training, and cross or collaborative assignments that provide teachers with training time.

Conclusion

What perceived organizational, training and resource barriers must Alberta teachers overcome to improve the use of computer technology with students?

By using information from the literature to construct a survey the author hopes to discover which of the needs identified and/or others needs, must be met to close the gap between what is currently occurring and the ideal.

Chapter III

RESEARCH METHODOLOGY

In order to determine the current state of computer technology use in schools and ways to improve technology use with students, a survey of teachers' perceived organizational, training and resource needs was conducted in order to close the gap between "what is" and "what should be", as defined by Stufflebeam et. al. (1985).

Within this chapter, the research questions are restated, followed by descriptions of the population, sample, organization of the questionnaire, procedures for the development and validation of the questionnaire, administration of the questionnaire, ethical considerations, and procedures for data collection, analysis and presentation.

The research questions were chosen because throughout the literature on computer use in schools the issues of organization, training and resources reappear continually. The problem is that the implementation of technology within an organization cannot be achieved through a single-faceted approach. Plans for the implementation and promotion of technology use must simultaneously address all three of the areas identified.

The research questions in the present study addressed general needs of Alberta teachers followed by a comparison of needs at each of four division

levels — divisions I (grades K-3), division II (grades 4-6), division III (grades 7-9) and division IV (grades 10-12). Because the ability levels of students in division one are different from the abilities of students in division four, the needs expressed by teachers at the various divisions were also expected to vary greatly.

Research Questions

What perceived organizational, training and resource barriers must Alberta teachers overcome to improve the use of computer technology with students?

Organizational Needs

1.1 What organizational needs must be met in order to improve the use of computer technology with students?

1.2 How do the organizational needs of teachers in divisions I, II, III and IV differ?

Training Needs

2.1 What are the current levels of training among Alberta teachers?

2.2 What are the teacher training needs that must be met to improve the use of computer technology with students?

2.3 How do the training needs of teachers in divisions I, II, III and IV differ?

Resource Needs

3.1 What resources are currently available to teachers in Alberta schools?

3.2 What are the resource needs of teachers that must be met to improve the use of computer technology with students?

3.3 How do the resource needs of teachers in divisions I, II, III and IV differ?

Sample

Three stratified random samples of 1,000 teachers from four division levels each were drawn by the Alberta Teachers' Association from a population consisting of 26,500 full time teachers currently working in public or separate schools in the province of Alberta. The questionnaire was not directed at computer experts, but rather, at regular classroom teachers from varying backgrounds and grade levels.

According to Statistics Canada (1988), a population of 25,000 required a sample size of 394 to obtain a margin of error of +/- 5% and a confidence level of 95%. In accordance with this, and in anticipation of a 45% return rate, the teacher sample size was 1000 for each part of the survey divided equally between the four division levels.

Development, Validation and Piloting of the Questionnaire

The questionnaire (Appendix A) was constructed in the spring of 1994 to reflect the sub questions identified in chapter one. The questions developed

for the survey were based on themes drawn from the literature as presented in chapter two.

The questionnaire was validated by:

- Dr. M. Szabo, Professor of Education, University of Alberta, June 1994

The questionnaire was piloted and validated by:

- Kevin Christmas, computer/elementary school teacher, Fort McMurray, Alberta, April, 1994
- Susan Mallinson, junior high school language arts teacher, Fort McMurray, Alberta, April 1994
- Pete MacKay, computer/junior high school teacher, Stony Plain, Alberta, June 1994.

Each of the individuals asked to pilot the survey completed the survey in the presence of the author. Any items that were unclear were discussed and noted. After the completion of the pilot, each individual was asked to suggest additions and deletions. These were noted and revisions were made.

Administration of the Questionnaire

Following the piloting of the questionnaire, it was mailed by the ATA to three thousand teachers in February, 1995. (Appendix A)

The c. ire sample was asked to complete the survey sections addressing current use and general information. In addition, one third of the sample was sent a survey section addressing organizational needs, one third was sent a survey section addressing training needs and one third was sent a survey

section addressing resource needs. This strategy was used to shorten the survey length for any given respondent.

The questionnaire took respondents approximately 20 minutes to complete. Self addressed envelopes were enclosed for the return of the survey. Follow-up letters were sent out after three weeks.

Ethical Considerations

All matters pertaining to the respondents anonymity, confidentiality, and voluntary participation were adhered to. Respondents were informed about the use of the information collected and results were available to them from the author in the form of a summary published in the ATA News and through the University of Alberta library as a completed document.

Data Analysis And Presentation

General Analysis Techniques

Data were numerically coded. For example, likert scales ranged from 1-5 where one equated to strongly disagree and five equated to strongly agree. (Appendix A) To maintain confidentiality, responses were identified and entered into the computer by ID number only. Once entered, the data were analyzed using SPSS.

The primary method of analysis was to determine the frequencies of the responses to the questions and to display these in frequency tables as

percentages. Where it was possible to have more than one response for a question, charts may reflect percentages in excess of 100%.

Subproblems — Data Collection, Data Analysis and Presentation

Organizational Needs

1.1 What organizational needs must be met in order to improve the use of computer technology with students?

Eighteen questions were used to assess existing needs. Respondents who completed this section of the survey were asked to assess issues related to support, access to resources, ownership, involvement in planning for the use of technology, and classroom management strategies.

For each question, respondents were asked to rate their level of agreement as strongly disagree, disagree, undecided, agree and strongly agree. The strongly disagree and disagree categories were combined as were the agree or strongly agree categories before being reported in frequency tables as percentages.

1.2 How do the organizational needs of teachers in divisions I, II, III and IV differ?

Using demographic information in combination with the data collected for research question 1.1, responses of teachers at each division level were compared in frequency tables as percentages.

Current Training Levels and Training Needs

2.1 What are the current levels of training among Alberta teachers?

Respondents who completed this section were asked sixteen questions which assessed the current training levels of Alberta teachers. Responses for the entire sample were reported in frequency tables as percentages.

2.2 What are the teacher training needs that must be met to improve the use of computer technology with students?

Respondents who completed this section were asked thirty two questions that addressed three general types of training needs: teaching techniques, technical needs and general needs.

For each question, respondents were asked to rate their level of agreement as strongly disagree, disagree, undecided, agree and strongly agree. The strongly disagree and disagree categories were combined as were the agree and strongly agree categories before being reported in frequency tables as percentages.

2.3 How do the training needs of teachers in divisions I, II, III and IV differ?

Using demographic information and the data collected for research question 2.2, the training needs of teachers at each division level were reported in frequency tables as percentages.

Resource Needs

3.1 What resources are currently available to teachers in Alberta schools?

All respondents completed this section which addressed available hardware and software.

For each question, respondents were asked to rate the frequency of use with students as not available, never, rarely, sometimes or often. The results were presented in frequency tables as percentages.

3.2 What are the resource needs of teachers that must be met to improve the use of computer technology with students?

Respondents who completed this section were asked nineteen questions which assessed the resource needs of Alberta teachers. Key concepts included hardware, software, time, peer support and administrative support.

For each question, respondents were asked to rate their level of agreement as strongly disagree, disagree, undecided, agree and strongly agree. The strongly disagree and disagree categories were combined as were the agree and strongly agree categories before being reported in frequency tables as percentages.

3.3 How do the resource needs of teachers in divisions I, II, III and IV differ?

Using demographic information as well as the data collected for research question 3.2, the resource needs of teachers at each division level were compared in frequency tables as percentages.

Chapter IV

PRESENTATION OF RESULTS

I. Introduction

Within this chapter, a summary of the results are provided in the form of figures and tables in order to illustrate the perceived organizational, training and resource needs of full-time teachers with regard to the promotion of student computer use in the province of Alberta.

Three thousand full-time Alberta teachers were surveyed. One thousand teachers were asked to complete the section of the survey addressing organizational needs. Two hundred and nineteen of these were returned. Three of these were not complete. One thousand teachers were asked to complete the section of the survey addressing training needs. Two hundred and forty two of these were returned. Six of these were not complete. One thousand teachers were asked to complete the section of the survey addressing resource needs. Two hundred and fifty five of these were returned. Three of these were not complete.

Table 4.1 shows the return rate of completed surveys based on division level and number of each type of survey returned by March 31, 1995. For the

entire sample, the total number of surveys returned was seven hundred and fifteen for a return rate of 23.8% and a total of 23.4% completed.

Table 4.1: Number of Surveys Returned (Frequencies)

	Training	Organization	Resource	Total
Division I	44	52	66	162
Division II	73	61	67	201
Division III	64	51	64	179
Division IV	77	62	64	203
Total	258	226	261	745*

*The total number of surveys returned was 715, however some teachers indicated that they teach in more than one division, therefore totals are in excess of 715.

II. Current Use of Resources

Current Use of Computer Technology

This section of the survey was completed by all respondents as a means of determining the extent to which computers are currently being used by Alberta teachers. From the total sample, seven hundred and three completed surveys were returned. Twenty two respondents did not complete this question.

Frequency of Computer Use Per Week

Figure 4.1 illustrates the current number of hours of computer use per week for the total sample. It is interesting to note that slightly more than one quarter of all respondents did not use computers at all and that slightly more than half used computers less than two hours per week. In short, more than three quarters of all teachers who responded indicated that they used computers less than two hours per week.

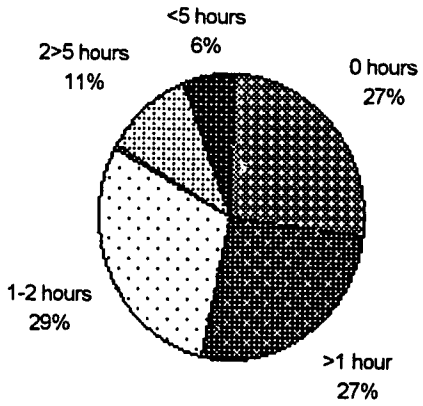

Figure 4.1: Hours of Computer Use Per Week

Table 4.2 illustrates the current number of hours of computer use per week broken down by division. Note that almost half of division four teachers never used computers with their students, yet those who did made up the majority of teachers who used computers in excess of five hours per week.

Table 4.2: Hours of Computer Use Per Week (Percentages)

	0 hours	>1 hour	1-2 hours	2>5 hours	<5 hours
Division I	21.5	36.1	36.1	5.7	0.6
Division II	12.1	26.3	47.0	10.1	4.5
Division III	32.4	22.0	21.4	17.9	6.4
Division IV	44.8	22.2	9.8	10.3	12.9

These results are based on n=681 completed surveys

Current Use of Software

This section of the survey was completed by all respondents. It addressed the current use of software in order to determine what software was available and the extent to which it was being used by teachers. From the total sample, seven hundred and three completed surveys were returned. This question was not applicable to another one hundred and seventy one teachers who had already indicated previously that they use computers zero hours per week.

Use of Word Processors

Sixty four respondents did not complete this question and another twenty one provided incomplete data. The results obtained, displayed in table 4.3 show that of those teachers who used computers to some extent with their students, more than three quarters used a word processor. This was the most highly used type of software reported by teachers. A breakdown by teaching divisions shows that in excess of eighty five percent of all division two, three and four teachers used word processors with their students. While this number was significantly lower for division one teachers, it is interesting to note the low rate of availability for this group. The percentage of division one teachers who did not have access to a word processor was almost as high as for the remaining three divisions combined.

Table 4.3: Frequency of Word Processor Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	9.0	9.8	11.1	28.4	41.7	100.0
Division I	15.7	23.1	10.2	28.7	22.2	99.9
Division II	5.6	3.7	9.3	36.4	45.1	100.1
Division III	3.5	7.0	11.4	21.9	56.1	99.9
Division IV	9.6	5.8	13.5	25.0	46.2	100.1

These results are based on n=468 completed surveys

Use of Databases

One hundred and two respondents did not complete this question and another six provided incomplete data. The data collected and displayed in table 4.4 shows that based on the total sample, very few teachers used databases with their students with any frequency. One quarter of all teachers did not have access to a database. Teachers in all divisions used databases with their students but they were used most by division three and four teachers. Access to databases was a particular problem for almost half of division one teachers and for more than one quarter of division two teachers.

Table 4.4: Frequency of Database Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	25.9	38.4	18.9	12.3	4.5	100.0
Division I	45.3	47.4	3.2	4.2	0.0	100.1
Division II	26.9	46.9	14.5	8.3	3.4	100.0
Division III	12.4	32.4	33.3	18.1	3.8	100.0
Division IV	15.8	23.2	29.5	21.1	10.5	100.1

These results are based on n=424 completed surveys

Use of Creativity Software

Eighty nine respondents did not complete this question and another ten provided incomplete data. Table 4.5 illustrates that of those teachers from the sample (n=433) who used computers to some extent with their students nearly half used creativity software with their students with some frequency. Note that more than fifty percent of teachers in all divisions used creativity software to some extent with their students.

Table 4.5: Frequency of Use of Creativity Software (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	18.2	11.5	19.6	30.9	19.6	99.8
Division I	24.5	12.7	13.7	28.4	20.6	99.9
Division II	14.7	7.3	20.0	33.3	24.7	100.0
Division III	11.9	10.1	25.7	33.0	19.3	100.0
Division IV	21.7	18.5	16.3	26.1	17.4	100.0

These results are based on n=433 completed surveys

Use of Telecommunications Software

One hundred and nine respondents did not complete this question and another four provided incomplete data. Based on the sample (n=419), table 4.6 shows that less than one quarter of the teachers who responded used telecommunications software with their students and that this was largely due to the fact that this technology was simply not available to them. A comparison of the responses of teachers by division revealed that while few teachers used telecommunications software with students, it was division three and four teachers who had the best access to such technology and who used it most.

Table 4.6: Frequency of Use of Telecommunications Software (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	49.6	29.6	11.9	6.2	2.6	99.9
Division I	65.6	31.2	2.2	1.1	0.0	100.1
Division II	55.2	32.4	7.6	4.1	0.7	100.0
Division III	42.5	22.6	17.0	13.2	4.7	100.0
Division IV	34.1	29.7	25.3	5.5	5.5	100.1

These results are based on n=419 completed surveys

Use of Drill and Practice Software

Sixty respondents did not complete this question and another thirteen provided incomplete data. Based on the results of n=459, table 4.7 illustrates that nearly eighty percent of teachers used drill and practice software with their students and that division one and two teachers were the primary users of drill and practice software. Note that drill and practice software was readily available to division one and two teachers while division three and four teachers indicated that drill and practice software was in short supply.

Table 4.7: Frequency of Use of Drill and Practice Software (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	9.2	11.1	16.3	30.5	32.9	100.0
Division I	3.2	2.2	5.4	33.3	55.9	100.0
Division II	2.8	6.9	17.9	35.9	36.6	100.1
Division III	15.2	13.3	24.8	28.6	18.1	100.0
Division IV	23.1	27.5	20.9	15.4	13.2	100.1

These results are based on n=459 completed surveys

Use of Keyboarding Software

Seventy of the respondents did not complete this question and another ten provided incomplete data. Based on the sample (n=452) of teachers who responded, table 4.8 shows that over half of the teachers used keyboarding software with their students and that division two teachers used keyboarding software the most.

Table 4.8: Frequency of Use of Keyboarding Software (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	13.7	18.6	15.5	28.3	23.9	100.0
Division I	19.3	15.6	13.8	24.9	16.5	90.1
Division II	5.6	8.7	11.8	39.1	34.8	100.0
Division III	14.7	15.6	23.9	22.0	23.9	100.1
Division IV	20.7	39.1	13.0	9.8	17.4	100.0

These results are based on n=452 completed surveys

Use of Desktop Publishing Software

Ninety eig t respondents did not complete this question and another five provided incomplete data. Table 4.9 shows that almost fifty percent of teachers surveyed (n=429) used desktop publishing software to some extent with their students, but that more than one quarter of the remaining teachers did not have access to a desktop publishing package. Broken down into divisions, roughly half of the teachers in division two, three and four used desktop publishing software. Note that division one teachers had the least access to the software, while division two teachers had the best access.

Table 4.9: Frequency of Use of Desktop Publishing Software (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	28.7	22.4	16.8	18.9	13.3	100.1
Division I	35.1	29.9	14.4	13.4	7.2	100.0
Division II	23.0	19.6	15.5	25.0	16.9	100.0
Division III	29.2	17.0	18.9	17.9	17.0	100.0
Division IV	26.6	23.4	17.0	18.1	14.9	100.0

These results are based on n=429 completed surveys

Use of Spreadsheets

One hundred and two respondents did not complete this question and another five provided incomplete data. Based on the sample of teachers surveyed (n=425), nearly one third used spreadsheets with their students as shown in table 4.10 and that teachers in division four used spreadsheets the most, and that use decreased with a decrease in division levels.

Table 4.10: Frequency of Spreadsheet Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	29.9	41.4	14.4	11.1	3.3	100.1
Division I	46.3	51.6	2.1	0.0	0.0	100.0
Division II	37.7	45.2	11.0	4.8	1.4	100.1
Division III	16.3	35.6	27.9	19.2	1.0	100.0
Division IV	17.7	27.1	17.7	27.1	10.4	100.0

These results are based on n=425 completed surveys

Use of Simulations

One hundred and eleven respondents did not complete this question and another four provided incomplete data. Table 4.11 shows that based on the sample (n=417), one third of teachers used simulations with their students, but that more than one third of the remaining teachers did not have access to simulations. A comparison of divisions shows that simulation use increased with an increase in division level.

Table 4.11: Frequency of Simulation Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	38.4	30.2	15.3	12.7	3.4	100.0
Division I	49.0	38.5	5.2	4.2	3.1	100.0
Division II	42.1	25.5	14.5	13.8	4.1	100.0
Division III	34.0	27.2	18.4	16.5	3.9	100.0
Division IV	25.0	26.1	27.2	17.4	4.3	100.0

These results are based on n=417 completed surveys

Use of CD ROMs

Seventy eight respondents did not complete this question and another twelve provided incomplete data. A view of the results for the sample (n=443), table 4.12, shows that more than half of all teachers used CD ROMs with their students. It is also interesting to note that nearly one third of all teachers indicated that they do not have access to CD ROM's. A comparison of divisions shows that for grades 4-12, CD ROM use was in excess of sixty percent, but that it was used by less than half of division one teachers.

Table 4.12: Frequency of Use of CD ROMs (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	31.2	9.9	17.6	27.8	13.5	100.0
Division I	35.3	17.6	18.6	17.6	10.8	99.9
Division II	26.8	9.8	19.6	31.4	12.4	100.0
Division III	34.5	4.5	17.3	25.5	18.2	100.0
Division IV	27.6	6.1	11.2	35.7	19.4	100.0

These results are based on n=443 completed surveys

Use of Programming Languages

One hundred and nine respondents did not complete this question and another four provided incomplete data. Table 4.13 shows that only a small percentage of teachers use programming languages with their students and that almost half of the teachers who responded did not have access to programming languages. A comparison of divisions, shows that programming software was used increasingly as students approached grade twelve, but that even at the high school level, use still only reached one third.

Table 4.13: Frequency of Use of Programming Languages (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	47.7	36.8	7.6	4.8	3.1	100.0
Division I	63.8	33.0	0.0	3.2	0.0	100.0
Division II	57.9	34.5	4.8	2.8	0.0	100.0
Division III	39.0	39.0	11.4	7.6	2.9	99.9
Division IV	25.0	41.3	17.4	5.4	10.9	100.0

These results are based on n=419 completed surveys

Use of Desktop Video Software

One hundred and fourteen respondents did not complete this question and another three provided incomplete data. Table 4.14 illustrates the frequency of use of desktop video software for the entire sample. Note that only approximately forty percent of teachers had access to such technology, but that division four teachers had the best access to desktop video software and used it the most.

Table 4.14: Frequency of Use of Desktop Video Software (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	62.2	25.5	6.0	4.1	2.2	100.0
Division I	67.4	29.3	0.0	2.2	1.1	100.0
Division II	69.5	20.6	4.3	4.3	1.4	100.1
Division III	56.2	25.7	9.5	4.8	3.8	100.0
Division IV	51.6	29.0	10.8	5.4	3.2	100.0

These results are based on n=415 completed surveys

Current Use of Hardware

This section of the survey was completed by all respondents. It addressed the current use of hardware in order to determine what hardware was available and the extent to which it was being used by teachers. From the total sample, seven hundred and three completed surveys were returned. This question was not applicable to another one hundred and seventy one teachers who had already indicated previously that they use computers zero hours per week.

Use of Modems

One hundred and thirty three respondents did not complete this question and another twenty three provided incomplete data. Based on the sample (n=376) as illustrated in table 4.15, nearly twenty percent of teachers used modems with their students, but half did not have access to the technology. Note that modem use increased with division level.

Table 4.15: Frequency of Modem Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	55.1	25.0	9.6	6.6	3.7	100.0
Division I	63.0	28.3	5.4	3.3	0.0	100.0
Division II	65.1	20.6	7.1	5.6	1.6	100.0
Division III	51.6	18.9	10.5	11.6	7.4	100.0
Division IV	35.1	31.2	19.5	6.5	7.8	100.1

These results are based on n=376 completed surveys

Use of Audio Conferencing Equipment

One hundred and sixty one respondents did not complete this question and one respondents provided incomplete data. As shown in table 4.16, very few teachers use audio conferencing equipment with their students. In fact this group accounted for less than five percent of the total; nearly three quarters of all teachers did not have access to the technology. It is interesting to note that use and access increased with division level.

Table 4.16: Frequency of Use of Audio Conferencing Equipment (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	73.8	21.9	2.7	1.4	0.3	100.1
Division I	80.0	20.0	0.0	0.0	0.0	100.0
Division II	81.0	16.7	0.8	1.6	0.0	100.1
Division III	71.0	23.7	2.2	2.2	1.1	100.2
Division IV	60.0	28.0	9.3	2.7	0.0	100.0

These results are based on n=370 completed surveys

Use of Scanners

One hundred and forty one respondents did not complete this question and another nineteen provided incomplete data. Table 4.17 shows the frequency of scanner use as reported by the sample (n=373). As with CD ROM technology, it is interesting to note how few teachers have access to a very common technology. Division four teachers had the best access to technology while division one teachers had the worst.

Table 4.17: Frequency of Scanner Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	64.3	18.0	8.0	6.4	3.2	99.9
Division I	76.7	21.1	2.2	0.0	0.0	100.0
Division II	73.0	15.9	4.0	4.8	2.4	100.1
Division III	63.2	11.6	11.6	9.5	4.2	100.1
Division IV	38.2	21.1	18.4	13.2	9.2	100.1

These results are based on n=373 completed surveys

Use of Laser Videodisc Players

One hundred and forty five respondents did not complete this question and another sixteen provided incomplete data. Based on the sample (n=372), as illustrated in table 4.18, the use of laser videodisc players with students was very minimal primarily because most teachers indicated that they did not have access to such technology. Access and use increased as division level increased.

Table 4.18: Frequency of Laser Videodisc Player Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	72.3	16.4	5.4	4.3	1.6	100.0
Division I	77.8	18.9	1.1	2.2	0.0	100.0
Division II	82.5	12.7	1.6	0.8	2.4	100.0
Division III	67.7	16.1	8.6	7.5	0.0	99.9
Division IV	55.8	18.2	10.4	11.7	3.9	100.0

These results are based on n=372 completed surveys

Use of Video Digitizing Equipment

One hundred and fifty eight respondents did not complete this question and another five provided incomplete data. As displayed in table 4.19, the use of video digitizing equipment for the sample (n=369) was limited. Nearly eighty percent of the respondents did not have access to the technology, but again use and access increased as division levels increased.

Table 4.19: Frequency of Use of Video Digitizing Equipment (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	77.5	16.0	3.3	2.4	0.8	100.0
Division I	83.3	14.4	1.1	1.1	0.0	99.9
Division II	86.5	9.5	1.6	1.6	0.8	100.0
Division III	73.1	16.1	4.3	4.3	2.2	100.0
Division IV	60.0	26.7	8.0	4.0	1.3	100.0

These results are based on n=369 completed surveys

Use of Robotic Devices

One hundred and fifty eight respondents did not complete this question and another six provided incomplete data. Based on the sample (n=368), table 4.20 shows that this technology was virtually nonexistent in Alberta schools; when available, they were used most with division four students.

Table 4.20: Frequency of Robotic Device Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	83.2	14.9	0.8	0.5	0.5	99.9
Division I	82.2	16.7	0.0	1.1	0.0	100.0
Division II	88.9	9.5	0.8	0.8	0.0	100.0
Division III	83.7	13.0	1.1	2.2	0.0	100.0
Division IV	74.7	22.7	1.3	1.3	0.0	100.0

These results are based on n=368 completed surveys

Use of Science Lab Interfaces

One hundred and fifty nine respondents did not complete this question and another four provided incomplete data. Table 4.21 shows that the majority of teachers do not have access to such technology and so use is very limited.

Table 4.21: Frequency of Science Lab Interface Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	80.2	16.8	1	0.5	0.8	99.9
Division I	83.3	13.3	0.0	1.1	2.2	99.9
Division II	89.6	9.6	0.0	0.0	0.8	100.0
Division III	75.3	21.5	2.2	1.1	0.0	100.1
Division IV	67.1	25.0	6.6	0.0	1.3	100.0

These results are based on n=369 completed surveys

Use of Plotters

One hundred and fifty nine respondents did not complete this question and another six provided incomplete data. A review of the data from the sample (n=367), table 4.22, shows that this technology is unavailable to most teachers, consequently, use was low. A comparison of divisions showed that plotter use increased with division level. In division one, plotters were not used at all, but use increased with grade level being highest at division four.

Table 4.22: Frequency of Plotter Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	77.9	17.7	2.7	0.8	0.8	99.9
Division I	81.1	18.9	0.0	0.0	0.0	100.0
Division II	90.2	9.0	0.8	0.0	0.0	100.0
Division III	73.1	22.6	3.2	0.0	1.1	100.0
Division IV	63.2	22.4	9.2	3.9	1.3	100.0

These results are based on n=367 completed surveys

Use of Graphic Tablets

One hundred and sixty four respondents did not complete this question and another three provided incomplete data. Table 4.23 shows that graphics tablets are in limited supply and consequently, use was limited. It is interesting to note that it was division three teachers who reported highest usage of this technology even though division four teachers had the best access to the technology.

Table 4.23: Frequency of Graphic Tablet Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	75.1	19.7	3.0	1.9	0.3	100.0
Division I	76.7	22.2	1.1	0.0	0.0	100.0
Division II	81.0	14.0	1.7	2.5	0.8	100.0
Division III	72.3	19.1	5.3	3.2	0.0	99.9
Division IV	70.3	24.3	2.7	2.7	0.0	100.0

These results are based on n=363 completed surveys

Use of Music Synthesizers

One hundred and fifty six respondents did not complete this question and another five provided incomplete data. Table 4.24 illustrates the frequency of use of music synthesizers. Note that the majority of teachers did not have access to such technology. Division three teachers used the technology the most, but again, division four teachers had the best access to music synthesizers.

Table 4.24: Frequency of Music Synthesizer Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	72.0	17.8	4.3	4.6	1.3	100.0
Division I	72.2	17.8	1.4	4.4	1.1	99.9
Division II	78.6	12.7	2.4	4.8	1.6	100.1
Division III	65.3	16.8	6.3	8.4	3.2	100.0
Division IV	64.9	24.7	5.2	1.3	3.9	100.0

These results are based on n=371 completed surveys

Use of CD ROM Equipment

Ninety five respondents did not complete this question and another forty six provided incomplete data. Table 4.25 illustrates the frequency of CD ROM use for the sample (n=392). Note that more than half of all teachers used the technology, but that another third of all teachers did not have access to this type of technology. Based on a comparison of CD ROM use at each division level, note that the use of CD ROM equipment was highest for division four teachers and lowest for division one teachers.

Table 4.25: Frequency of CD ROM Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	33.2	11.2	17.9	24.5	13.3	100.1
Division I	38.3	19.1	17.0	16.0	9.6	100.0
Division II	31.3	9.0	21.6	25.4	12.7	100.0
Division III	35.4	6.3	10.4	27.1	20.8	100.0
Division IV	26.2	10.7	15.5	32.1	15.5	100.0

These results are based on n=392 completed surveys

Use of Dot Matrix Printers

One hundred and eight respondents did not complete this question and another forty one provided incomplete data. Based on the results of the entire sample, table 4.26 shows that more than half of the teachers surveyed still depend on dot matrix printers to some extent. A comparison of division levels shows that division two and three teachers use dot matrix printers the most, but that most teachers have access to this type of printer.

Table 4.26: Frequency of Dot Matrix Printer Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	23.5	10.2	11.5	20.9	33.9	100.0
Division I	29.0	15.1	17.2	17.2	21.5	100.0
Division II	18.4	5.6	9.6	25.6	40.8	100.0
Division III	22.9	6.3	7.3	20.8	42.7	100.0
Division IV	25.6	17.1	12.2	14.6	30.5	100.0

These results are based on n=383 completed surveys

Use of Laser Printers

Ninety six respondents did not complete this question and another forty seven provided incomplete data. Based on the sample (n=389), as shown in table 4.27, slightly more than half of all teachers had used laser printers with their students. Another third did not have access to this type of printer. When comparing divisions, it is interesting to note that division four teachers had the best access to laser printers and used them more than teachers in any other division.

Table 4.27: Frequency of Laser Printer Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	31.9	11.6	12.3	16.7	27.5	100.0
Division I	39.8	18.3	24.7	5.4	11.8	100.0
Division II	38.2	10.7	9.2	19.1	22.9	100.1
Division III	26.3	8.1	7.1	21.2	37.4	100.1
Division IV	15.9	9.8	8.5	23.2	42.7	100.1

These results are based on n=389 completed surveys

Use of an Audio Digitizer

One hundred and sixty three respondents did not complete this question and another four provided incomplete data. Based on the sample (n=365), table 4.28 shows that most teachers do not have access to this type of technology and for this reason, use was very limited. A comparison of divisions shows that division four teachers had the best access to the technology and used it the most. Use and accessibility to the technology declined with grade level.

Table 4.28: Frequency of Audio Digitizer Use (Percentages)

	Unavailable	Never	Rarely	Sometimes	Often	Total
Total Sample	76.7	17.5	4.1	1.6	0.0	99.9
Division I	79.8	20.2	0.0	0.0	0.0	100.0
Division II	82.9	11.4	3.3	2.4	0.0	100.0
Division III	74.7	16.5	5.5	3.3	0.0	100.0
Division IV	64.0	25.3	9.3	1.3	0.0	99.9

These results are based on n=365 completed surveys

Other Hardware

As well as the hardware listed here, additional types listed by respondents are in Appendix B.

III. Organization

This section of the survey was mailed to one third of the sample population -- 1000 teachers. It addressed the organizational needs of teachers in order to determine what changes needed to be made in order to improve the use of computer technology with students. A total of 226 surveys addressing this topic were returned; three were not completed. Table 4.29 shows the breakdown of surveys by division.

Table 4.29: Organizational Surveys Returned (Frequencies)

Division I	Division II	Division III	Division IV	Total
52	61	51	62	226

Statement #1: Class length must be increased.

Overall, based on the data for the total sample, the majority of respondents disagreed with this statement as illustrated in table 4.30. A comparison of divisions showed that division one and two teachers were divided about this issue, but that division three and four teachers felt that increasing class length was unnecessary.

Table 4.30: Increase Class Length (Percentage)

	Disagree	Undecided	Agree
Total Sample	56.0	18.7	25.4
Division I	46.0	24.0	30.0
Division II	37.9	20.7	41.4
Division III	61.2	14.3	24.5
Division IV	74.6	15.3	10.2

These results are based on n=209 completed surveys

Statement #2: Access to computers must be improved.

The data for the entire sample, as shown in table 4.31, clearly shows that the majority of respondents agreed with this statement. Access was an issue at all division levels.

Table 4.31: Access Must Improve (Percentage)

	Disagree	Undecided	Agree
Total Sample	12.1	7.0	80.8
Division I	9.8	5.9	84.3
Division II	15.0	5.0	80.0
Division III	18.0	10.0	72.0
Division IV	8.3	6.7	85.0

These results are based on n=214 completed surveys

Statement #3: Subject areas must be more integrated.

Based on the entire sample, more than half of all respondents agreed with this statement as shown in table 4.32. Broken down by division, the group of teachers whose opinions differed the most, were teachers in division three. Note the high percentage of teachers who were undecided.

Table 4.32: Subject Areas More Integrated (Percentage)

	Disagree	Undecided	Agree
Total Sample	16.9	23.0	60.1
Division I	18.0	20.0	62.0
Division II	11.7	21.7	66.7
Division III	16.0	32.0	52.0
Division IV	20.0	18.3	61.7

These results are based on n=213 completed surveys

Statement #4: More administrative support for computer use is necessary.

Overall, the majority of respondents agreed with this statement. A comparison of divisions shows that the largest difference exists between division three and four teachers. Division four teachers felt that they needed more administrative support than did teachers at other division levels, particularly teachers in division three. (Table 4.33)

Table 4.33: More Administrative Support Is Needed (Percentage)

	Disagree	Undecided	Agree
Total Sample	27.1	13.8	59.0
Division I	28.0	14.0	58.0
Division II	27.1	13.6	59.3
Division III	36.0	14.0	50.0
Division IV	20.7	12.1	67.2

These results are based on n=210 completed surveys

Statement #5: Access to timely technical help within the school is necessary.

Overall, the majority of respondents agreed with this statement. A comparison of divisions, shown in table 4.34, reveals that the largest difference in opinions falls between division two and three teachers. A larger percentage of division two teachers felt they did not need technical help within their schools.

Table 4.34: Access To Technical Help Is Necessary (Percentages)

	Disagree	Undecided	Agree
Total Sample	6.1	8.5	85.4
Division I	3.9	7.8	88.2
Division II	5.0	15.0	80.0
Division III	6.0	4.0	90.0
Division IV	8.5	6.8	84.7

These results are based on n=213 completed surveys

Statement #6: The majority of computers must be available in classrooms.

Overall, the majority of respondents agreed with this statement as indicated by table 4.35. A comparison of division levels shows that teachers had mixed opinions about the need for computers within their classrooms.

Table 4.35: Computers must be in classrooms (Percentages)

	Disagree	Undecided	Agree
Total Sample	25.7	15.7	58.6
Division I	30.0	14.0	56.0
Division II	20.7	19.0	60.3
Division III	30.6	16.3	53.1
Division IV	23.3	11.7	65.0

These results are based on n=210 completed surveys

Statement #7: The majority of computers must be available in a computer lab setting.

Nearly half of the teachers surveyed agreed that computers should be placed in labs, but teachers were in no way decisive about this. Note how many teachers either disagreed or were undecided. (Table 4.36)

Table 4.36: Computers must be in labs (Percentages)

	Disagree	Undecided	Agree
Total Sample	35.4	17.0	47.6
Division I	26.5	16.3	57.1
Division II	41.7	16.7	41.7
Division III	28.0	20.0	52.0
Division IV	38.3	16.7	45.0

These results are based on n=212 completed surveys

Statement #8: Software must be more accessible.

Eighty percent of the entire sample agreed that software must be more accessible. Note that at all division levels, shown in table 4.37, in excess of three quarters of all teachers felt it was necessary to make software more accessible.

Table 4.37: Software must be more accessible (Percentages)

	Disagree	Undecided	Agree
Total Sample	10.3	9.4	80.3
Division I	7.8	7.8	84.3
Division II	13.3	11.7	75.0
Division III	12.0	12.0	76.0
Division IV	10.2	5.1	84.7

These results are based on n=213 completed sur

Statement #9: Computer facilities must be easier to schedule.

Based on the results from the entire sample, as shown in table 4.38, the majority of respondents agreed that computer facilities must be easier to schedule. Note also that more division four teachers agreed with this than teachers in other divisions.

Table 4.38: Computer facilities must be easier to schedule (Percentages)

	Disagree	Undecided	Agree
Total Sample	17.8	18.2	64.0
Division I	19.6	19.6	60.8
Division II	21.7	18.3	60.0
Division III	18.0	22.0	60.0
Division IV	15.0	13.3	71.7

These results are based on n=214 completed surveys

Statement #10: Teachers must have more input into the purchase of software.

Overall, table 4.39 shows that the majority of respondents felt that they wanted more input into the purchase of software. Notice that input into software purchases was of particular importance to division one teachers.

Table 4.39: Teachers need input into software purchases (Percentages)

	Disagree	Undecided	Agree
Total Sample	17.4	17.8	64.8
Division I	13.7	17.6	68.6
Division II	25.4	11.9	62.7
Division III	18.0	20.0	62.0
Division IV	11.7	21.7	66.7

These results are based on n=213 completed surveys

Statement #11: Teachers must have more input into the purchase of hardware.

It is interesting to note that while teachers wanted more input into the purchase of software, they were less keen on the idea of input into hardware purchases. Based on the entire sample, as illustrated in table 4.40, roughly half of all teachers wanted input in this regard. Note also that input into hardware purchases was most important to division one and division four teachers.

Table 4.40: Teachers need input into hardware purchases(Percentages)

	Disagree	Undecided	Agree
Total Sample	21 5	23.8	54.7
Division I	17.6	23.5	58.8
Division II	26.7	23.3	50.0
Division III	28.0	22.0	50.0
Division IV	15.0	25.0	60.0

These results are based on n=214 completed surveys

Statement #12: More emphasis must be placed on computers.

Table 4.41 shows that the majority of respondents agreed that more emphasis should be placed on computers. Based on divisions, note that division one teachers are the most undecided and that more division three teachers disagreed with this statement than any other groups of teachers.

Table 4.41: More emphasis must be placed on computers (Percentages)

	Disagree	Undecided	Agree
Total Sample	18.5	20.4	61.1
Division I	13.7	27.5	58.8
Division II	20.0	16.7	63.3
Division III	27.7	12.8	59.6
Division IV	13.3	21.7	65.0

These results are based on n=211 completed surveys

Statement #13: A more student-centered approach to teaching must be adopted by teachers.

The results from the total sample as shown in table 4.42 indicate that slightly more than half of all teachers agreed that a more student centered approach to teaching must be adopted by teachers. It is interesting that more division one teachers than any other group disagreed with the idea of student centered approaches and that more division four teachers agreed.

Table 4.42: Teachers must adopted a more student centered approach to teaching (Percentages)

	Disagree	Undecided	Agree
Total Sample	22.3	25.1	52.6
Division I	24.5	30.6	44.9
Division II	23.7	20.3	55.9
Division III	22.0	26.0	52.0
Division IV	18.3	23.3	58.3

These results are based on n=211 completed surveys

Statement #14: An experienced computer user must be available to teach with when learning to use computers.

While the majority of respondents from the total sample agreed with the idea of team teaching with an experienced computer user (table 4.43), it is interesting to note that more division one teachers agreed than any other group of teachers.

Table 4.43: Team teaching with an experienced computer user (Percentages)

	Disagree	Undecided	Agree
Total Sa[illegible]	[illegible]	10.7	79.4
Division I	[illegible]	7.8	90.2
Division II	10.0	13.3	76.7
Division III	14.0	12.0	74.0
Division IV	11.7	10.0	78.3

These results are based on n=214 completed surveys

Statement #15: A network administrator is necessary to keep the computer system running.

Most respondents from the entire sample agreed that a network administrator was necessary (table 4.44), but it is interesting to note how many division one teachers were unsure about this.

Table 4.44: A network administrator is needed (Percentages)

	Disagree	Undecided	Agree
Total Sample	9.8	19.2	71.0
Division I	2.0	29.4	68.6
Division II	11.7	13.3	75.0
Division III	14.0	14.0	72.0
Division IV	10.0	18.3	71.7

These results are based on n=214 completed surveys

Statement #16: Teachers should have more input with regard to how computers are used in the school.

As shown in table 4.45, more than three quarters of the total sample felt this was important. Note that more division one teachers agreed with this statement than any other division of teachers.

Table 4.45: More teacher input into computer use is needed (Percentages)

	Disagree	Undecided	Agree
Total Sample	11.8	11.8	76.3
Division I	4.0	12.0	84.0
Division II	17.2	12.1	70.7
Division III	16.0	12.0	72.0
Division IV	11.7	11.7	76.7

These results are based on n=214 completed surveys

Statement #17: Teachers must be involved in developing long range plans for computer use in schools.

As shown in table 4.46, teachers from the total sample agreed that this was necessary. Interestingly enough, fewer division three teachers agreed than teachers in other divisions.

Table 4.46: Teacher involvement in long range planning is necessary (Percentages)

	Disagree	Undecided	Agree
Total Sample	6.6	8.0	85.4
Division I	5.9	5.9	88.2
Division II	5.1	10.2	84.7
Division III	10.0	12 0	78.0
Division IV	5.1	5.1	89.8

These results are based on n=212 completed surveys

Statement #18: A team approach to computer use would be beneficial in schools.

Table 4.47 shows that teachers are interested in being part of a team of professionals involved in computer use. Note how little disagreement there was on this issue.

Table 4.47: A team approach to computer use would be beneficial (Percentages)

	Disagree	Undecided	Agree
Total Sample	5.2	13.7	81.0
Division I	7.8	7.8	84.3
Division II	5.2	12.1	82.8
Division III	4.1	22.4	73.5
Division IV	3.3	15.0	81.7

These results are based on n=211 completed surveys

Other Comments:

In addition to these organizational concerns, teachers also provided many other comments which are available in Appendix B.

IV. Current Training Levels (formal and informal)

This section of the survey was mailed to one third of the sample population -- 1000 teachers. It addressed the current training levels of teachers in order to determine what changes needed to be made in order to improve the use of computer technology with students. A total of 258 surveys addressing this topic were returned; six were not completed. Table 4.48 shows the breakdown of surveys by division.

Table 4.48: Training Surveys Returned (Frequencies)

Division I	Division II	Division III	Division IV	Total
44	73	64	77	258

Statement #1: The use of drill and practice software

Based on the sample (n=224), table 4.49 shows that one third of teachers have not been trained to use drill and practice software. The next largest group of teachers fall within the category of having less than ten hours of training. A comparison of teachers at division levels shows that the majority of teachers in all divisions had no training or less than ten hours of training in the use of drill and practice software.

Table 4.49: Current Level of Training Using Drill and Practice Software (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	32.1	46.0	12.1	3.6	6.3
Division I	23.3	60.5	7.0	7.0	2.3
Division II	23.9	52.1	15.5	4.2	4.2
Division III	36.7	46.7	11.7	1.7	3.3
Division IV	43.7	29.6	12.7	2.8	11.3

These results are based on n=224 completed surveys

Statement #2: The Use of CD ROM technology

In table 4.50, note the large percentage of all teachers surveyed who had no training or less than ten hours of training in the use of CD ROM technology. Note that the largest group of teachers with no training were division one teachers.

Table 4.50: Current Level of Training Using CD ROM Technology (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	46.3	41.5	5.7	2.2	4.4
Division I	59.1	29.5	6.8	2.3	2.3
Division II	39.4	46.5	5.6	5.6	2.8
Division III	50.0	40.3	4.8	1.6	3.2
Division IV	41.1	43.8	6.8	1.4	6.8

These results are based on n=229 completed surveys

Statement #3: The use of word processors

Table 4.51 illustrates that all but ten percent of teachers have some training in this area. In fact, overall, teachers had more training in the use of word processors than in any other area surveyed. Note that division one teachers were the worst trained, based on the number of teachers who had no training or less than ten hours of training while more division four teachers had in excess of thirty hours of training than teachers in any other division.

Table 4.51: Current Level of Training on the Use of Word Processors (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	9.9	29.7	22.0	10.3	28.0
Division I	18.6	27.9	18.6	16.3	18.6
Division II	5.5	31.5	27.4		24.7
Division III	14.3	23.8	22.2		31.7
Division IV	5.4	33.8			33.8

These results are based on n=232

Statement #4: Teaching programming languages (e.g. BASIC, PASCAL, C, LOGO)

Table 4.52 shows that more than three quarters of all respondents had no training or less than ten hours of training in the use of programming languages. A comparison of divisions shows that division one teachers had the least amount of training and division three teachers had the most training, although teachers with more than thirty hours of training were predominantly from division four.

Table 4.52: Current Level of Training on Teaching Programming Languages (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	57.5	19.7	7.0	5.7	10.1
Division I	68.2	15.9	9.1	0.0	6.8
Division II	54.3	22.9	12.9	5.7	4.3
Division III	48.4	27.4	8.1	4.8	11.3
Division IV	60.3	9.6	4.1	9.6	16.4

These results are based on n=228 completed surveys

Statement #5: The use of databases

Table 4.53 shows that nearly three quarters of all respondents had no training or less than ten hours of training in the use of databases. Based on divisions, there were more division four teachers who had in excess of ten hours of training than any other division of teachers. Fewer division one teachers had in excess of ten hours of training than any other group of teachers.

Table 4.53: Current Level of Training On Using Databases (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	41.3	31.7	14.3	6.1	6.5
Division I	58.1	32.6	7.0	0.0	2.3
Division II	36.6	33.8	19.7	5.6	4.2
Division III	34.9	34.9	14.3	7.9	7.9
Division IV	40.5	27.0	16.2	6.8	9.5

These results are based on n=230 completed surveys

Statement #6: Teaching keyboarding skills

Table 4.54 shows that overall, the majority of respondents had no training or less than ten hours of training in the use of keyboarding software. Note that nearly half of division one, three and four teachers had no training, but that the number of untrained division two teachers was considerably less.

Table 4.54: Current Level of Training On Using Keyboarding Software (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	41.9	26.6	16.2	3.9	11.4
Division I	41.9	39.5	9.3	0.0	9.3
Division II	29.6	38.0	21.1	8.5	2.8
Division III	48.4	16.1	19.4	0.0	16.1
Division IV	48.6	14.9	12.2	4.1	20.3

These results are based on n=229 completed surveys

Statement #7: The use of spreadsheets

Table 4.55 shows that nearly forty percent of all teachers surveyed have no training in the use of spreadsheets and that more division one teachers than any other division were untrained in the use of spreadsheets.

Table 4.55: Current Level of Training Using Spreadsheets (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	38.1	34.6	14.3	3.9	9.1
Division I	54.5	38.6	4.5	0.0	2.3
Division II	38.0	31.0	23.9	2.8	4.2
Division III	28.6	38.1	17.5	4.8	11.1
Division IV	32.4	37.8	9.5	5.4	14.9

These results are based on n=231 completed surveys

Statement #8: The use of desktop publishing software

Table 4.56 shows that half of all teachers surveyed had no training whatsoever in the use of desktop publishing software while another third had less than ten hours of training. Note that a higher percentage of division one teachers had no training at all compared to teachers in other divisions.

Table 4.56: Current Level of Training Using Desktop Publishing Software (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	49.8	29.3	9.6	4.4	7.0
Division I	61.9	28.6	7.1	0.0	2.4
Division II	43.7	35.2	14.1	4.2	2.8
Division III	57.1	15.9	7.9	7.9	11.1
Division IV	40.5	36.5	9.5	4.1	9.5

These results are based on n=229 completed surveys

Statement #9: The use of telecommunications technology

Table 4.57 shows that based on the total sample, sixty percent of teachers had no training. Notice that the percentage of untrained teachers was highest for division one and that division four teachers had the most training.

Table 4.57: Current Level of Training Using Telecommunications Technology (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	61.6	27.1	5.2	1.7	4.4
Division I	81.4	14.0	2.3	0.0	2.3
Division II	60.6	33.8	2.8	1.4	1.4
Division III	60.3	28.6	4.8	0.0	6.3
Division IV	52.1	27.4	9.6	4.1	6.8

These results are based on n=229 completed surveys

Statement #10: The use of creativity software (graphics and drawing software)

Table 4.58 shows that almost forty percent of all teachers surveyed had no training at all. A comparison of divisions shows that more division one teachers were without any training in the use of creativity software than any other group of teachers.

Table 4.58: Current Level of Training On Using Creativity Software (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	38.5	45.0	9.5	2.6	4.3
Division I	47.7	38.6	6.8	4.5	2.3
Division II	36.1	47.2	11.1	4.2	1.4
Division III	34.9	44.4	9.5	1.6	9.5
Division IV	34.2	50.7	9.6	2.7	2.7

These results are based on n=231 completed surveys

Statement #11: The use of midi capable computers (computers attached to musical instruments)

Based on the data shown in table 4.59, less than ten percent of teachers had any training whatsoever in the use of MIDI capable computers. Those who had the most training were teachers in division four.

Table 4.59: Current Level of Training On Using MIDI Capable Computers (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	92.2	5.7	1.3	0.4	0.4
Division I	93.0	7.0	0.0	0.0	0.0
Division II	94.4	5.6	0.0	0.0	0.0
Division III	92.1	6.3	0.0	1.6	0.0
Division IV	87.8	6.8	4.1	0.0	1.4

These results are based on n=230 completed surveys

Statement #12: The use of a computerized library card catalogue system

As shown below in table 4.60, most teachers had no training in the use of computerized card catalogue systems. Interestingly, more division four teachers were without training than any other division, but no one division stands out.

Table 4.60: Current Level of Training Using A Computerized Card Catalogue System (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	60.5	30.3	4.4	1.8	3.1
Division I	62.8	27.9	2.3	2.3	4.7
Division II	52.1	33.8	4.2	2.8	7.0
Division III	59.7	29.0	6.5	3.2	1.6
Division IV	64.4	27.4	5.5	1.4	1.4

These results are based on n=228 completed surveys

Statement #13: The use of problem solving software

Based on the total sample as shown in table 4.61, the majority of teachers had no trainin .. the use of problem solving software. Almost one third of the remaining teachers had less than ten hours of training. A comparison of divisions shows that more division two and four teachers had in excess of ten hours of training than any other groups.

Table 4.61: Current Level of Training On Using Problem Solving Software (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	64.5	26.0	5.2	1.7	2.6
Division I	70.5	25.0	3	0.0	2.3
Division II	56.9	30.(	9	4.2	1.4
Division III	65.1	28.6	4.8	1.6	0.0
Division IV	68.5	16.4	8.2	1.4	5.5

These results are based on n=231 completed surveys

Statement #14: Using the computer to teach curriculum specific topics

Table 4.62 shows that most teachers had either no training at all or less than ten hours of training in the use of computers to teach curriculum topics. A comparison of divisions shows that division four teachers had the most training in excess of ten hours.

Table 4.62: Current Level of Training On Using Computers to Teach Curriculum Topics (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	48.9	34.2	6.9	4.3	5.6
Division I	63.6	27.3	6.8	0.0	2.3
Division II	39.4	42.3	11.3	4.2	2.8
Division III	60.3	23.8	3.2	7.9	4.8
Division IV	44.6	32.4	6.8	6.8	9.5

These results are based on n=231 completed surveys

Statement #15: Strategies for integrating computers into the curriculum

Overall, based on the entire sample, most teachers had either no training or less than ten hours of training on how to integrate computers into the curriculum. Comparing divisions shows that more division one teachers than any other had no training whatsoever. Division four teachers had the most training. (Table 4.63)

Table 4.63: Current Level of Training On Strategies for Integrating Computers Into The Curriculum (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	47.4	40.9	3.5	1.7	6.5
Division I	63.6	31.8	2.3	0.0	2.3
Division II	40.8	47.9	2.8	2.8	5.6
Division III	54.0	34.9	1.6	1.6	7.9
Division IV	39.7	43.8	5.5	1.4	9.6

These results are based on n=230 completed surveys

Statement #16: How computers relate to teaching areas

Table 4.64 shows that almost half of the total sample had no training at all that addressed how computers relate to specific teaching areas. Division one teachers had the least amount of training, while division four teachers had the most.

Table 4.64: Current Level of Training On How Computers Relate to Teaching Areas (Percentages)

	0 hrs	0-10 hrs	11-20 hrs	21-30 hrs	31+ hrs
Total Sample	47.6	42.8	2.6	2.6	4.4
Division I	60.5	37.2	0.0	0.0	2.3
Division II	42.3	49.3	0.0	2.8	5.6
Division III	54.0	33.3	6.3	3.2	3.2
Division IV	41.1	46.6	2.7	2.7	6.8

These results are based on n=229 completed surveys

V. Training Needs

This section of the survey was mailed to one third of the sample population -- 1000 teachers, to address the training needs of teachers in order to improve the use of technology with students. A total of 258 surveys addressing this topic were returned; six were not completed. Table 4.65 shows the breakdown of surveys by division.

Table 4.65: Training Surveys Returned (Frequencies)

Division I	Division II	Division III	Division IV	Total
44	73	64	77	258

Teaching Techniques

Teachers were asked to respond to the following statements in the area of teaching techniques.

Statement #1: What teaching methods are most effective when using computers with students

Table 4.66 shows that an overwhelming number of teachers agreed that learning what teaching methods are most effective would be beneficial. Note that division one teachers agreed unanimously. Notice also that division three and four teachers were more undecided than teachers in divisions one and two.

Table 4.66: Training Needs: Teaching Methods (Percentages)

	Disagree	Undecided	Agree
Total Sample	1.7	5.6	92.6
Division I	0.0	0.0	100.0
Division II	1.4	1.4	97.3
Division III	3.2	11.1	85.7
Division IV	0.0	8.2	91.8

These results are based on n=231 completed surveys

Statement #2: Effective classroom management strategies when working in a computer lab

Table 4.67 shows that in excess of three quarters of all teachers agreed that they would like training regarding effective classroom management strategies when working in a computer lab setting. Note that division two teachers were especially interested in this type of training, but that division four teachers were particularly undecided. Only a small percentage of teachers in each division disagreed.

Table 4.67: Training Needs: Classroom Management Strategies (Percentages)

	Disagree	Undecided	Agree
Total Sample	5.6	10.3	84.2
Division I	2.3	0.0	97.7
Division II	4.2	9.7	86.1
Division III	7.8	9.4	82.8
Division IV	6.6	15.8	77.6

These results are based on n=234 completed surveys

Statement #3: How to incorporate computers into the existing curriculum that teachers are responsible for teaching

Overall, nearly ninety five percent of teachers surveyed agreed that they would find training that explained how to incorporate computer into curriculum of benefit. Table 4.68 also shows that division two teachers were most interested in such training and that division one teachers were most undecided. Notice that levels of disagreement were very low for all groups.

Table 4.68: Training Needs: Incorporating Computers Into Curriculum (Percentages)

	Disagree	Undecided	Agree
Total Sample	0.9	4.7	94.5
Division I	0.0	9.1	90.9
Division II	1.4	1.4	97.3
Division III	0.0	4.7	95.3
Division IV	1.3	3.9	94.7

These results are based on n=235 completed surveys

Statement #4: Evaluation strategies for lessons that integrate computers

Overall, in excess of eighty percent of all teachers surveyed agreed that training to teach evaluation strategies would be beneficial in promoting technology use with students. Table 4.69 also shows that while few teachers disagreed, as many as twenty percent of any given group were undecided.

Table 4.69: Training Needs: Evaluation Strategies (Percentages)

	Disagree	Undecided	Agree
Total Sample	4.3	13.3	82.4
Division I	0.0	20.5	79.5
Division II	4.2	12.5	83.3
Division III	4.8	12.7	82.5
Division IV	6.6	10.5	82.9

These results are based on n=233 completed surveys

Statement #5: Strategies teachers can use to teach students how to use computers as tools

Overall, more than ninety percent of all teachers surveyed agreed that they needed training to teach them how students can use computers as tools. More division two teachers agreed with this statement than any others, while more divi: 'on four teachers were undecided than teachers in other divisions. (Table 4.70)

Table 4.70: Training Needs: Using Computers As Tools (Percentages)

	Disagree	Undecided	Agree
Total Sample	0.9	7.7	91.5
Division I	0.0	6.8	93.2
Division II	0.0	4.1	95.9
Division III	1.6	7.8	90.6
Division IV	0.0	11.8	88.2

These results are based on n=235 completed surveys

Statement #6: How to encourage group work when students are using computers

Overall, three quarters of all teachers surveyed agreed with this statement. It is interesting to note that levels of agreement dropped as division level increased and that the percentage of teachers who were undecided increased as division levels increased. (Table 4.71)

Table 4.71: Training Needs: Encouraging Group Work (Percentages)

	Disagree	Undecided	Agree
Total Sample	10.3	15.0	74.8
Division I	4.5	6.8	88.6
Division II	11.0	9.6	79.5
Division III	7.9	23.8	68.3
Division IV	10.5	19.7	69.7

These results are based on n=234 completed surveys

Statement #7: How to teach keyboarding skills to students

Overall, nearly three quarters of all teachers surveyed agreed that they needed training in the area of teaching keyboarding skills to students. It is interesting to note that division four teachers were much less interested in this than were division two teachers. Notice the large percentage of division four teachers who were undecided. (Table 4.72)

Table 4.72: Training Needs: Teaching Keyboarding (Percentages)

	Disagree	Undecided	Agree
Total Sample	10.2	17.0	72.8
Division I	6.8	13.6	79.5
Division II	2.7	6.8	90.4
Division III	14.1	12.5	73.4
Division IV	15.8	31.6	52.6

These results are based on n=235 completed surveys

Statement #8: Ways in which teachers can use computers to teach their subject areas

Overall, the majority of teachers surveyed agreed that training that addressed using computers in specific subject areas would be beneficial in promoting the use of technology with students. Teachers at all division levels were in agreement with this as shown in table 4.73.

Table 4.73: Training Needs: Teaching Specific Subject Areas (Percentages)

	Disagree	Undecided	Agree
Total Sample	1.3	4.7	94.0
Division I	2.3	6.8	90.9
Division II	0.0	4.1	95.9
Division III	1.6	1.6	96.9
Division IV	1.3	5.3	93.4

These results are based on n=235 completed surveys

Technical Needs

Teachers were asked to respond to the following statements in the area of technical training needs.

Statement #9: General operation of computers

Roughly half of all teachers surveyed felt they needed training that addressed the general operation of computers. More division one teachers felt they needed training in this area than any other group. (Table 4.74)

Table 4.74: Training Needs: General Operation of Computers (Percentages)

	Disagree	Undecided	Agree
Total Sample	39.3	9.2	51.5
Division I	36.4	2.3	61.4
Division II	45.1	7.0	47.9
Division III	42.6	8.2	49.2
Division IV	37.3	17.3	45.3

These results are based on n=229 completed surveys

Statement #10: Use of a word processing package

Table 4.75 shows that roughly half of all teachers surveyed felt they needed training that addressed the use of a word processing package. Teachers in division four were less interested in such training as compared with division one teachers.

Table 4.75: Training Needs: Using A Word Processor (Percentages)

	Disagree	Undecided	Agree
Total Sample	37.7	9.1	53.2
Division I	32.6	7.0	60.5
Division II	41.1	5.5	53.4
Division III	40.3	4.8	54 8
Division IV	40.0	18.7	41.3

These results are based on n=231 completed surveys

Statement #11: Use of a spreadsheet package

Slightly more than half of all teachers surveyed wanted to learn about spreadsheets. Nearly twenty percent were undecided as shown below in table 4.76. It is interesting to note that division one and four teachers were less interested in learning about spreadsheets than were division two and three teachers.

Table 4.76: Training Needs: Using A Spreadsheet (Percentages)

	Disagree	Undecided	Agree
Total Sample	25.0	19.0	56.0
Division I	27.9	18.6	53.5
Division II	20.5	16.4	63.0
Division III	23.8	14.3	61.9
Division IV	24.0	25.3	50.7

These results are based on n=232 completed surveys

Statement #12: Use of a database package

While the majority of all teachers surveyed agreed that knowledge of a database would help improve the use of technology with students, division two teachers were particularly interested while division four teachers were much more undecided. (Table 4.77)

Table 4.77: Training Needs: Using A Database (Percentages)

	Disagree	Undecided	Agree
Total Sample	19.0	22.5	58.4
Division I	23.3	18.6	58.1
Division II	13.7	19.2	67.1
Division III	20.6	19.0	60.3
Division IV	18.9	31.1	50.0

These results are based on n=231 completed surveys

Statement #13: Use of a desktop publishing package

As shown below in table 4.78, the majority of teachers agreed that training in the area of desktop publishing would be of benefit in promoting the use of technology with students. Notice that the level of agreement decreased as division levels increased. Notice also that division one teachers had the lowest level of disagreement.

Table 4.78: Training Needs: Using Desktop Publishing Software (Percentages)

	Disagree	Undecided	Agree
Total Sample	15.9	17.2	67.0
Division I	7.0	14.0	79.1
Division II	17.8	13.7	68.5
Division III	18.8	17.2	64.1
Division IV	20.0	21.3	58.7

These results are based on n=233 completed surveys

Statement #14: Use of telecommunications technology

Table 4.79 shows that the majority of teachers surveyed, nearly seventy percent, felt that training in the use of telecommunications technology was necessary. Notice that division two teachers showed the most interest.

Table 4.79: Training Needs: Using Telecommunications Technology (Percentages)

	Disagree	Undecided	Agree
Total Sample	11.6	18.9	69.5
Division I	14.0	18.6	67.4
Division II	9.7	13.9	76.4
Division III	17.2	14.1	68.8
Division IV	9.2	25.0	65.8

These results are based on n=233 completed surveys

Statement #15: Use of authoring programs such as Authorware

Less than half of all teachers agreed with this statement. This was the result of a large undecided vote for teachers from all divisions, especially division four teachers. (Table 4.80)

Table 4.80: Training Needs: Using Authoring Programs (Percentages)

	Disagree	Undecided	Agree
Total Sample	13.7	41.2	45.1
Division I	14.0	34.9	51.2
Division II	12.7	36.6	50.7
Division III	12.9	38.7	48.4
Division IV	1.4	52.1	33.8

These results are based on n=226 completed surveys

Statement #16: Use of clip art software

While most teachers surveyed agreed that they needed training on how to use clip art software packages, notice that it was division one teachers who were most interested in this, and that the level of agreement decreased as division level increased. Notice also that division four teachers were much more undecided than teachers in other divisions. (Table 4.81)

Table 4.81: Training Needs: Using Clip Art Software (Percentages)

Total Sample	20.5	21.4	58.1
Division I	20.9	9.3	69.8
Division II	16.7	20.8	62.5
Division III	25.4	17.5	57.1
Division IV	19.2	32.9	47.9

These results are based on n=229 completed surveys

Statement #17: Use of graphics software

Most teachers, as shown in table 4.82, were interested in training to learn how to use graphics software. Notice that again, it was division one teachers who were most interested in being trained.

Table 4.82: Training Needs: Using Graphics Software (Percentages)

	Disagree	Undecided	Agree
Total Sample	17.0	16.1	67.0
Division I	18.6	4.7	76.7
Division II	16.4	12.3	71.2
Division III	22.2	19.0	58.7
Division IV	12.3	26.0	61.6

These results are based on n=230 completed surveys

Statement #18: Use of CD ROM technology

As shown below in table 4.83, eighty percent of all teachers surveyed felt they could benefit from training in the use of CD ROM technology. Notice that division one and four teachers were more undecided about this than division two and three teachers. Notice also that levels of disagreement increased as division levels increased.

Table 4.83: Training Needs: Using CD ROM Technology (Percentages)

	Disagree	Undecided	Agree
Total Sample	9.9	9.9	80.2
Division I	6.8	13.6	79.5
Division II	8.3	6.9	84.7
Division III	12.7	9.5	77.8
Division IV	13.3	14.7	72.0

These results are based on n=232 completed surveys

Statement #19: Use of a computerized card catalogue system

Levels of agreement were roughly half for all teachers surveyed. Table 4.84 shows that the levels of agreement drop as division levels increase. Notice that nearly forty percent of all division four teachers were undecided about the need for training in the use of computerized card catalogue systems.

Table 4.84: Training Needs: Using a Computerized Card Catalogue System (Percentages)

	Disagree	Undecided	Agree
Total Sample	25.0	25.4	49.6
Division I	11.6	25.6	62.8
Division II	25.0	18.1	56.9
Division III	36.1	21.3	42.6
Division IV	24.3	39.2	36.5

These results are based on n=228 completed surveys

Statement #20: Teaching programming

Interestingly, only one third of all teachers surveyed felt they need to know how to teach programming to their students. Even more interesting, is that this type of training follows the trends seen for other categories of training; levels of agreement decrease as division levels increase. (Table 4.85)

Table 4.85: Training Needs: Teaching Programming (Percentages)

	Disagree	Undecided	Agree
Total Sample	48.5	20.5	31.0
Division I	38.1	19.0	42.9
Division II	35.6	26.0	38.4
Division III	61.3	12.9	25.8
Division IV	58.1	21.6	20.3

These results are based on n=229 completed surveys

General Needs

Teachers were asked to respond to the following statements in the area of general needs.

Statement #21: Teacher training must be hands on

As shown in table 4.86, teachers were almost unanimous on this issue; training must be hands on.

Table 4.86: Training Needs: Hands On Training (Percentages)

	Disagree	Undecided	Agree
Total Sample	0.4	1.3	98.3
Division I	0.0	0.0	100.0
Division II	1.4	1.4	97.3
Division III	0.0	0.0	100.0
Division IV	0.0	2.6	97.4

These results are based on n=234 completed surveys

Statement #22: Teacher training must be available from someone within the school district/board

As shown in table 4.87, nearly three quarters of all teachers surveyed agreed that training must be available from someone within the school district/board. Notice that levels of agreement for division one and two teachers were close, but levels of agreement decreased for division three and four teachers.

Table 4.87: Training Needs: In-house Training (Percentages)

	Disagree	Undecided	Agree
Total Sample	13.3	14.2	72.5
Division I	9.1	13.6	77.3
Division II	12.3	9.6	78.1
Division III	7.9	17.5	74.6
Division IV	21.1	15.8	63.2

These results are based on n=233 completed surveys

Statement #23: "On call" help must be available to teachers

Table 4.88 shows that most teachers, nearly ninety percent of them, felt that on-call help was necessary. Interestingly, it was division four teachers who agreed most strongly with this idea. Note that there was no disagreement from any of the teachers in divisions one, three or four.

Table 4.88: Training Needs: On Call Help (Percentages)

	Disagree	Undecided	Agree
Total Sample	1.3	9.0	89.7
Division I	0.0	9.1	90.9
Division II	4.1	6.8	89.0
Division III	0.0	14.1	85.9
Division IV	0.0	7.9	92.1

These results are based on n=234 completed surveys

Statement #24: Teachers need to learn how students can use computers as tools

Again, as shown in table 4.89, there was very little disagreement with this statement. While a larger percentage of teachers in division one agreed that teachers need to learn how students can use computers as tools, teachers in the other divisions also agreed overwhelmingly.

Table 4.89: Training Needs: Using Computers As Tools (Percentages)

	Disagree	Undecided	Agree
Total Sample	2.6	3.9	93.5
Division I	0.0	2.3	97.7
Division II	2.8	4.2	93.1
Division III	3.2	4.8	92.1
Division IV	3.9	3.9	92.1

These results are based on n=233 completed surveys

Statement #25: Modeling must be a component of training

As shown in table 4.90. in excess of three quarters of all teachers surveyed agreed that modeling was an important component of training. Notice that there was no disagreement from any of the division three teachers, but that there were more teachers in divisions three and four who were undecided than the other divisions. Again, fewer division four teachers agreed with this than teachers in other divisions.

Table 4.90: Training Needs: Modeling (Percentages)

	Disagree	Undecided	Agree
Total Sample	2.6	12.0	85.4
Division I	4.5	6.8	88.6
Division II	1.4	6.8	91.8
Division III	0.0	14.3	85.7
Division IV	3.9	17.1	78.9

These results are based on n=233 completed surveys

Statement #26: Teachers must be shown how computers can be used to improve learning

Overall, teachers were overwhelmingly in favor of training that showed how computers can increase learning. Notice that teachers in divisions one and two were not the least bit undecided, yet teachers in divisions three and four were. (Table 4.91)

Table 4.91: Training Needs: How Computers Can Improve Learning (Percentages)

	Disagree	Undecided	Agree
Total Sample	2.1	5.1	92.7
Division I	4.5	0.0	95.5
Division II	4.1	0.0	95.9
Division III	0.0	7 8	92.2
Division IV	0.0	10.5	89.5

These results are based on n=234 completed surveys

Statement #27: Teachers need the opportunity to see sound computer practices being modeled

The majority of all teachers surveyed agreed that they wanted the opportunity to see computer practices being modeled. It is interesting that division four teachers are most undecided about this, while percentage levels of agreement for the remaining divisions were roughly equal. (Table 4.92)

Table 4.92: Training Needs: Modeling Sound Computer Practices (Percentages)

	Disagree	Undecided	Agree
Total Sample	2.1	10.3	87.6
Division I	2.3	6.8	90.9
Division II	1.4	9.6	89.0
Division III	1.6	7.8	90.6
Division IV	2.6	14.5	82.9

These results are based on n=234 completed surveys

Statement #28: Teachers need information about available software

As shown in table 4.93, the majority of teachers at all division levels agreed that they needed information about software. At every division level more than ninety five percent of all teachers were in agreement that information about software was needed.

Table 4.93: Training Needs: Information About Software (Percentages)

	Disagree	Undecided	Agree
Total Sample	0.4	3.4	96.2
Division I	0.0	2.3	97.7
Division II	1.4	1.4	97.3
Division III	0.0	4.7	95.3
Division IV	0.0	3.9	96.1

These results are based on n=234 completed surveys

Statement #29: Training must continue until teachers are confident in the use of computers with students

Teachers overwhelmingly agreed that they must receive training until they feel confident in the use of computers. Table 4.94 shows that the percentage of teachers who disagreed and who were undecided was very low.

Table 4.94: Training Needs: Improving Confidence Levels (Percentages)

	Disagree	Undecided	Agree
Total Sample	1.7	5.2	93.1
Division I	2.3	4.5	93.2
Division II	4.1	4.1	91.8
Division III	0.0	7.9	92.1
Division IV	1.3	3.9	94.7

These results are based on n=233 completed surveys

Statement #30: Training must be provided on a regular basis

Table 4.95 shows that teachers overwhelmingly agreed that training must be provided on a regular basis. It is interesting to note that division one and four teachers were more undecided than teachers in divisions two and three.

Table 4.95: Training Needs: Regular Training (Percentages)

	Disagree	Undecided	Agree
Total Sample	2.6	7.4	90.0
Division I	0.0	9.1	90.9
Division II	4.1	1.4	94 5
Division III	1.6	7.9	90.5
Division IV	4.1	10.8	85.1

These results are based on n=231 completed surveys

Statement #31: Teacher training must be practical

All teachers in all divisions felt a need for practical training. Only a small number of teachers disagreed or were undecided on this issue. (Table 4.96)

Table 4.96: Training Needs: Practical Training (Percentages)

	Disagree	Undecided	Agree
Total Sample	0.4	2.6	97.0
Division I	0.0	2.3	97.7
Division II	1.4	0.0	98.6
Division III	0.0	3.2	96.8
Division IV	0.0	4.0	96.0

These results are based on n=232 completed surveys

Other Comments

In addition to these concerns, teachers also provided many additional comments which are available in Appendix B.

VI. Resource Needs

This section of the survey was mailed to one third of the sample population - 1000 teachers, to address the resource needs of teachers in order to improve the use of technology with students. A total of 261 surveys addressing this topic were returned; three were not completed. Table 4.97 shows the breakdown of surveys by division.

Table 4.97: Resource Needs Surveys Returned (Frequencies)

Division I	Division II	Division III	Division IV	Total
66	67	64	64	261

Statement #1: Newer computer equipment is needed

Table 4.98 shows that according to all teachers surveyed, the age of existing computer equipment is a concern. A comparison of responses across division levels shows that division two teachers were especially concerned, but that more than half of all the teachers at all division levels also agreed.

Table 4.98: Resource Needs: Newer Equipment (Percentages)

	Disagree	Undecided	Agree
Total Sample	19.9	9.8	70.3
Division I	19.0	7.9	73.0
Division II	10.6	13.6	75.8
Division III	27.0	9.5	63.5
Division IV	20.3	10.9	68.8

These results are based on n=246 completed surveys

Statement #2: The ratio of computers to students must be 1:1

Table 4.99 shows the results for the total sample of teachers surveyed. Notice that teachers were split almost evenly on this issue. A look at data for each division shows that a higher percentage of division two teachers agreed with this statement than teachers in other divisions, but that responses are variable overall.

Table 4.99: Resource Needs: 1:1 Ratio (Percentages)

	Disagree	Undecided	Agree
Total Sample	42.1	12.6	45.3
Division I	45.3	17.2	37.5
Division II	33.3	10.6	56.1
Division III	44.4	12.7	42.9
Division IV	48.4	14.1	37.5

These results are based on n=247 completed surveys

Statement #3: Higher quality software is needed

Table 4.100 illustrates that more than half of the entire sample was in agreement with the need for higher quality software. A comparison of divisions shows that division one teachers were most concerned about quality software, but that at least half of all teachers at all division levels shared this concern.

Table 4.100: Resource Needs: Higher Quality Software (Percentages)

	Disagree	Undecided	Agree
Total Sample	20.7	13.4	65.9
Division I	15.4	4.6	80.0
Division II	22.7	16.7	60.6
Division III	29.0	17.7	53.2
Division IV	20.3	15.6	64.1

These results are based on n=246 completed surveys

Statement #4: Curriculum specific software is needed

The data from the total sample, as illustrated in table 4.101, indicates that curriculum specific software is needed by the majority of respondents. Teachers at all division levels shared this concern.

Table 4.101: Resource Needs: Curriculum Specific Software (Percentages)

	Disagree	Undecided	Agree
Total Sample	8.6	8.2	83.3
Division I	7.8	10.9	81.3
Division II	6.2	6.2	87.7
Division III	11.5	9.8	78.7
Division IV	9.4	7.8	82.8

These results are based on n=245 completed surveys

Statement #5: Technical assistance is needed within each school

Table 1.102 that the majority of respondents agreed that technical assistance was needed within each school. A comparison of divisions, shows that while the level of agreement varied by division, this variation was slight.

Table 4.102: Resource Needs: Technical Assistance Within The School (Percentages)

	Disagree	Undecided	Agree
Total Sample	6.5	8.1	85.4
Division I	7.7	10.8	81.5
Division II	4.5	9.1	86.4
Division III	12.7	4.8	82.5
Division IV	6.3	7.8	85.9

These results are based on n=247 completed surveys

Statement #6: A computer teacher must be available to team teach with teachers

Based on the data for the total sample as displayed in table 4.103, a slight majority of respondents agreed with this statement. A comparison of divisions shows that division one teachers felt that team teaching would be beneficial, while division four teachers did not. The level of agreement with this statement decreased as division levels increased.

Table 4.103: Resource Needs: Teachers To Team Teach With (Percentages)

	Disagree	Undecided	Agree
Total Sample	24.6	21.0	54.4
Division I	23.1	12.3	64.6
Division II	18.2	22.7	59.1
Division III	33.3	14.3	52.4
Division IV	31.3	32.8	35.9

These results are based on n=248 completed surveys

Statement #7: Peer support is critical

Table 4.104 shows that while most teachers agreed that peer support was critical, it is interesting to note that division one teachers felt the need for support much more than division four teachers. The need for support decreased as division levels increased.

Table 4.104: Resource Needs: Peer Support (Percentages)

	Disagree	Undecided	Agree
Total Sample	7.8	15.2	77.0
Division I	3.2	9.7	87.1
Division II	7.7	13.8	78.5
Division III	12.7	15.9	71.4
Division IV	9.4	21.9	68.8

These results are based on n=244 completed surveys

Statement #8: Teachers must be given time to experiment with computers

As shown in table 4.105, the majority of teachers felt they needed time to experiment with computers, but it is interesting to note that the need for time decreased with an increase in division level. So too did the number of undecided teachers.

Table 4.105: Resource Needs: Time To Experiment (Percentages)

	Disagree	Undecided	Agree
Total Sample	4.9	5.3	89.8
Division I	4.6	1.5	93.8
Division II	6.1	4.5	89.4
Division III	4.8	6.5	88.7
Division IV	7.8	10.9	81.3

These results are based on n=246 completed surveys

Statement #9: Teachers must be given time to learn technical computer skills

Table 4.106 shows that almost ninety percent of teachers felt they needed time to learn technical skills, but that this need was less important to division four teachers who were somewhat undecided than it was for teachers in divisions one through three.

Table 4.106: Resource Needs: Time To Learn Technical Skills (Percentages)

	Disagree	Undecided	Agree
Total Sample	4.4	5.6	89.9
Division I	4.6	4.6	90.8
Division II	4.5	6.1	89.4
Division III	6.3	1.6	92.1
Division IV	4.7	12.5	82.8

These results are based on n=248 completed surveys

Statement #10: Teachers must be given time to learn about computer uses in education

As shown in table 4.107, in excess of ninety percent of all teachers surveyed agreed that time was needed to learn about computer uses in education, but note that the level of agreement decreased as division level increased. Division four teachers were much more undecided about this statement than any other group of teachers.

Table 4.107: Resource Needs: Time To Learn About Computer Use In Education (Percentages)

	Disagree	Undecided	Agree
Total Sample	3.6	4.0	92.3
Division I	1.5	1.5	96.9
Division II	3.0	0.0	97.0
Division III	7.9	3.2	88.9
Division IV	3.1	10.9	85.9

These results are based on n=247 completed surveys

Statement #11: More administrative support is needed

As shown in table 4.108, more than half of all teachers surveyed felt that they needed more administrative support, while significant numbers of teachers in all divisions were undecided on this issue. Division two teachers were particularly undecided, while a higher percentage of division three teachers disagreed with the need for more administrative support.

Table 4.108: Resource Needs: Administrative Support (Percentages)

	Disagree	Undecided	Agree
Total Sample	21.3	18.4	60.2
Division I	21.9	14.1	64.1
Division II	16.9	29.2	53.8
Division III	32.3	16.1	51.6
Division IV	21.9	18.8	59.4

These results are based on n=244 completed surveys

Statement #12: Technical assistance from outside of the school is needed

Again, while in excess of fifty percent of all teachers agreed with this statement (table 4.109), it is interesting to note the number of teachers who were undecided.

Table 4.109: Resource Needs: Technical Assistance Outside The School (Percentages)

	Disagree	Undecided	Agree
Total Sample	17.9	21.1	61.0
Division I	15.4	16.9	67.7
Division II	18.2	19.7	62.1
Division III	25.4	19.0	55.6
Division IV	14.3	25.4	60.3

These results are based on n=246 completed surveys

Statement #13: Teachers must have access to tutorial programs

In total, more than three quarters of all teachers surveyed agreed that teachers need access to tutorial programs, however, it is interesting to note that the undecided vote was high for teachers from all divisions. (Table 4.110)

Table 4.110: Resource Needs: Access To Tutorials (Percentages)

	Disagree	Undecided	Agree
Total Sample	5.3	18.0	76.6
Division I	3.1	17.2	79.7
Division II	3.1	17.2	79.7
Division III	11.1	17.5	71.4
Division IV	4.8	17.5	77.8

These results are based on n=244 completed surveys

Statement #14: Teachers must have access to a projection pad (to project computer images onto an overhead screen)

Table 4.111 shows that teachers had mixed reactions to this statement. While in excess of forty percent of all teachers agreed with this statement, a large number, especially division one teachers, were undecided.

Table 4.111: Resource Needs: Access To A Projection Device (Percentages)

	L[illegible]	Undecided	Agree
Total Sample	22.3	34.4	43.3
Division I	16.9	40.0	43.1
Division II	22.7	28.8	48.5
Division III	27.0	30.2	42.9
Division IV	26.6	32.8	40.6

These results are based on n=247 completed surveys

Statement #15: Teachers must have access to periodicals (MacUser, PC World, etc.)

The teachers surveyed had mixed feelings about this issue as shown in table 4.112. While slightly more than forty percent of all teachers agreed that they needed access to periodicals, there were a significant number of teachers who were undecided including almost half of all division one teachers.

Table 4.112: Resource Needs: Access To Periodicals (Percentages)

	Disagree	Undecided	Agree
Total Sample	18.6	38.9	42.5
Division I	9.2	43.1	47.7
Division II	16.7	39.4	43.9
Division III	27.0	28.6	44.4
Division IV	23.4	40.6	35.9

These results are based on n=247 completed surveys

Statement #16: Computer manuals must be accessible

Table 4.113 shows that while the majority of all teachers surveyed agreed that computer manuals must be accessible, it is interesting to note the variance in responses from division three teachers.

Table 4.113: Resource Needs: Access To Computer Manuals (Percentages)

	Disagree	Undecided	Agree
Total Sample	5.7	9.3	85.0
Division I	3.1	10.8	86.2
Division II	3.0	12.1	84.8
Division III	12.7	9.5	77.8
Division IV	3.2	7.9	88.9

These results are based on n=247 completed surveys

Statement #17: Teachers must have class sets of software to use

As shown in table 4.114, the majority of respondents surveyed agreed with this statement. Notice that division one and two teachers were most undecided about this, but that the percentage of disagreement was higher for division three and four teachers.

Table 4.114: Resource Needs: Access To Class Sets of Software (Percentages)

	Disagree	Undecided	Agree
Total Sample	16.3	15.9	67.8
Division I	13.8	23.1	63.1
Division II	17.2	21.9	60.9
Division III	20.6	11.1	68.3
Division IV	20.3	12.5	67.2

These results are based on n=245 completed surveys

Statement #18: Computer equipment must be reliable

As shown in table 4.115, teachers in all divisions overwhelmingly agreed with this statement.

Table 4.115: Resource Needs: Reliable Equipment (Percentages)

	Disagree	Undecided	Agree
Total Sample	0.8	0.0	99.2
Division I	1.5	0.0	98.5
Division II	1.5	0.0	98.5
Division III	0.0	0.0	100.0
Division IV	1.6	0.0	98.4

These results are based on n=246 completed surveys

Statement #19: Equipment repairs must be made swiftly

Again, as shown in table 4.116, teachers in all divisions agreed overwhelmingly that equipment repairs must be made swiftly.

Table 4.116: Resource Needs: Swift Repairs (Percentages)

	Disagree	Undecided	Agree
Total Sample	0.8	0.8	98.4
Division I	1.5	0.0	98.5
Division II	1.5	1.5	97.0
Division III	0.0	1.6	98.4
Division IV	1.6	0.0	98.4

These results are based on n=247 completed surveys

General Comments

On each survey there was a place for respondents to add additional comments. Overall, these comments fell into three main categories: training, time, and money (Appendix B).

Under training theme, the following comments are representative:

> More teachers need in-servicing on how to use computers as it seems to be 'learn on your own.'
>
> Some teachers are afraid of the equipment and need to be shown how the technology can help their job.
>
> Access to support funds to obtain training.
>
> We are expected to teach ourselves. At no time have we been 'supported' in trying to learn new software! 'Here are the machines -- use them -- that has been the attitude!

Under the theme of time, the following comments are representative:

> More time is needed beyond regular classroom duties to learn.
>
> Time to plan the integration of computer use into a program and time to be totally familiar with programs.
>
> Time allowed to train inside of regular school hours.

Under the money theme, by far the largest group of comments, the following comments are representative:

Strategy to update computers to keep current (i.e. ours are over 12 years old!!!)

More money is needed.

Government funding to update obsolete computers.

I would use it if the resources were available. My students depend on home computers or do without. I teach high school English and know that it would be a great asset to have them in the class.

The technology needs to be available. At present in our small community school our 'Apples' are holding their own but many have been used for large classes for 15-16 years! We do not have access to classroom computers!

VII. Teacher Opinions

This section of the survey was completed by all respondents to address the demographics of the sample and to assess their attitudes toward the use of computer technology in the classroom. A total of 715 surveys addressing this topic were returned; twelve of these were not completed.

At what grades should computers be used with students?

Based on the sample (n=698), table 4.117 shows that most teachers believe that students at all division levels should use computers. It is interesting however, that a considerable number of teachers felt that division one students need not use computers, and that as grade level increased, teachers felt more strongly that computer use should occur.

Table 4.117 also shows a comparison of teachers at each division level. It is even more interesting to note that while most teachers felt all students should use computers, these numbers are highest for the division in which they taught. For example, 95.5% of division two teachers felt that grade 4-6 students should use computers. This number is higher for this group of students than for any other. Similarly, 97.2% of division three teachers felt that grade 7-9 students should use computers, yet they did not feel as strongly about students in other divisions using computers.

It is also interesting that only 66.8% of division four teachers felt that K-3 students should use computers. The idea that K-3 students need not use computers was shared by all respondents (to varying degrees), except division one teachers.

Table 4.117: At What Levels Should Computers Be Used? (Percentages)

	Total Sample	Division I	Division II	Division III	Division IV
Gr K-3	81.1	95.7	89.5	74.9	66.8
Gr 4-6	93.4	96.3	95.5	93.3	90.1
Gr 7-9	95.7	94.4	95.0	97.2	95.5
Gr 10-12	95.6	93.8	94.0	96.1	97.0

These results are based on n=698 completed surveys

How do you think computers should be used in schools?

Table 4.118 shows that most teachers agreed that computers should be used as tools, for remediation, and for enrichment. While in agreement, that comput ... ould be used to teach curriculum topics, fewer teachers believed this to be an acceptable use of the technology. Less than half of all teachers believed that programming was a suitable activity, and while drill and practice activities were seen as a good use of technology by division one teachers, support lessened as the division levels increased.

Table 4.118: How Should Computers Be Used? (Percentages)

	Total Sample	Division I	Division II	Division III	Division IV
Should not be used	0.9	0.9	1.0	0.0	0.5
Tools	96.6	97.5	98.0	96.6	94.6
Remediation	86.2	87.0	87.5	85.5	82.2
Teach curriculum topics	73.9	69.8	79.5	70.9	75.7
Drill and practice	86.1	95.7	89.5	84.4	77.7
Programming	45.8	45.1	46.0	44.1	47.0
Enrichment	92.3	98.1	95.0	91.6	87.6

These results are based on n=698 completed surveys

Should all classroom teachers be expected to use computers with students?

As shown in table 4.119, slightly more than half of all teachers said yes. Note that the mean for this question was brought down by the responses of division three and four teachers.

Table 4.119: Should All Teachers Use Computers? (Percentages)

	Total Sample	Division I	Division II	Division III	Division IV
Yes	58.0	69.8	69.0	50.3	45.8
No	42.0	30.2	31.0	49.7	54.2

These results are based on n=697 completed surveys

If no, who should use computers with students?

As illustrated below, the bulk of teachers who responded to this question felt that computers should be used only by those who were interested in using them. The next largest group of responses was the "other" category. (Table 4.120)

Table 4.120: Who should Use Computers With Students? (Percentages)

	Total Sample	Division I	Division II	Division III	Division IV
Only those interested in doing so	71.0	65.3	62.9	73.0	77.1
Computer specialists	21.2	22.4	27.4	16.9	19.3
Teacher librarians	15.4	14.3	14.5	9.0	22.0
Other	30.4	26.5	14.5	27.0	35.8

These results are based on n=293 completed surveys

The "other" category, (Appendix B) was made up primarily of teachers who felt that computers should only be used if computer use was appropriate. Comments such as those that follow were common:

> Depends on subject.
>
> Computers are tools! Sometimes they fit the task sometimes they don't!
>
> All teachers except those that don't require them like band teachers, industrial arts, home economics, dramatic arts, and physical education although sometimes they can be used as a part of these subjects as well.

Others felt that equipment and funds were the limiting factor:

> It cannot be expected if government doesn't provide resources.
>
> Only those for whom computers are easily accessible and readily available.

Some teachers felt that training needed to be provided before this was possible:

> If they could be in-serviced first.
>
> Inservicing on a regular basis so all classroom teachers are comfortable with them, otherwise only specialists should teach it.

What would you consider an ideal number of minutes of computer use by students per week?

The bulk of responses as illustrated in table 4 121 fell between 30 minutes and 2-5 hours.

Table 4.121: Ideal Number of Minutes of Use Per Week (Percentages)

	Total Sample	Division I	Division II	Division III	Division IV
0 minutes	0.3	0.6	1.0	0.0	0.0
less than 30	0.6	2.5	0.5	0.6	0.0
30-60 minutes	19.6	33.1	16.7	14.7	15.3
1-2 hours	31.7	35.7	33.3	31.2	26.5
2-5 hours	25.0	15.9	29.2	30.0	23.3
5-8 hours	8.8	0.6	9.4	10.6	14.3
Other	13.9	11.5	9.9	12.9	20.6
Total	99.9	99.9	100.0	100.0	100.0

These results are based on n=668 completed surveys

The other category was made up of comments that fell into a three key themes:

Depends on age:

Gr 4-6: 30-60 minutes; Gr 7-9: 30-60 minutes; Gr 10-12: 1-2 hours.

Depends on grade level and programs available.

Depends on activity:

Depends on purpose. Programming takes much longer that drill and practice.

Depending on objective of their use, I believe a 30% balance of student time be invested in computer work/tasks to improve training/independent study.

As required throughout the day. Unlimited access to employ computers as tools.

Depends on available resources:

In a school my size, any more time would not be possible.

What do you consider a reasonable ratio of computers to students when students are engaged in computer-based activities?

As shown in table 4.122, more than half of all teachers felt that a ratio of 1:1 was ideal, but an additional third felt that one computer for every two students was acceptable. Notice that a 2:1 ratio was more acceptable to division one teachers than to teachers in other divisions.

Table 4.122: Ideal Ratio of Computers To Students (Percentages)

	Total Sample	Division I	Division II	Division III	Division IV
1 computer:1 student	56.4	49.4	59.3	57.9	57.7
1 computer:2 students	30.3	41.8	29.4	28.1	24.0
1 computer:3 students	6.1	4.4	4.1	3.5	11.2
1 computer:5 students	2.5	1.9	1.5	2.9	3.1
1 computer:10 students	0.7	0.0	0.0	2.9	0.0
1 computer:15 students	0.0	0.0	0.0	0.0	0.0
Other	4.0	2.5	5.7	4.7	4.1
Total	100.0	100.0	100.0	100.0	100.1

These results are based on n=683 completed surveys

The "other" responses included comments suggesting that the ratio depended on the intended use such as those listed below:

> Depends on the activity.
>
> As a word processor 1:1, for communications 1:3, for knowledge browsing 1:3
>
> 1:1 for projects, 1:15 for occasional classroom use.

Another group of comments focused on the ideal vs. the acceptable ratio:

> 1:1 is ideal but 1:2 is acceptable.
>
> 1:1 - desirable, 1:2 - acceptable.

IIX. Summary

Organizational Needs

Where indicated, the following issues were identified as needs by sixty percent or more of the teachers surveyed (table 4.123):

Table 4.123: Organizational Needs Summary

		Div I	Div II	Div III	Div IV
a)	improved access to technology	•	•	•	•
b)	access to timely technical help within the school	•	•	•	•
c)	access to software	•	•	•	•
d)	the need for easier scheduling of computer facilities	•	•	•	•
e)	more teacher input into software purchases	•	•	•	•
f)	the opportunity to team teach with experienced computer users	•	•	•	•
g)	the need for network administrators	•	•	•	•
h)	increased teachers input into how computers are used	•	•	•	•
i)	more teacher involvement in long range planning for technology use at the school level	•	•	•	•
j)	a team approach to computer use with schools	•	•	•	•
k)	more emphasis must be placed on computers		•	•	•
l)	more subject integration	•	•		•
m)	computers in the classrooms		•		•
n)	more administrative support				•
o)	more input into hardware purchases				•

Though the needs above differ slightly from division to division, most areas identified are of concern to all teachers.

Resource Needs

Current Available Resources

Where indicated, sixty percent of all teachers surveyed have access to the hardware and software listed below (table 4.124):

Table 4.124: Available Resources Summary

		Div I	Div II	Div III	Div IV
Software					
a)	word processors	•	•	•	•
b)	creativity software	•	•	•	•
c)	drill and practice software	•	•	•	•
d)	keyboarding software	•	•	•	•
e)	desktop publishing software	•	•	•	•
f)	CD ROM's	•	•	•	•
g)	databases		•	•	•
h)	spreadsheets		•	•	•
i)	simulations			•	•
j)	programming software			•	•
k)	telecommunications software				•

Hardware					
a)	CD ROM players	•	•	•	•
b)	dot matrix printers	•	•	•	•
c)	laser printers	•	•	•	•
d)	modem				•
e)	scanner				•

Notice the limited resources available to teachers, and that division four teachers have the access to more resources than do teachers in division one through three.

These results are consistent with results from a survey conducted Alberta Education in 1994 which addressed the computer equipment that teachers had access to: (Table 4.125)

Table 4.125: Computer Equipment Currently Available (Percentages)

Computer Type	Elementary School	Junior High School	Senior High School
Apple II Type	66.0	40.8	8.0
386/486	3.9	6.5	24.4
286	2.4	2.8	10.9
Pre 286	3.8	6.2	29.0
Other	10.2	10.2	3.4
Mac Separate	4.9	7.7	5.5
Mac Built-In	8.9	25.7	18.8

Note that as per the general comments made by teachers about lack of equipment/age of equipment, table 4.125 confirms that at the elementary

school level (divisions one and two), the Apple II, 286 and Pre 286 models make up 72% of the technology available to teachers and students. These computers are more than ten years old. At the junior high level, these same three types of computers make up almost 50% of the total and at the high school level, these three types of computers make up almost 65% of the total available.

Resource Needs

The resource needs identified by sixty percent or more of teachers surveyed include those indicated below (table 4.126):

Table 4.126: Resource Needs Summary

		Div I	Div II	Div III	Div IV
a)	newer equipment	•	•	•	•
b)	higher quality software	•	•		•
c)	curriculum specific software	•	•	•	•
d)	technical assistance within each school	•	•	•	•
e)	peer support	•	•	•	•
f)	time to experiment	•	•	•	•
g)	time to learn technical skills	•	•	•	•
h)	time to learn about computer uses in education	•	•	•	•

		Div I	Div II	Div III	Div IV
i)	access to tutorials	•	•	•	•
j)	access to computer manuals	•	•	•	•
k)	access to class sets of software	•	•	•	•
l)	reliable equipment	•	•	•	•
m)	swift repairs of equipment	•	•	•	•
n)	a computer teacher to team teach with	•			
o)	more administrative support	•			
p)	technical assistance from outside the school	•	•		•

Note that most concerns were shared by teachers in all divisions, but that a few such as support from a computer teacher and from administration were a concern for division one teachers in particular.

Training Needs

Current Training

Based on the data from the entire sample, there was only one area, word processing, where sixty percent or more of all teachers indicated that they currently had more than ten hours of training. Division one teachers did not have training in even this one area as shown in table 4.127.

Table 4.127: Current Training Summary

		Div I	Div II	Div III	Div IV
a)	a word processor		•	•	•

Training Needs

As indicated, sixty percent or more of all teachers surveyed indicated that they felt they could benefit from training in the following areas (table 4.128):

Table 4.128: Training Needs Summary

		Div I	Div II	Div III	Div IV
Teaching Techniques					
a)	teaching methods	•	•	•	•
b)	classroom management in a computer lab	•	•	•	•
c)	incorporating computers into the curriculum	•	•	•	•
d)	evaluation strategies	•	•	•	•
e)	using computers as tools	•	•	•	•
f)	encouraging group work	•	•	•	•
g)	teaching keyboarding	•	•	•	
h)	ways in which teachers can use computers to teach their subject	•	•	•	•

		Div I	Div II	Div III	Div IV
Technical Needs					
a)	general operation of computers	•			
b)	use of a word processing package	•			
c)	use of a spreadsheet package		•	•	
d)	use of a database package		•	•	
e)	use of desktop publishing software	•	•	•	
f)	use of telecommunications technology	•	•	•	•
g)	use of clip art software	•	•		
h)	use of graphics software	•	•		•
i)	use of CD ROM technology	•	•	•	•
j)	teaching programming			•	
k)	computerized card catalogue system	•			
General Needs					
a)	hands on training	•	•	•	•
b)	training available from someone within the school board/district	•	•	•	•
c)	on call help	•	•	•	•
d)	how students can use computers as tools	•	•	•	•
e)	modelling as a component of training	•	•	•	•
f)	training that demonstrates how computers can improve learning	•	•	•	•
g)	the opportunity to see sound computer practices being modeled	•	•	•	•
h)	information about software	•	•	•	•
i)	continuous training until teachers are confident about using computers	•	•	•	•
j)	regular training	•	•	•	•
k)	practical training	•	•	•	•

Note that in the areas of general needs and teaching techniques, the needs of teachers did not differ a great deal from division to division, however in the area of technical needs, needs varied more. Division four teachers felt they needed less help in this area than did teachers in other divisions.

Chapter V

DISCUSSION OF RESULTS & CONCLUSIONS

In this chapter, the results presented in chapter four will be interpreted followed by recommendations for change to address the needs identified by Alberta teachers. This chapter will also provide a conclusion and suggestions for further research.

Introduction

The survey that was conducted assessed the needs of classroom teachers with regard to organizational, resource and training issues so that these needs once identified might be met in order to improve the use of technology with students.

It should be noted that because the return rate was low (23.4%), the generalizability of the results discussed in the following pages is limited. The author did not provide return postage for the surveys and speculates that this may have been one of the main reasons for the low return rate. Other reasons may include a lack of interest in the topic and the length of the survey.

Actual vs. Ideal Use

A gap exists between what respondents felt was ideal and what is currently happening with regard to computer use with students in Alberta schools. A comparison of current computer use and ideal computer use as specified by the respondents (table 5.1) shows that currently twenty seven percent of teachers never use computers with students, even though less than one percent of respondents believed that this was ideal. Similarly, twenty five percent of all respondents believed that 2-5 hours of computer use was ideal, although currently, only eleven percent of teachers used computers to this extent. The mean for current use was less than one hour per week. The mean for ideal use was between one and two hours.

Table 5.1: Ideal vs. Current Use of Technology (Percentages)

Hours of Use/Week	Ideal	Current
0 minutes	0.3	26.9
>60 minutes	20.2	26.9
1-2 hours	31.7	29.4
2-5 hours	25	10.7
5-8 hours	8	6.2

These results are based on [illegible]68 completed surveys

Respondents indicated that the software students used most included word processors (70%), drill and practice software (63.4%) and CD ROM's (41.3%) together with CD ROM drives (38%), dot matrix printers (55%) and laser printers (44%).

Yet, when respondents were asked how computers should be used, the sample of teachers overwhelmingly felt they should be used in a variety of ways including as tools (96.6%), for remediation (86.2%), to teach curriculum topics (73.9%), for drill and practice (86.1%) as well as for enrichment (92.3%). It seems unlikely that all of this is happening through the use of three types of software and in less than one hour per week.

Given that current use is less than what respondents indicated was ideal, especially at the low and high ends of the continuum, and that use is limited to a few types of hardware and software, the author will now discuss the reasons for th[illegible]s revealed by the respondents and make recommendations for change to close the gap.

As stated earlier, this author believes that in order to close the gap between the current and the ideal, whether that ideal be the one expressed earlier by this author, or simply the gap that teachers themselves perceive, the organizational, resource and training needs of teachers must be addressed simultaneously.

Teachers, though not asked about the relationship between these variables, nonetheless emphasized their inter-relatedness when they provided comments about additional needs, regardless of which section of the survey they were asked to complete. For example, teachers asked about organizational needs also added 8 comments about training needs, 26 comments about lack of funds, and 6 comments about time issues. Teachers asked about training issues, provided 8 comments related to training, but as well another 23 about funding and 7 related to time. Lastly, teachers asked about resource needs,

provided 14 comments about training needs, 27 comments about funding and 6 comments about time issues. The issues of training, funding and time were the top three needs expressed by teachers.

Teachers recognize that providing more equipment in itself will not benefit students unless teachers are familiar, comfortable and willing to use it. Providing training will not increase technology use with students unless teachers have the technology available for them to use. Having adequate equipment will not be of benefit, if for example, school policies make it difficult to get access to the equipment. Clearly, these three issues are closely tied to one another and cannot be addressed in isolation.

One teacher wrote: "Which comes first? Trained instructors or computers? Often one or the other. Boards should be encouraged to supply and provide access and teachers should be taught (trained in their use)."

Figure 5.1 depicts the relationship between these three components as viewed by this author.

Figure 5.1: Relationship between organization, resources and training

Notice that training and resources are superimposed on the organizational component. The organizational component of figure 5.1 represents the underlying vision of computer use in schools and the support for making the vision a reality. Training and resources are interlocked because when new materials are introduced, training must take place to ensure proper usage. These are superimposed on the organizational component because neither training nor resources will likely be made available unless organizationally there is clear a vision of the outcomes, and thus the type of resources and training required to produce those outcomes. Without vision, it is also unlikely that the organizational support will exist to improve computer use with students.

This author believes that in addition to clear vision and leadership, all the players in the educational community beginning with representatives from the Department of Education continuing right down to district administrators, school administrators, classroom teachers and even members of the community must play an active role in promoting technology use in Alberta schools.

Recommendations and Discussion

Organizational Needs

Level #1: Department of Education

Alberta Education must work with industry to determine what technology based skills are requir[illegible]le from graduates of public school systems. These skills should be used to identify outcomes to be achieved by students prior to graduation and be worked into a vision of how computers should be used in education. The result would be curricula for the Information Age.

Together with this curriculum, learning guides need to be developed to assist teachers with the implementation of the technology by providing explicit examples of computer use consistent with the vision. While this needs to remain generic enough so as to apply to any type of computer system or possible arrangement of computers within a school, it should be specific enough that teachers should know for example, that the word processor

should be used to assist students in the writing of reports. This makes it generic enough that any word processor could be used, but would clearly identify the particular use of computers for students within a given curriculum.

Level #2: School Districts

In 1994, only thirty eight percent of all districts had a policy that featured a planning process for the implementation of computer technology (Alberta Education, 1994); this is critical.

Scope and sequence charts, consistent with the vision and in line with the curriculum, should be created that clearly identify what skills students must gain by the end of each grade. This would ensure that by graduation, students would be capable of demonstrating the basic skills outlined by industry and the department of education. It would also ensure a gradual increase in skills over a period of time and make it clear to school administrators and teachers alike, which skills students are required to master at each grade level.

In addition, school districts must determine the means by which progress will be measured. As of 1994, only thirty five percent of all school districts had policies in place to evaluate technology programs (Alberta Education, 1994).

Level #3: Schools

At the school level, mechanisms to address the integration of computers and technology into the curriculum must be implemented; as of 1994 only fifty four percent of schools had such a mechanism (Alberta Education, 1994).

Knowing the intended outcomes and the means by which they are to be measured, each school administrator must devise means of addressing computer integration and ensure that each teacher incorporates computers in both short range and long range plans.

To assist teachers, school administrators must create a supportive team environment that provides teachers with the opportunity for input into methods of achieving the "vision" as well as long range planning, and required hardware and software purchases. While the vision must be achieved, there will be many ways to get there. By allowing for input and decisions at each school, teachers will feel more ownership for the initiative.

School administrators must be flexible and responsive to teachers needs regarding timetabling to support subject integration. They must recognize that achieving these outcomes may require school staff to review current policies and practices that may hinder technology promotion. For example, access was a key concern for eighty one percent of survey respondents, yet according to Alberta Education, in 1994, only sixty three percent of schools had policies regarding access to microcomputers. This may be deemed a hindrance to use by staff at a particular school, and may need to be reevaluated to ensure that equipment is being utilized efficiently. Interestingly, respondents of the survey were unsure where they wanted computers to be located. Fifty nine percent wanted the majority of computers in classrooms; forty eight percent wanted them in labs. The issue of access to software, manuals and tutorials was also a concern to teachers.

Access on a broader scale may also include allowing staff to borrow equipment overnight, on weekends, holidays, or during summer breaks. This promotes computers use and familiarity with computers, but as of 1994, only fifty seven percent of school districts allowed this (Alberta Education, 1994).

Apple Computer, Inc. (1991b) noted that collegial interaction was a key in the adoption of technology, as was indicated by 77% of respondents. As discussed she categorized four types of support: emotional support, technical assistance, instructional sharing, and collaboration.

School administrators must recognize the different types of collegial interaction and be prepared to facilitate this. The emotional needs of teachers can be met with recognition of the need for time for collegial interaction. Technical help in the form of "on call" help and network administration require that funding be allocated. The 1994 Alberta Education survey indicated that eighty six percent of schools had on-site peer coaching; this at the elbow assistance is a critical part of success, but should not be added to existing staff workloads without compensation. One respondent wrote:

> Trust me...teachers with limited experience are useless. (I am one of them!) I have frustrating moments on computers with students. If it were not for another teacher who is interested in computers saving me, I would have abandoned using them. We need a specialist in the same room as the computer!

Instructional sharing and collaboration require time. All must be recognized by administrators.

While needs will vary with each school, all administrators must be prepared to address issues such as those outlined above in consultation with teachers to ensure that outcomes are achieved while at the same time holding teachers accountable for ensuring that this occurs.

Level #4: Classrooms

Teachers must play an active role in decisions making within their schools and ensure that they are clear in their understanding of the vision that they are responsible for implementing.

All classroom teachers must ensure that their students are gaining the skills outlined in the scope and sequence chart by planning for technology use in daily, short range and long range plans.

Resource Needs

Level #1: Department of Education

A 1994 Alberta Education survey revealed that only 31.7% of all computers in Alberta schools were either Macintosh or MS DOS 386/486 models and while these models comprise the "newer" models, the Macintosh with built-in monitors have been in existence since 1984. The majority of the equipment in Alberta schools, a total of forty four percent, are the Apple II type which was first introduced in 1979 and are no longer being manufactured. Only nine percent of respondents rated the age and condition of their computers as excellent.

Similarly, according to the survey, only 790 CD ROM drives, 1,493 laser printers and 233 projection devices existed in Alberta schools in 1994 despite the fact the these technologies are now common place.

The Alberta government needs to demonstrate their commitment to the use of computer technology with students by committing funds to the purchase of hardware and software on an ongoing basis in order to prevent schools from falling seriously behind. Each school district should be given a "technology budget", based on the number of students it is responsible for educating, with which to purchase physical resources and to hire a computer "expert" to assist with implementation and staff development.

As well, districts should establish guidelines for the repair of hardware. This might mean hiring a technician for the district or budgeting for equipment to be sent out for repairs.

Lastly, it is this author's belief that funds need to be established for computer purchase plans, administered by school districts, that encourage teachers to purchase home computers. In time, this can lead to increased comfort levels.

Level #2: School District Level

In addition to the physical resources outlined above, funding must be provided for a computer "expert" responsible for network administration and for staff development at each school or for each jurisdication, as appropriate.

According to a 1994 Alberta Education survey, only thirty one percent of all districts had a policy in place to guide in regular replacement of aging

computer equipment. Funds must be allocated by school districts in order to replace existing outdated equipment, to purchase software and to provide training. Many teachers commented on this fact. One said "current technology is needed (not 10 years old!)". Another said "government funding to update obsolete computers". Another teachers stated that "the technology needs be available. At present in our small community school our "Apples" are holding their own but many have been used for large classes for 15-16 years! We do not have access to classroom computers!" One respondent said we must be sure that schools are "updating hardwa every few years (out of date maintenance of some of our equipment becomes doorstop!!) No help to kids!". Finally, one teacher noted that "...if we are to prepare students for the real working world. Most schools spend little or nothing on software and new (current) hardware."

School districts must allocate funds for a computer purchase plan to encourage teacher use which in turn increases familiarity and comfort levels. As of 1994, only thirty six percent of school districts had computer purchase plans in place. (Alberta Education, 1994)

In 1994, only twenty seven percent of districts had policies in place to encourage partnerships with other jurisdictions or consortia and only twenty three percent encouraged partnerships with private sector organizations (Alberta Education, 1994), but because funding from government sources will likely be limited, school districts should be encouraged to pursue industry partnerships more actively as means of staying current with new technologies.

As well, policies must be established regarding the scheduling of facilities to community organizations. While in 1994, only fifty eight percent of school districts had a policy in place that permits community access to computers during out-of-school hours (Alberta Education), this can be an additional source of revenue for schools and should be considered.

Level #3: Schools

As of 1994, only forty two percent of schools had policies regarding the replacement and acquisition of computers and only forty seven percent had policies on the acquisition and replacement of software; this too is critical.

It is also important, as discussed earlier, that school administrators provide the opportunity for teacher input into these decisions because needs will vary depending on grade levels taught and the skills of the existing staff. Some schools may have adequate hardware, but no software. Other schools may have a very literate staff that is not in need of as much basic training, but need a "technical expert" in house for training or network administration. These scenarios will vary from school to school.

School administrators must recognize the need for time. If teachers are expected to transform their classrooms, they need not only physical resources, but also time for planning, learning, peer observation and collegial interaction. Teachers wanted "time to plan the integration of computer use into a program and time to be totally familiar with programs" and "training not added to an already heavy load".

Level #4: Classrooms

Teachers must actively seek out resources that would be of most benefit to them, channel this information to school administrators, and use resources effectively.

Training Needs

Level #1: Department of Education

According to the 1994 Alberta Education survey, forty three percent of all teachers surveyed indicated that training in the use of computers was less than satisfactory. One teacher said "we are expected to teach ourselves. At no time have we been 'supported' in trying to learn new software! 'Here are the machines -- use them' -- that has been the attitude!".

Training days need to be worked into the regular school year. Given the tight time constraints of school calendars, it is necessary for the department of education to demonstrate commitment to the use of technology by designating that a particular number of days of every operational year will be spent on training teachers and administrators to use technology in ways consistent with the vision.

Recommendations should be made to universities about the skills new teachers must have in order to seek employment in the public school system. It should be made clear that Alberta Education has basic minimum expectations regarding computer literacy levels of new teachers. In this way, they may be able to influence teacher training programs.

Level #2: School District Level

Training must begin at the top and filter down. Without knowledge of the benefits of computers to students both as tools and as a learning media, district administrators will likely find it difficult to provide vision and direction to school administrators and teachers.

The training provided to administrators must focus on how computers can be used by teachers to teach, by students to learn and by students as productivity tools.

School districts must make it clear to all potential teachers that computer skills are required for employment. These should be clearly defined and new employees should be expected to demonstrate these skills in ways consistent with the vision.

Level #3: Schools

School administrators must be trained; without a knowledgeable, enthusiastic, strong leader and advocate of technology within each school, success may be limited.

School administrators must be advocates and role models of technology use within schools. While for administrators, computer use may simply involve the use of application software, administrators must constantly be providing ideas and examples to their staff.

The training provided to school administrators must focus on how computers can be used by teachers to teach, by students to learn and by students as productivity tools.

All training should be done locally, during regular work hours so as not to add to an already busy schedule. Training must be hands on, continuous, conducted by a respected member of the educational community, preferably a local educator, and must involve observation of teachers using technology effectively.

Staff development is critical, yet as of 1994, only twenty five percent of schools had a policy regarding staff training. (Alberta Education, 1994) Teachers commented that "more teachers need in-servicing on how to use computers as it seems to be 'learn on your own'". As well one respondent said that "teachers should know computers well enough that they are a benefit to the students and not another time consuming nightmare for teachers. If teachers are not competent on computers students will not benefit". Other teachers felt that "all teachers must be trained" and that "training must be more than a 1/2 day inservice." Some teachers cited other concerns such as t "some teachers are afraid of the equipment and need to be technology can help their job".

or staff development activities, school administrators must nd arrange a variety of sessions that address the needs of at a variety of levels of computer expertise. Computer enthusiasts on staff may choose to provide inservice help to colleagues on topics of interest.

Lastly, school administrators when speaking with potential employees should stress the need for computer skills. These expectation levels should be set for all new employees.

Level #4: Classrooms

Apple Computer, Inc. (1991) describe five stages through which teachers progress when using technology and implications for classrooms. In the initial stage, the Entry Phase, teachers rely on text-based teaching; computers sit idle. The pedagogy is based on lecture, recitation and seatwork. In the Adoption Phase, teachers who have high computer access, use computers but initially continue to rely on the same pedagogical framework they have always used. As they begin to enter the Adaptation Phase they begin to adopt a more constructivist approach to teaching that involves play and experimentation with technology, though their former technologies and pedagogical styles also remain in use. At the Phase of Appropriation, pedagogy splits between traditional methods and individualized, cooperative, project-based, and interdisciplinary approaches. When teachers reach the last phase, Invention, students are involved in doing, creating, and interacting with each other and information and the traditional pedagogical models are replaced.

While the Invention Phase is the "ideal", from a training perspective it is unrealistic to believe that teachers will move from stage one to five overnight and it is unlikely that all teachers would be at the same level at the same time. Teachers must recognize the need for continuous training and be open to it.

As with administrators, training should be done locally during regular work hours so as not to add to an already busy schedule. Training must be hands on, continuous, conducted by a respected member of the educational community, preferably a local educator, must involve observation of teachers using technology effectively, and the opportunity to team teach with other, more experienced technology users.

Conclusion and Recommendations

Vision for technology use together with planning for ways in which to achieve the vision are critical. This planning needs to begin with the Department of Education, but continue right down to the school districts, school and classroom levels. At each level, the organizational, resource and training needs must be addressed simultaneously if technology use is to be improved.

Suggestions for Further Research

1. Review teacher education programs to determine the type and extent of teacher training provided with regard to the use of technology in schools.

2. Review of computer related policies at the department, jurisdiction and school levels.

3. Survey of how computers are currently being used.

4. Comparison of high computer use classrooms with low computer use classrooms to identify factors contributing to use.

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APPENDIX A - Survey

#101 - 15004 - 45 Avenue,
Edmonton, Alberta
February 15, 1995

Dear Colleague,

I am conducting a needs assessment study for my thesis as part of a University of Alberta Masters of Education degree. The purpose is to determine what teachers perceive as needs with regard to the use of computer technology in Alberta schools. I am writing to request your help with my research.

This survey is **NOT** geared towards "computer experts"; the Alberta teachers selected for this survey were randomly chosen as regular classroom teachers from a wide range of backgrounds, teaching a variety of subjects at many different grade levels. The survey includes eight general questions and a series of specific questions about either the organization, training or resources needs within your school. The intent of the study is to determine what needs must be met in order for the regular classroom teacher to improve the use of computer technology with students.

You are under no obligation to participate, but should you choose to, I estimate that the survey I have enclosed will take approximately 20 minutes to complete. Your responses are strictly confidential. The information collected will be analyzed as a whole; individual responses will not be analyzed in isolation. A summary of my research results will appear in the ATA News at a later date to ensure that participants are aware of the findings.

Please complete the survey prior to March 1st, place it in the self addressed envelope provided and drop it in the mail. I look forward to your response. In advance, thank you for your assistance.

Sincerely,

Kathy Schwarz, B.Sc., B.Ed.

Dr. M. Szabo, Ph.D.
Thesis Supervisor
Professor of Educational Psychology

Current Use Of Computer Technology

1. What is the average number of hours per week that your students spend using computers during your classes? Check (_) one.

   1❑ 0 hours **(If 0 skip Q #2)** 3❑ 1-2 hours 5❑ more than 5 hours

   2❑ less than 1 hour 4❑ 2>5 hours

Col. 5

2. Rate the frequency with which your **students** use each of the following in your classes:

0	1	2	3	4
Not available	Never	Rarely	Sometimes	Often

Software:

01___	word processor	07___	desktop publishing software
02___	database	08___	spreadsheet
03___	creativity software	09___	simulations
04___	telecommunications software	10___	CD ROM technology
05___	drill and practice software	11___	programming languages
06___	keyboarding software	12___	desktop video software

Other **software** used by students in your classes (please specify below)

13___ _____

14___ _____

15___ _____

Col. 6-20

Computer Peripherals:

16___	modem	23___	plotter
17___	audio conferencing equipment	24___	graphics tablet
18___	scanner	25___	music synthesizer
19___	laser videodisc player	26___	CD ROM equipment
20___	video digitizing equipment	27___	dot matrix printer
21___	robotic devices	28___	laser or ink jet printer
22___	science lab interface	29___	audio digitizer

Other **computer peripherals** used by students in your classes

(please specify below)

30___ _____

31___ _____

32___ _____

Col. 21-37

Thank you for your cooperation! Please proceed.

Organizational Needs

Circle the response that indicates your level of agreement with each statement.

In order to improve the use of computer technology with students...

		1 strongly disagree	2 disagree	3 undecided	4 agree	5 strongly agree	
1.	class length must be increased.	1	2	3	4	5	Col. 38
2.	access to computers must be improved.	1	2	3	4	5	Col. 39
3.	subject areas must be more integrated.	1	2	3	4	5	Col. 40
4.	more administrative support for computer use is necessary.	1	2	3	4	5	Col. 41
5.	access to timely technical help within the school is necessary.	1	2	3	4	5	Col. 42
6.	the majority of computers must be available in classrooms.	1	2	3	4	5	Col. 43
7	the majority of computers must be available in a computer lab setting.	1	2	3	4	5	Col. 44
8.	software must be more accessible.	1	2	3	4	5	Col. 45
9.	computer facilities must be easier to schedule.	1	2	3	4	5	Col. 46
10.	teachers must have more input into the purchase of software.	1	2	3	4	5	Col. 47
11.	teachers must have more input into the purchase of hardware (computers).	1	2	3	4	5	Col. 48
12.	more emphasis must be placed on computers.	1	2	3	4	5	Col. 49
13.	a more student-centered approach to teaching must be adopted by teachers.	1	2	3	4	5	Col. 50
14.	an experienced computer user must be available to team teach with when teachers are first learning to use computers.	1	2	3	4	5	Col. 51
15.	a network administrator is necessary to keep the computer system running.	1	2	3	4	5	Col. 52
16.	teachers should have more input with regard to how computers are used in schools.	1	2	3	4	5	Col. 53
17.	teachers must be involved in developing long range plans for computer use in schools.	1	2	3	4	5	Col. 54
18.	a team approach to computer use would be beneficial in schools.	1	2	3	4	5	Col. 55
19.	Other organizational needs (please specify below)						
	_____	1	2	3	4	5	Col. 56
	_____	1	2	3	4	5	Col. 57

Thank you for your cooperation! Please proceed.

Current Level of Training

Circle the number that best approximates the amount of training (formal and informal) you have received in the following areas:

1	2	3	4	5
0 hours	0-10 hours	11-20 hours	21-30 hours	31+ hours

1.	the use of drill and practice software	1	2	3	4	5	Col. 58
2.	the use of CD ROM technology	1	2	3	4	5	Col. 59
3.	the use of word processors	1	2	3	4	5	Col. 60
4.	teaching programming languages (e.g. BASIC, PASCAL, C, LOGO)	1	2	3	4	5	Col. 61
5.	the use of databases	1	2	3	4	5	Col. 62
6.	teaching keyboarding skills	1	2	3	4	5	Col. 63
7.	the use of spreadsheets	1	2	3	4	5	Col. 64
8.	the use of desktop publishing software	1	2	3	4	5	Col. 65
9.	the use of telecommunications technology	1	2	3	4	5	Col. 66
10.	the use of creativity software (graphics & drawing software)	1	2	3	4	5	Col. 67
11.	the use of midi capable computers (computers attached to musical instruments)	1	2	3	4	5	Col. 68
12.	the use of a computerized library card catalogue system	1	2	3	4	5	Col. 69
13.	the use of problem-solving software	1	2	3	4	5	Col. 70
14.	using the computer to teach curriculum specific concepts	1	2	3	4	5	Col. 71
15.	**strategies** for integrating computers into the curriculum	1	2	3	4	5	Col. 72
16.	how computers relate to teaching areas	1	2	3	4	5	Col. 73
17.	Other training you have received (please specify below)						
	_____	1	2	3	4	5	Col. 74
	_____	1	2	3	4	5	Col. 75
	_____ _____	1	2	3	4	5	Col. 76

Thank you for your cooperation! Please proceed.

Staff Training Needs

Circle the response that indicates your level of agreement with each statement.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

A.	**Teaching Techniques:**						
	In order to improve the use of computer technology with students, teacher training sessions must address...						
1.	what teaching methods are most effective when using computers with students.	1	2	3	4	5	Col. 77
2.	effective classroom management strategies when working in a computer lab.	1	2	3	4	5	Col. 78
3.	how to incorporate computers into the existing curriculum that teachers are responsible for teaching.	1	2	3	4	5	Col. 79
4.	evaluation strategies for lessons that integrate computers.	1	2	3	4	5	Col. 80
5.	strategies teachers can use to teach students how to use computers as tools.	1	2	3	4	5	Col. 81
6.	how to manage group work when students are using computers.	1	2	3	4	5	Col. 82
7.	how to teach keyboarding skills to students.	1	2	3	4	5	Col. 83
8.	ways in which teachers can use computers to teach their subject areas.	1	2	3	4	5	Col. 84
B.	**Technical Needs:**						
	In order to improve the use of computer technology with students, I need training in the following areas:						
9.	general operation of computers.	1	2	3	4	5	Col. 85
10.	use of a word processing package.	1	2	3	4	5	Col. 86
11.	use of a spreadsheet package.	1	2	3	4	5	Col. 87
12.	use of a database package.	1	2	3	4	5	Col. 88
13.	use of a desktop publishing package.	1	2	3	4	5	Col. 89
14.	use of telecommunications technology.	1	2	3	4	5	Col. 90
15.	use of authoring programs such as Authorware Professional.	1	2	3	4	5	Col. 91
16.	use of clip art software.	1	2	3	4	5	Col. 92
17.	use of graphics software.	1	2	3	4	5	Col. 93
18.	use of CD ROM technology.	1	2	3	4	5	Col. 94
19.	use of a computerized card catalogue system.	1	2	3	4	5	Col. 95
20.	teaching programming.	1	2	3	4	5	Col. 96

Thank you for your cooperation! Please proceed.

Circle the response that indicates your level of agreement with each statement.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

C.	**General Needs:**						
	In order to improve the use of computer technology with students...						
21.	teacher training must be hands-on.	1	2	3	4	5	Col. 97
22.	teacher training must be available from someone within the school district/board.	1	2	3	4	5	Col. 98
23.	"on call" help must be available to teachers.	1	2	3	4	5	Col. 99
24.	teachers need to learn how students can use computers as tools.	1	2	3	4	5	Col. 100
25.	modeling must be a component of training.	1	2	3	4	5	Col. 101
26.	teachers must be shown how computers can be used to improve learning.	1	2	3	4	5	Col. 102
27.	teachers need the opportunity to see sound computer practices being modeled.	1	2	3	4	5	Col. 103
28.	teachers need information about available software.	1	2	3	4	5	Col. 104
29.	training must continue until teachers are confident in the use of computers with students.	1	2	3	4	5	Col. 105
30.	training must be provided on a regular basis.	1	2	3	4	5	Col. 106
31.	teacher training must be practical.	1	2	3	4	5	Col. 107
32.	Other training needs (please specify below)						
	_____	1	2	3	4	5	Col. 108
	_____	1	2	3	4	5	Col. 109
	_____	1	2	3	4	5	Col. 110

Thank you for your cooperation! Please proceed.

Resource Need

Circle the response that indicates your level of agreement with each statement.

In order to improve the use of computer technology with students...

	1 strongly disagree	2 disagree	3 undecided	4 agree	5 strongly agree	
1.	newer computer equipment is needed.	1	2	3	4	5	Col. 111
2.	the ratio of computers to students must be 1:1.	1	2	3	4	5	Col. 112
3.	higher quality software is needed.	1	2	3	4	5	Col. 113
4.	curriculum specific software is needed.	1	2	3	4	5	Col. 114
5.	technical assistance is needed within each school.	1	2	3	4	5	Col. 115
6.	a computer teacher must be available to team teach with teachers.	1	2	3	4	5	Col. 116
7.	peer support is critical.	1	2	3	4	5	Col. 117
8.	teachers must be given time to experiment with computers.	1	2	3	4	5	Col. 118
9.	teachers must be given time to learn technical computer skills.	1	2	3	4	5	Col. 119
10.	teachers must be given time to learn about computer uses in education.	1	2	3	4	5	Col. 120
11.	more administrative support is needed.	1	2	3	4	5	Col. 121
12.	technical assistance from outside of the school is needed.	1	2	3	4	5	Col. 122
13.	teachers must have access to tutorial programs.	1	2	3	4	5	Col. 123
14.	teachers must have access to a projection pad (to project computer images onto an overhead screen).	1	2	3	4	5	Col. 124
15.	teachers must have access to periodicals (MacUser, PC World, etc.).	1	2	3	4	5	Col. 125
16.	computer manuals must be accessible.	1	2	3	4	5	Col. 126
17.	teachers must have class sets of software to use.	1	2	3	4	5	Col. 127
18.	computer equipment must be reliable.	1	2	3	4	5	Col. 128
19.	equipment repairs must be made swiftly.	1	2	3	4	5	Col. 129
20.	Other resource needs (please specify below)						
	_____	1	2	3	4	5	Col. 130
	_____	1	2	3	4	5	Col. 131
	_____	1	2	3	4	5	Col. 132

Thank you for your cooperation! Please proceed.

General Information

1. The **majority** of your teaching assignment falls into which division? Check one.

1☐	K-3	3☐	7-9	
2☐	4-6	4☐	10-12	C. 133

2. At what grades should computers be used with students? Check all that apply.

1☐	K-3	3☐	7-9	5☐	Not at all	
2☐	4-6	4☐	10-12			C. 134-138

3. How do you think computers should be used in schools? Check all that apply.

1☐	They should not be used	5☐	For drill and practice	
2☐	As tools -- e.g. word processing	6☐	For programming	
3☐	For remediation	7☐	For enrichment purposes	
4☐	To teach curriculum topics			C. 139-146
8☐	Other (please specify below)			

_____

_____

4. Should <u>ALL</u> classroom teachers be expected to use computers with students?

1☐	yes (Go to Q#5)	2☐	no	Col. 147

If no, who should use computers with students? Check one.

1☐	Only those who are interested in doing so	2☐	Computer specialists	Col. 148
3☐	Teacher librarian			
4☐	Other (please specify below)			

_____

_____

5. What would you consider an **ideal** number of minutes of computer use by students per week? Check one.

1❑ 0 minutes	4❑ 1 – 2 hours	Col. 149
2❑ less than 30 minutes	5❑ 2 – 5 hours	
3❑ 30 – 60 minutes	6❑ 5 – 8 hours	
7❑ Other (please specify below)		

_____

_____

6. What do you consider a reasonable ratio of computers to students when students are engaged in computer activities? Check one.

1❑ 1 computer : 1 student	4❑ 1 computer : 5 students	Col. 150
2❑ 1 computer : 2 students	5❑ 1 computer : 10 students	
3❑ 1 computer : 3 students	6❑ 1 computer : 15 students	
7❑ Other: ____ computer : ____ student(s)		

Please return this survey in the envelope provided by March 30, 1995.

Return to:

Kathy Schwarz

#101 - 15004 - 45 Avenue,

Edmonton, Alberta

T6H 5T5

APPENDIX B - Comments

Other Software

Graphics

025 Illustrator
025 Photoshop
025 Corel Draw
039 graphics
067 Aldus Photostyler
067 Autosketch
093 Presentation software -- ClarisWorks and HyperStudio
119 Graphics (MacDraw), clipart
150 Printshop
161 Aldus Prep
Graphics - PrintShop, MacPaint, MacDraw
216 Digital photography and DTP
291 Hypermedia
341 Photoshop, Illustrator, Presentation, HyperStudio
346 PrintShop, Bannermania, Graphics - paint
349 Photoshop (scanning and graphic work)
362 Presentation, dictionary, Image and OCR Scanning
406 Paintbrush
412 Graphics Design
436 Animation Works
482 Paint programs
513 Kid Pix (drawing)
I don't know if these others are available or not; I don't know what they are!

560 Draw, paint

564 PrintShop

576 Art - draw programs

676 Drawing program

664 HyperStudio multimedia software Mac and IIGS
Slideshop multimedia Mac and IIGS

CAD

137 CAD

274 I teach drafting on the Microstation 5.0 software at the GR 10-12 level

320 CAD

412 CAD

442 CAD

507 AutoCAD and CADKEY

CAI/Drill and Practice

010 PC Globe

016 "MacTour" tutorial software

027 Curriculum related but not drill and practice

054 WiggleWorks - however we share the computer with two other classrooms so some weeks the students have 0 hours per week

080 Lego Robotics

115 Zap-a-graph
Computer assisted instruction

117 Enrichment

122 MECC

150 Apple Logo

151 MacGlobe

152 MECC Writer
Logo

167 MECC items

183 MECC software - letter introduction and basic addition, basic reading skills for grade one level

203 EZ Logo

241 ECS related software - counting, etc.

242 Diet balance - to analyze diet

256 Mathville

Number Munchers

264 Logo

266 Math 20 CAI

270 Logo/Easy Logo with grade one "buddies"

311 Computer math activities, language arts activities (letter/word match)

319 MECC programs

330 Social studies - Cross country Canada, Oregon

361 MECC Programs

381 Champs science interface

Math 30 and 31 distance learning

391 Technology software and CD ROM

396 As I teach grad one, we use age appropriate software

400 Math CAI

428 PC Globe

443 Curriculum specific - social studies, science

528 Carmen Sandiego

535 Games - MECC

543 MECC programs e.g. DynoPark

553 tutorial

561 Personal science lab -- interactive software with labs

596 MacGlobe

Canada Geograph

646 Encyclopedia programs -- CD ROM

693 MECC software

Accounting

008 Accounting software
324 Accounting
357 Flexware Accounting

Games

012 Games
032 Interactive games
058 Educational games
157 Various games on an old commodore
229 Games
307 Academic games
308 Games
511 Games on floppy disk
607 Educational games
684 Games to practice coordination
Games to practice spelling
Games to practice logic and deducing

Music

194 Music drill
281 Musicator (studio and MIDI program)
341 Finale
540 Various music software

Graphing

038 Graphing software in math 20 and 30
242 Graphing and plotting program
269 graphing tools -- i.e. zap graph
graphing calculator -- i.e. T1-81

415 Graphing (Mathematical) software

517 Graphing programs

Career Search

225 Employability skills portfolio software

316 Career Choices Jr

Career Choices Sr.

346 Career Search

FSL

221 French as a second language programs

FSL CDROM programs

582 French skills

Internet

027 Library research browser

051 email

080 Internet soon! (3 weeks)

115 Internet

204 Internet - students can make up messages and those messages then sent by teacher or by coordinator

411 Browsers (i.e. Mosaic, Internet)

Your questions reveal that you have not asked about problem solving with programming languages. This is the curricula in IB and AP programmes, which characterize academic schools generally. Edmonton Public high schools have mainly Macs, which do not have strong software for this, so Edmonton schools don't support programming at challenging levels. Try elsewhere, perhaps Toronto or Calgary.

420 We are making a connection with Internet within the next month so this will change

Utility Software

044 Grammatik
092 Data acquisition software
Data analysis software
576 Grammar checkers

TestBank Software

242 LXR - distance learning programs for math
268 Test banking

Programming Software

436 MacroMedia Director
436 Authorware
411 Compilers -- (Is this your programming language?)

Other

025 Word Pro
052 None - PE class
067 TeamWheel
096 If they bring their own
141 Teacher made programs
264 Appleworks Claris version
280 Computerized remote control are (robotics)
Computerized engraving
307 Interactive software
392 Logitech scanner software
428 SIRS
433 WICAT - programming in LA and Math
475 Translation program
539 science concepts (Gizmos and Gadgets)

576 Writepro - short story writing program
610 switch use programs
663 CCC

Other Hardware

Mice

008 Mice
050 Mouse
061 Mouse
117 mouse
143 mouse
411 Mouse (How did you miss this?)
531 Mouse
574 mouse
684 Mouse

Joysticks

157 joysticks

Video/Digital camera

046 Computer camera
067 Logitech Fotoman camera
070 Video cams, video switcher, audio mixer
093 digitize camera
136 video camera
228 VCR
228 Video camera
369 Our school is involved in a digital video learning network project as part of the Alberta Educational Research Foundation (AETRF) series of

projects. I am one of the two school team members running the project. Consequently, my students get a level of exposure not normally available.

701 VCR camera

701 VCR

Averkey/LCD Panel

061 Overhead projector attached to computer

119 Interface with overhead projector and TV monitor

228 Averkey

242 LCD panel

384 Liquid crystal display overhead

274 Averkey peripheral for demo work

543 Overhead projection pallet

560 TV - computer hookup

Network

676 Network

Library Card Catalogue System

521 Library LIRS System. Being installed. Our computers and software have been purchased with money from hotdog sales not Board funds. We will soon have a network of 30 (486'2 IBM) for a school of 460 students. Presently we are still using old PC Jr's

Other

011 Inkjet Printer

228 Dictaphone

232 3-4 laptops

311 print stories they have written on computer

341 Coolscan - slide scanner

392 Scanner

411 Floppy drive (3.5 inch)

411 Keyboard

411 Microphone

539 Sound Boards and multimedia programs

540 Various synthesizers

590 color ink jet printer

610 unicorn board

muppet keyboard

touch window (borrowed from kindergarten)

652 sign cutter

663 Earphones

General Information Q#3

How do you think computers should be used in schools?

Integrated

006 Totally integrated into all aspects of the program

016 To develop a "culture of use" which is required in this communication age

079 Any possible way -- they should ultimately be viewed as a tool like a pencil

080 computer=pencil

Computers should be integrated as a tool like a pencil. I believe that people drive the technology. Technology is a tool. People use tools.

115 Anywhere they (computers) improve learning...

149 Computers should be as common as textbooks

Humanities courses have as much use for computers as any other course

Organizationally speaking, schools need to have a long-term funding program to maintain and replace equipment; not just for initial purchase.

269 To be used as a tool like a pen to aid the depth of understanding

343 second nature

362 Everywhere possible so that students automatically think of using computers to solve their problems

387 Like a textbook with their notebook all in one.

560 Fully integrated to accentuate curriculum

654 Subject integration between the academic areas. The computer is a great tool to bring subjects together.

685 Seems we need to understand that computers are no longer "a frill" or extra. They are necessary. They have become an integral part of society!

Problem Solving

010 Problem solving

064 Research - Internet

201 Problem solving

338 Problem solving

344 To be used as a problem solving tool for any subject matter. To connect students to the global communication systems.

411 Problem solving is the common ingredient for programming and generic applications!

Research

019 As research tools

071 To search/access resources (research)

098 For enrichment, review, pre and post tests. CDROM should be available for research, games (educational) for time out.

104 Internet communication

110 Research

151 Resources for student research i.e. atlas, encyclopedia, etc.

176 Internet

195 In libraries - CDROM encyclopedias, etc.

197 Research for essays

201 Research
225 Research
242 As research resources - CD ROM, on-line databases, Internet, etc.
272 Internet
342 Research
356 For research as well as the processing of projects and assignments
379 Research - CD ROM entertainment
400 Research/Telecommunications
449 To search for information
469 Research and Resource
484 Research
502 Source of information -- Internet - CDROMS
503 Research - databases for teacher and students
Admin support for teachers/administrators
527 For research
541 Research
545 Research - Career and Tech studies
Post secondary info
578 Internet
580 For research information i.e. Internet, CD ROM
616 communication and information -- i.e. Internet
621 Research
644 Research
648 To access information through Internet
655 Storage, access, research
665 As teacher tools and independent study tools
666 For reference and research
667 Communication, research
671 communicate with other students at their schools: city, province, country, world
693 Research -- CD ROM disks
706 To access information from external sources

Games

149 Games
308 For fun
363 Exploration of superhighway, Games/Entertainment
445 Games to allow students to see the fun side of computers as well as developing
517 For entertainment and recreation
684 For fun. Game programs can be used as rewards.

Multimedia

069 Multimedia is exciting and Hypercard can replace paper and pen storyboards
070 CTS - Career and Technology studies
070 Video, audio production, animation, photography
177 e.g. video editing, sound effects, script writing -- for Drama
519 Multimedia
652 Graphics -- e.g. Photoshop
709 Multimedia Production

Communications

019 as communication tools with the rest of the world
039 As a communications tool (Internet)
351 Telecommunications - networking
Students interacting with other students through modems
519 Telecommunications
539 Interaction thru BBS or Internet, or networking the school between students
581 Communication links to information
616 communication and information -- i.e. Internet

Curriculum

165 To reinforce curriculum topics

179 To complement curriculum topics

191 To aid in teaching curriculum topics

Just a comment -- Children need to learn to feel comfortable using computer technology...our society runs on computers! However, no computer class should take precedence over learning about the natural world; our environment is much more important. Young children need to explore the natural world and learn where they "fit in" before learning about the technology man has created.

221 To supplement curriculum materials available in a unit

277 They should not replace teachers but be used as a tool to supplement the curriculum

281 It can be used in every area but not solely for curriculum topics supplement only

630 To supplement curriculum topics

Other

013 Administration

014 To enhance curriculum objectives

as another strategy for teaching concepts - auditory, visual, tactile

018 Pa[illegible]tes for teachers to demo steps/screens

028 Sc[illegible]l Counselor - career exploration and planning

054 All of the above!

064 Database

New service groups

School Net

School ?? by modem

067 as part of career and technology studies

081 For programming only at the appropriate level - for example 10-12 is more appropriate than 4-6

085 If good programs exist (for curriculum)

092 Data acquisition and analysis

093 For presentations

109 Availability for teachers for increasing administrative work downloaded on teachers

134 Our PTA was under the assumption that 1) since we had 10 computers in school, all children received word processing and typing training 2) that funds raised by PTA were matched by government or school board 3) there was a set curriculum of skills 4) that computers were a mandated course for all 400 children (ECS - 6)

I do feel, in Calgary, that integrated special needs kids need a computer. I have brought my Apple IIe machines from home for my 2 prep kids, integrated (hah!) into my grade 4 class. They are wonderful tools for mentally challenged. I have some serious considerations when I hear of global education and take over by multinational companies. I do not feel large companies IBM or Apple should be involved in curriculum or teacher training. I feel that the money outlay to equip schools (as Oakview in Ontario) is out of the question for the average school. Most homes in our low middle class district do not have computers and the PTA is strapped to find funds for anymore than 10 computers.

137 In industrial education there are many purposes

158 I like computers in my classroom used during center time. I also like the lab situation where each child has a computer. In this situation, the computer is very individualized We have Macintosh computers with many problems on the hard drives. The children mostly choose what they want to do. The children love it and for grade 2, my goal is for them to enjoy computers -- not be frustrated. It is the one time when there are programs where all children can be successful and it is at their fingertips.

173 Lab simulation (biology, chemistry) as preparation for the actual lab work!!

188 Great data management

205 The problem is access to the computers - there's no money available to meet the scale of the needs

227 Most programs are quite a low level for high school

232 co-op learning environment

244 As tools to study computer technology

255 I think too much time spent in front of them is physically unhealthy

273 For creative thinking problems

278 Too many kids just play games on computers

279 Reward - incentives

289 As a tool to prepare students for their future

301 For keyboarding speed and accuracy

For assessment

314 For programming only at upper level grades

315 Evaluation/Feedback

337 Newspapers, yearbooks, publishing, student writing and drawing.

You need effective programs to teach to the curriculum -- there aren't many!

341 student portfolio development (tracking)

352 #6 - for some, not all students

364 For publishing polished work as in desktop publishing

365 Keypals -- peer revision - wider audience for writing

369 Preparation of teaching materials by teachers

Exam data banks e.g. ACCESS for IBM compatibles

My answers are affected by the fact that I teach a computer processing 10 class in addition to a regular course load of math and sciences.

372 Connection to other subjects

381 Test Banks for teachers

390 Positive reinforcement

416 Teacher mark distribution

425 School-based budgeting makes it virtually impossible to keep up with what's out there

433 For basic skills/career training

450 I think this use should be very limited -- they are much over-rated in the learning process

488 Incentive to increase reading and comprehension skills

508 CD ROM, assignment completion, etc.

516 To learn new skills - e.g. pattern drafting in clothing classes

519 Keyboarding

Building information literacy - accessing electronic databases

521 PrintShop - banners, certificates, cards, etc.

Marks programs

523 Simulations

528 To teach keyboarding skills

351 computer clubs (Extra curricular)

543 motivators

cooperative projects

567 Free exploration, number skills enrichment, reading enrichment

581 Knowledge browsing; CD ROM information smorgasborgs

596 At the moment despite all the talk there is very little useful software when you actually get down to trying to use it.

610 As augmentative communication devices

611 For reinforcement of specific skills

612 My students love to challenge themselves with math games

616 training

629 WARNING -- They should not be used as a primary form of teaching!

650 For analysis -- i.e. biomechanics

660 They are now used for university application to the U of C and this will probably become a trend.

662 To develop eye-hand coordination and fine motor skills

663 I hesitate on 3 and 4 (remediation and curriculum) because it often replaces the one-on-one teaching that is critical

664 As tools for presentation of student research projects. Database software allows students to manipulate data in order to see relationships, discover generalizations, etc.

673 For expanding tools for creative expression (e.g. music, art...)

676 As preparation for jobs (business applications, etc.)

701 To access, handle, build and transmit information beyond present curriculum limits.

702 To help students "create" a share knowledge -- that deal with new and important/challenging issues.

704 Teacher productivity

General Information Q#4

Should ALL classroom teachers be expected to use computers with students?

If appropriate

007 Depends on subject

016 Those who's subjects would benefit from concepts

021 Computers are tools! sometimes they fit the task and sometimes they don't!

028 I wouldn't want a forced or mandatory position imposed on teachers. However, I do believe computers can be used in most areas including my own.

033 All teachers except those that don't require them like band teachers, industrial arts, home economics, dramatic arts, and physical education although sometimes they can be used as a part of these subjects as well.

054 yes, if it is a program that will benefit students e.g. WiggleWorks

071 teachers where the use will benefit students

where the use will access applicable content, etc.

082 Only with teachers and subjects where it can be demonstrated that the use of computers will create a distinct advantage

086 Only teachers of courses where it makes sense to do so

091 Teachers should be given specific workshops on how to implement computers in classrooms so that it enhances and prepares students for changing job market and technologies. These workshops should be in-depth, hands-on, paid for by school system, and on school time -- as opposed to taking weekend workshops, etc. If practical use of computers is important to school -- should be implemented correctly not in a hodge-podge fashion.

106 No because computers may not have a place in some classes i.e. outdoor ed, phys ed.

145 Those teacher whose subject area would benefit

157 It's a developmental process. Integration of technology cannot proceed ad hoc. Computer expertise should not replace traditional methods; rather the computer should enhance. Have dual track course completions be required with technology based education i.e. some required courses are offered via computer, some aren't.

177 Not all - Home Economics, shop, art(?), drama, music

Drama would be an exception -- we could use them for a few units such as playwriting -- much as the language arts teacher would. Great for editing! Also: Internet for research into time, place setting - character development.

231 If forced, who'll want to teach it computer usage? Also, sometimes it isn't practical for every teacher to use a computer in their class. Language arts, art, social studies, etc. the computer is applicable everywhere but with little money and "one computer per room" how can 30 students all have access? I have to buy my own software for my class too and that gets costly!

258 The only exceptions may be Phys. Ed. and some options like sewing or outdoor education

277 Core subject teacher and technical complementary teachers (e.g. multimedia or computers). practical arts could (e.g. music) but should not "be expected to".

324 In those areas where the computer is useful - some LA, Social, Math, Science, much Business Education, but not ALL courses all the time.

338 All should model what they can use in their curriculum.

350 teachers who find it most beneficial in their subject area. E.g. Social and English -- word processors is all that is needed

423 Programs which require computers in order for the learning to be relevant i.e. Business classes

427 Where they fit (e.g. curriculum) and depends on # of students and teachers.

computers are becoming the way of today and the future. In CTS, stations of videos and computers are the move for tomorrow. I disagree we still need blue color labourers (ie. plumbers, electricians, carpenters, cooks, tailors, etc.) and without teaching CTS the "old" way (IA/HEc) we will lose out. Computers have their place but...

446 Those who can demonstrate the advantages justify the cost!

464 Where computers will assist with the program of studies

481 Some students do not have concepts which are easy to find software that is relevant. Some schools, e.g. colonies, do not allow computer use.

482 Teachers should be encouraged to however some discipline areas may not need to e.g. PE

503 Only those who for which computer use results in better educational experiences for students. ie. Why have students do simulated titrations in chemistry classes when doing actual titrations in the lab is better?

514 I think that all teachers need to be computer literate and ready to use computer when appropriate. The computer is a wonderful tool but not the only effective teaching tool.

516 Those whose curriculum demands it.

529 Some classes (phys ed) are not necessarily conducive to computer use.

562 It shouldn't be mandated that all teachers must use computers anymore than it should be mandated that all teachers must use an overhead.

577 Some areas it does not make sense (ie. PE)

585 teachers that are able to integrate software/hardware into their classroom without making it the focus.

650 Anyone who sees computer use as beneficial for the students!

667 Depends on the project; not all projects can be completed on computers

677 Those who see a way to integrate computer usage with their curricula

680 Where it enhances learning

692 If it is applicable to your area. I teach Home Ec and Music so my courses are more "hands on".

698 Only where computers add value

702 Most teacher should, however drama teachers for example may only want/need to use camera and video recorder.

Additional Comment:

Alberta Education and local school boards have not provided the leadership or vision to build the information sharing network (ie. telecommunications) needed so that teachers can share among themselves resources, ideas, and assistance relevant to Alberta. ie. Telnet sites, UUCP Gateways to K12Net in Alberta and have not recognized the need for helping to coordinate

Information/communication Strategy /Plan for all educators in Alberta. (AETRF is a wasteful sham!)

704 some subjects lend well to computers, Math, Science, LA, others do not. Yes, for teacher productivity (seating plans, attendance, marks, electronic blackboard, etc.)

If equipment/funds allow

109 We just received a memo stating grade 3 students should communicate through Internet to other classes across Canada (keyboarding and slide presentations). With all the cutbacks, I strongly believe that we cannot afford any of this for primary level. The money needs to be spent 1)keeping student ratio low 2)availability of aides, specialists, materials. I spend hundreds of dollars yearly just on the "basic" needs for my students (none can be claimed - taxes) CDROMS are just a dream - our priorities are too fundamental to even consider this. Rural schools are just struggling to exist so kids don't have to travel 3 hrs on a bus daily. Because of our government, we're going backwards not forwards. Computer wishes are just in another time warp. We need $ for aides to supervise the integrated needs kids who are literally climbing the walls or $ fix the vandalism caused by our forgotten youth. The $ are not there and if they are the money must be spent where the priorities are. Sorry Kathy but this is reality.

202 All should be encouraged to use computers with students, however unless there are an adequate number of computers in good repair how can we expect all to use them

233 which comes first? trained instructors or computers? Often one or the other. Boards should be encouraged to supply and provide access ad teachers should be taught (trained in their use).

278 Those who have the facilities to do so. Only a few classrooms in our school have computers in them. The rest of us are just SOL.

313 I would use it if the resources were available. My students depend on home computers or do without. I teach high school English and know that it would be a great asset to have them in the class.

328 Programs that have computer software support -- Ideally each classroom should have 5 or 6 computers.

331 Important if we are to prepare students for the real working world. Most schools spend little or nothing on software and new (current) hardware.

337 All students should have access to computers

If all teachers are expected to use computers -- schools should supply teachers with their own computers. Also, if teachers are expected to use them in their classes, it would be helpful if a classroom set were available. To use computers effectively, both teachers and students must use them regularly.

361 The technology needs to be available. At present in our small community school our "Apples" are holding their own but many have been used for large classes for 15-16 years! We do not have access to classroom computers!

443 Only those for whom computers are easily accessible and readily available

479 There should be enough computers in the school so that a teacher and class have access to a computer lab 20% of their class. As an art teacher, I can see some benefit to using computers in the classroom but the graphics art teacher has a much greater need. I'm sure my program could survive (thrive) without the use of computers.

481 Some students do not have concepts which are easy to find software that is relevant. Some schools, e.g. colonies, do not allow computer use.

508 As well as those who have access to computers

567 This is very difficult to determine. With all the cut-backs I would prefer to lose a few computers in our school in order to gain more teaching staff. The computers we have are very outdated and not compatible to the computers used by the students in their homes.

594 It cannot be expected if government doesn't provide resources

618 Provided inservicing and computer accessibility

641 Classroom teachers in all subjects who have access to equipment and know how to use it to enhance learning.

If teachers are properly trained

051 If they could be in-serviced first

052 Those teachers should know computers well enough that they are a benefit to the students and not another time consuming nightmare for teachers. If teachers are not competent on computers students will not benefit

137 As teachers become comfortable and see an application for their area of curriculum, they should use it to enhance their teaching

164 Inservicing on a regular basis so all classroom teachers are comfortable with them, otherwise only specialists should teach it

208 Computer technology should be available to all students however where teachers are overwhelmed by such technology some cooperation with other teachers should be encouraged. The teacher "fearing" computers should not be forced to teach such an area as more harm could be done that good.

211 But many are scared to use them, plus we need more time to learn how to use various programs.

261 Computers - especially if networked are too complex for the classroom teacher, it only leads to frustration!

274 Some teachers are afraid of the equipment and need to be shown how the technology can help their job.

311 Difficult to answer as many teachers are not "user" friendly. Personally I think #1 (yes, all should use), but I don't feel I should judge colleagues.

352 Only those who are trained and can use the computer to tech not to play games and put in time.

353 ALL STUDENTS should become proficient with computers -- teachers can exchange classes with someone who is experienced/interested much like they may for French, music, gym, etc.

380 I suppose so, but these is so much that we need to keep up with now and that we are asked to do. It never ends...

387 Anyone with interest and training

454 Teacher specialist -- it is not practical for all teachers to be and keep up-to date!

470 Teachers with knowledge. Classroom teachers with little knowledge cannot help students.

476 It would be a good idea if teachers got in-serviced. They would then have a choice if facilities provided proper equipment. PS> Computers

like MacDonalds are here to stay, so we may as well adapt them in our teaching.

484 People shouldn't be forced into using computers with the students if they don't feel they can use them effectively. However, all students should have the opportunity to work with computers on a regular basis.

487 They should be encouraged to do so. I think teachers and support staff should be thoroughly inserviced on computer programs appropriate for the grade level(s) their working with. Computer knowledge and competency are needed to successfully survive in the near future.

536 Only those with knowledge of how to use the computer/software to the students' best advantage

580 Because forcing someone who isn't interested accomplishes nothing

626 It needs to be a teacher who can effectively teach computers, not just play software games.

630 And trained (or inserviced) to do so.

641 Classroom teachers in all subjects who have access to equipment and know how to use it to enhance learning.

647 Those who have the expertise and only if pertinent programs are available

652 Should have a good working knowledge of specific programs

668 All teachers must be trained first.

683 Those who are capable

707 Trust me... teachers with limited experience on a computer are useless. (I am one of them!) I have had many frustrating moments on computers with students. If it were not for another teacher who is interested in computers saving me, I would have abandoned using them. We need a specialist in the same room as the computer!

If time is given

134 we no not have time on curriculum table to do all the mandated items

493 At junior high - computer specialists. In elementary there's not enough time to teach a proper program, given all the subjects we are already responsible for and with all the testing!

675 Those who have been given time and opportunity to be trained to use computers with students

Not Div I

085 teachers in grades 4-12

548 Only after grade 4

Overemphasis on computers

088 WARNING - Computers should be supplementary and not primary in pedagogy.

111 I strongly feel that emphasis on reading and handwriting is much more important to elementary students than use of the computer. We have two computer labs in our school an Apple lab for Div I (with computers that are constantly breaking down) and an IBM lab that is used by DivIII and somewhat by div II. I have a grade six class (30) and one 45 minute period - totally useless. I am not a computer expert. I strongly feel that an expert is necessary to teach computers (and fix). There is too much pressure on schools now. Also benefits of computers vs. the ridiculous costs do not balance. But I definitely feel that computers are unnecessary for elementary students -- they have more important areas to learn.

173 As educators we should be careful as to the extent of importance we place on computer technology case in point, since the advent of pocket calculators, students even in grade 12 cannot multiply or divide without them!! ie. Let's avoid gaining most of our learning experiences from a monitor!!

CORE subjects

103 Those involved with lang arts or related subjects

146 Teachers of LA, Science, Social and anyone else interested.

474 If students have keyboarding skills, the core subjects should use for word processing and remedial lessons.

613 Those who are interested (hoping this covers most areas) ie. hope math teacher is interested. LA teacher also.

Other

095 which may include teacher librarian, etc.

117 But ideally a computer specialist would be available

156 Those teachers interested, computer specialists, teacher assistants, librarian

195 Computer specialist, special ad, teacher librarian

225 Administrators/Guidance counselors. This already happens in our school.

227 At this time, expecting all to bug? into computer technology, regardless of their subject area is unrealistic

242 I'm on the fence on this one. This is what's happening in our school (teacher librarian/computer specialist/those interested)

244 Teachers should use the tools of their choice

273 Computer specialists obviously should be able to use computers!!

All teacher librarians should use computers as well

359 Classroom Teachers

401 At least a basic introduction

433 Some programs still need to stress the written communication

438 Any teacher or librarian who has responsibility over computers and software and has contact with students (supervision or instruction)

502 Those who have planned computers to be a part of their program

544 All should be encouraged

571 There should be 1-4 computers in classrooms, but the specialists should be: 1)teacher librarians 2) computer specialists

575 No teacher should be 'expected' to use computers except the computer teacher. The computer is a tool - and only <u>one</u> tool. It is a <u>means</u> -- not an <u>end</u>!

578 But, I reword this as "all teachers should be <u>prepared</u> to use computers..."

593 But technical back-up is crucial

608 Parent volunteers

612 It all depends on the teacher. I feel every child should have the opportunity to access a computer.

629 Computers should be used as supplementary resources, not to replace good pedagogy!

676 But all should be encouraged and supported

General Information Q#5

What would you consider an ideal number of minutes of computer use by students per week?

Depends on age

016 Depends on age: K-6 about 5 hours
7-12 about 10 hours

038 Gr 4-6: 30-60 minutes
Gr 7-9: 30-60 minutes
Gr 10-12: 1-2 hours

088 Poor question - this would depend on the grade level and type of courses, etc.

099 Younger children much less (1-2 hrs/week) Junior - senior high 5 hrs/week

101 Depends on grade level or what one is doing; should be flexible

116 Depends on grade level and programs available

143 120 minutes per week for regular students
150 minutes per week for special needs students

170 It varies depending on grade level

182 Varies depending on grade level

183 Since I teach in Div I - 30 would be ideal. I feel however, perhaps 30-60 in div II and III and 2-5 hours in high school

191 Depending on grade level! KG - introduction <30 min and a slow increase thru the grades

Senior high requires more if reports etc. are expected to be done on a word processor

278 I don't like this question. "Students" is a broad term...Grade six students need more computer time than kindergarten!

As a teacher I feel very frustrated about my lack of computer knowledge, yet our school board seems unwilling to provide the training and facilities we need. We are expected to use our summers and weekends to upgrade on our own - at our own expense. I say FORGET IT. I already put in 10 hour days. (We get 1/2 hour prep time per week). So my weekends and summers are not going to be school oriented too.

287 I think it should vary according to age and keyboarding experience

303 Depends on grade level

30 minutes/wk for gr 1-2 should be fine

313 Depends on age, subjects being taken. I use it a minimum of 10 hours per week.

349 This depends on the subject area and grade level

352 Would vary less at K-3 than 4-6 and more as grade level went up

448 #4 (at lower grades)

#5 (at higher grades)

467 The time would increase as students get older. I am very concerned that become dependent on a machine.

487 It depends on the grade level and the assignment being worked on. Some students need extra help and time.

492 0 - elementary

6 - Junior high

530 Depends on age and ability

593 Less in the early grades. Increased use in the later grade, if appropriate software is available.

626 Grade specific -- gr 1 and 2 - 30 -60 min

Gr 3- 5 - 1-2 hours

Gr 6 - 2-5 hours

662 At ECS level more at higher grades

Depends on activity

012 Depends on their written assignments

042 depends on the purpose

Programming/creating takes much longer than drill and practice

045 40 minutes/day with access in all other periods where needed

072 depends on the week - but at least 1 hour/week

073 As required by topic

Teacher and curriculum applicability

081 depends on the use and availability as well as student concerns. e.g. I have a couple of students who would benefit from having a computer available all day simply because they have difficulty with handwriting

111 uncertain -- depends on purpose

125 It depends on the need of a student as dictated by a particular subject area.

165 It depends very much on how it is being used.

184 Depends on the assignments being done -- time will vary!

251 Depends on the need for them at the particular moment

327 Depending on objective of their use, I believe a 30% balance of student time be invested in computer work/tasks to improve training/independent study.

341 It depends on curricular programs available, student teacher expertise, hardware, telephone lines available, projects being assigned - money - money

We need more money for hi tech - teacher training

389 Depending on what it is used for - ie. subjects researching, copying, etc. (some weeks more and some less, number of students)

423 Depends on many variables (student knowledge/interest, subjects enrolled in, teacher expertise, etc.)

501 It does depend on subject matter being taught

514 This depends on the needs of the individual student and their program

557 Depends on the subject -- directly related computer subjects require 5-8 hours, other subjects depends on topics being covered.

575 It depends on the current unit. e.g. essay writing would allow more use than a non-fiction unit in LA

577 Depends on program/curriculum and project work being done

Just guessing -- the more the better

629 This would depend on the type of courses, etc. A blanket question such as this is a poor question!

667 Depends on the project computers are tools

701 As the task demands. One measures success in task journey and competency, not minutes.

As necessary

018 As required throughout the day.

Unlimited access to employ computers as tools.

039 computers should be available as required

070 Constant access

079 Computers should be used by students whenever it is necessary

096 As much time as possible -- A lap top for every student would be a dream come true -- especially remedial students.

I have recently purchased a computer and can not believe all the possibilities which it provides on of my children is far more computer literate than I am. I only which I could offer the time to spend learning more about the computer. All students would benefit from computer skills for those that are slower learners it could be a gift that could be very beneficial. Being dyslexic myself, I can see how a computer could be of great benefit. Excuse the writing or whatever, I am on a tight schedule -- need more computer time (should have been earlier in life)

128 computers should be available to be used when necessary -- say like a pencil or an eraser or the blackboard.

166 Students should be encouraged and provided with the opportunity to use computers all day long. All classes have computer components. If you are going to have computers in schools you should have one computer per student. How else do you recommend students learning how to use them!! The government gives everyone a SIN and a health care #. Schools should provide each student with a computer. After that it is a

combination of student interest and teacher initiative that will enhance student's computer abilities.

177 Whenever the job is better done y computer, great.

237 The ideal situation would be 1 machine per student so that use could be flexible and constant (fully integrated)

I think teaching background/experience is important for your data. I am the computer coordinator for my school. That effects your sampling. Just a thought.

239 Ideally, every student should have access to a computer all the time.

254 As much as possible

269 Whatever they need to do the task

272 At my level, computers should be used when the student has a need to use them, whether it be word processing, using Maz?? or research on the Internet

280 As much time as necessary

297 It is a tool and like any tool needs to be available when needed

300 I see computers as tools, so there is no ideal time. You use them when you need to.

You are trying to determine what teachers perceive as needs. Well what is more important than the training is the physical computers. In most schools, not in a major city, there is the computer lab and then a few other computers spread throughout the school. It is almost impossible to book time in the lab and having one, or possibly two computers wheeled into your room on a short term basis to be used by 30 students is a farce. Little is accomplished except a nightmare for the teacher. I use my own computer constantly for myself, but except for researching topics, I never use them in my classroom.

412 Students need to use computers as much as possible as they can in a day.

417 Access to a computer anytime all day fro as long as is needed

466 A computer is a tool integrated with the curriculum. If a computer is effective for the curriculum, use it. Therefore, a computer could ideally be used more than 8 hours per week.

484 I prefer to see computer time flexibility booked as needed. Several hours may be needed for a particular project then no time needed for a while. Flexible scheduling of computer lab time.

503 Use the computer when it is useful -- I don't believe an optimum time can be specified

536 As much as it is a total in facilitating students' learning

587 Students should have constant access to computer in classroom to use whenever they need it -- Not assigned time

596 There is no ideal. Computers should be used for tasks that they can perform efficiently and effectively.

650 Whatever is deemed necessary

654 The more time they have to see the true power of what computers can do the better

657 Use computer as needed for projects and assignments related to topic of study.

665 As needed and as is desirable for any given subject area

685 Used when needed -- could be all day.

694 As much as possible!

Provided equipment/$'s are available

077 The problem is we only have old outdated Apple computers and not enough printers for classroom use we have a few new ones in the library.

126 I teach in a small school with no funds for computers. We are short of money for texts and other necessary supplies. Computers seem like a luxury!

158 More computers in classroom with excellent equipment would be beneficial.

454 In a school my size, any more time would not be possible

480 We are a small elementary school so do not have a very good computer program or the necessary equipment. We would love to have more computer resources and more up to date equipment.

634 Prefer not to measure per week -- rather -- use of computers as needs arise. (Depends on units of students, etc..)

Other considerations: 1) scheduling and 2)lab supervision in elementary schools as most elementary schools have computer labs suitable only for small numbers of students at any one time.

670 Most of this would be in computing science courses

Due to the cost and rapid change in the technology, (something new every 3 months) schools can never afford to be up-to-date. While I hesitate to rain on your parade, I have seen many 'technological' innovations from Pictorial Programmed instruction to slide and tape to Super 8 Loop to VCR/TV. Most of these work very well with self motivated students. In order for these systems to continue to function, students must be a) closely supervised or b) very responsible. The theory is great until Sally glues the P.P.I. pages together, Harry destroys three slides. Luweegee takes apart the film loop cartridge, and the tape for the VCR has sections missing after Suzy watched it. Another must is an ability to keyboard at a reasonable pace. I have witnessed elementary students hunt and peck, delete, and peck again. Perhaps paper and pen/pencil would be more efficient! Third, people who use computers must have good readings skills (writing too). If you can't do those two things, computers are of little use except remedial drill. I have worked at W.P. Wagner when it was a vocational school, and limited to excellent success (often depending on student self-motivation) was achieved using remedial math programs in a computer lab (max 15 students/one teacher) (usually 5-8 students/one teacher). while I admire your efforts to improve classroom learning, remember that all your wishes and desires are tempered by $$ available. A city center school with K-9 would never achieve a computer program like Harry Ainley with approximately 2000 students. Don't make students overly dependent on computers. They should be comfortable and capable oaf learning with pen, paper and textbooks as well.

Most of this would be in computing science courses.

If trained properly

010 2- 40 minute classes

034 45 minutes - 1 hour per day

051 spread through all subject areas

054 Program like Wiggleworks - 20-30 minutes a day. I am not familiar with the math and other programs.

064 In class - 1 hour

Out of class - 3 + hours

065 I have no idea. One would have to experiment with time and benefits

069 This is a difficult question to answer - kids would need more time when working on a project (5-8 hours/week +) but less where not working on a specific project (1-2 hours/week)

071 Undecided

095 per subject area or in total?

113 All written work, math, computations, problem solving, research

145 This does not have to be in school

173 As a science teacher it should not replace lab time but should support it

205 In computer instruction -- ie. keyboarding, word processing, database

Curriculum related

227 Many students now do virtually all work on computer; some do none. An ideal minimum would be 1-2 hours

233 I really don't know

242 Depends on the teacher, students, course and resources. In the case of my students, using the library, the choice is not computers versus other practices, but always which resource best meets their needs and those of their current task. Sometimes (often) it is computer-based tools, but often it is not and students need to learn not only to use computer tools, but how to discriminate among the available tools, and when to use other print-based resources.

244 Too many variables for this question

Students within the EPSB system are become less and less computer literate. By reducing the emphasis on computer studies at the Jr. high level we have narrowed the focus of computer use for students. They are lacking the skills and confidence as a broad based potential solution to problems.

273 This depends on the age and on students ability. Some could use much more than 8 hours e.g. unmotivated Jr. h students who might well be motivated by computer use -- might in fact be the only way to reach these kids. At lower grade levels (div 1) would think students would

need less time. At senior high when students are writing essays -- 5-8 hours of word processing alone might not be enough. I am so glad that someone is addressing this situation. I hope we get some extra computers/training out of this when your thesis is finished.

289 1/2 hr/day at least

298 Depending on the individuals program and needs this number could vary but an hour plus could be beneficial.

311 30 minutes per day (similar to religion!)

324 75 hours/semester minimum (4 hr/wk)

150 hours/semester maximum (8 hr/wk)

366 With provincial exams looming over your head computer time is minimal.

Although I agree computer training is very important -- there is so little time left in the school day to cover our programs. The stress of integration of special needs students and provincial exams makes computers last on my list of priorities until I get training through the school.

379 Our district is saying 2.5 hours/week for math and LA alone!

386 30-60 (minimum)

387 Especially high school and junior high

404 30-60 minutes (for K)

I teach kindergarten. Students go to the computer lab for 30 minutes each week (2 students/ 1 computer). I have a computer as a center in my classroom and 4 students are assigned for an additional 30 min per day (2 per am, 2 per pm)

411 This tool amplifies most cognitive processes. It is the handle of intelligence.

413 1 hour per day or more

443 This depends entirely on the student -- none for some 5-8 hours for others and everything in between as needed.

445 This however depends on the equipment available as well.

464 Impossible to answer because it would vary during the year

468 I find it takes a <u>great</u> deal of time for students to do activities such as stories, reports, etc. on the computer at gr 6 level. We therefore do

some, but most are done by hand so we can get on with everything we need to teach. At elementary computers should be introduced, NOT MASTERED! Varies from week to week. Some weeks - doing project - use lots! Other times -- little or none.

494 Depends on individual students

500 I like the time we have at the present (1 computer per student)

508 Need time to use concepts

518 Use of computer is only useful when directly applicable to the curriculum

519 I'd say 1/2 of their days

528 Think of the paper we could save by not printing hard copy

531 K-gr 3 - #4 (1-2 hrs)

539 minimum 30 minutes a day, maximum 60 minutes a day.

560 Computers available for students to use as need dictates

562 Depends on too many factors, but by the time a student graduates they should have computer skills as per each school div plan.

578 2 - in my subject

3 - overall

597 40 minutes per day -- 20 minutes/week

609 For younger students (K-3)

610 Whatever the child's individual needs

642 I would like to see them in a lab about 45 minutes a week (gr 1), but also using CDROM and word processing more often as tools and adding variety

671 3-4 hours

672 Due to eye strain, focal distance, eyesight must be protected.

675 This cannot be answered before results are seen. It depends on age, aptitude, use, teacher and computer availability, subject, student skill, etc.

678 30 minutes per class or about 2 hrs total

705 120 minutes

709 Computers should be available to all students in the classroom

General Information Q#6

What do you consider a reasonable ratio of computers to students when students are engaged in computer-based activities?

Task Dependent

064 Depends on task
Drill and practice 1:1
Research 1:5
Internet 1:15

191 This depends on what computer based activities and what grade level and what kind of classroom (ie. centre-based can be 1-10 students computer)

297 Depends on activity

313 At least 1:2
Again, subject dependent.

384 Depends on course, activity, etc.

411 It depends. Group activities -- high ratio ie. 2-3 if brainstorming, etc.
Individual activities - 1 if coding (could be 2-3), composing (could be 2-3), etc.

448 Depends on activity

478 Depends on task at hand

484 It depends on the activity -- I like 1 on 1 in a lab set up

571 1:1 for projects
1:15 for occasional classroom use

581 As a word processor 1:1
For communications 1:3
Knowledge browsing 1:3

657 No necessarily on class set - dependent on purpose and project
Collaborative group work/activities are successful using one computer

667 Depends on the project

Other

002 Ratio 0 computers:30 students

054 2-3 computers in a classroom

074 1 computer:4 students

085 1:1 The ideal; perhaps lower grades (ie. 4 - could be 2 students per computer)

101 Computers are here. All students will soon have one to do regular school work.

A school needs 30 laptops, 30 computers in a lab, 1-2 in classrooms. This provides for both large and small group activities and centres. We have open times in our lab where small groups or even 1 student from various classes are using the lab or closed times for classroom drill or instruction etc. 30 laptops are shared by the whole school (used by small groups or 1 student (used particularly for word processing).

287 1:1 is ideal but 1:2 is acceptable

I'm surprised that one of your questions did not address the number of computers in my school compared with the number of students. We are a small school of 175 students K-6. There is an old Apple II in each class grades 1-4, one in the special ed class, and 2 in the grade 5 and 2 in the grade 6 class. Some do not have colored monitors.

308 Depends on the activity

1:1 - typing, drills

1:2 - problem solving type activity

318 1:1 - desirable

1:2 - acceptable

349 Sometimes (1:1)

Depends on students levels (1:2)

379 We have 4 new IBM models, networked to 1 file server in each classroom to be connected as we speak! That's 8 students all day if you want! We've waited 5 years for this purchase!

390 1:1 preferably

391 Ideally 1 computer to 1 student. I have 1:3

430 1:1 - ideal

1:2

474 Each needs a computer to compose individual writings at the computer.

503 The key is reasonable vs. ideal. Ideal is 1:1.

531 1:1 desired

1:2 present situation

540 Am not involved in computer classes -- only as enrichment and reinforcement

560 As a school computer ratio 10:1, but there need to be sufficient computers for every child in a class to have one at times.

577 But I believe the ratio can be much higher for a classroom. (that some can work on computers, some on other things)

612 My students like working in pairs

672 Ideal 1:1

Reasonable 1:3

677 1:1 -- but not all the time. One group could be doing other work while one is at computers.

698 In class 1 computer: all student(s) in a class -- (assume projector available)

701 Collaboration at a terminal can be beneficial.

706 ideal 1:1

reasonable 1:2

All Training Comments

007 teacher inservice on software

023 More training in computers for teachers

027 Continued teacher inservice

051 More teachers need in-servicing on how to use computers as it seems to be "learn on your own"

051 If they could be in-serviced first

052 Those teachers should know computers well enough that they are a benefit to the students and not another time consuming nightmare for teachers. If teachers are not competent on computers students will not benefit

064 Train teacher -- student attitude to use computer -- based on success

Flexible scheduling

Teacher inservice

070 How/software

080 Breakdown fears about technology

093 computer workshops for teachers

096 more instruction for teachers

more information regarding available software for teachers

117 More inservicing for teachers on computers

134 One 1/2 day inservice not enough teacher training

137 As teachers become comfortable and see an application for their area of curriculum, they should use it to enhance their teaching

164 Inservicing on a regular basis so all classroom teachers are comfortable with them, otherwise only specialists should teach it

169 Workshops given to teacher so they can teach their class

208 Computer technology should be available to all students however where teachers are overwhelmed by such technology some cooperation with other teachers should be encouraged. The teacher "fearing" computers should not be forced to teach such an area as more harm could be done that good.

211 But many are scared to use them, plus we need more time to learn how to use various programs.

261 Computers - especially if networked are too complex for the classroom teacher, it only leads to frustration!

274 Some teachers are afraid of the equipment and need to be shown how the technology can help their job.

311 Difficult to answer as many teachers are not "user" friendly. Personally I think #1 (yes, all should use), but I don't feel I should judge colleagues.

327 Access to support funds to obtain training

352 Only those who are trained and can use the computer to tech not to play games and put in time.

353 ALL STUDENTS should become proficient with computers -- teachers can exchange classes with someone who is experienced/interested much like they may for French, music, gym, etc.

380 I suppose so, but these is so much that we need to keep up with now and that we are asked to do. It never ends...

387 Anyone with interest and training

454 Teacher specialist -- It is not practical for all teachers to be and keep up-to date!

454 Inservicing offered by boards at their cost

470 Teachers with knowledge. Classroom teachers with little knowledge cannot help students.

476 It would be a good idea if teachers got in-serviced. They would then have a choice if facilities provided proper equipment. PS> Computers like MacDonalds are here to stay, so we may as well adapt them in our teaching.

484 People shouldn't be forced into using computers with the students if they don't feel they can use them effectively. However, all students should have the opportunity to work with computers on a regular basis.

487 They should be encouraged to do so. I think teachers and support staff should be thoroughly inserviced on computer programs appropriate for the grade level(s) their working with. Computer knowledge and competency are needed to successfully survive in the near future.

536 Only those with knowledge of how to use the computer/software to the students' best advantage

580 Because forcing someone who isn't interested accomplishes nothing

626 It needs to be a teacher who can effectively teach computers, not just play software games.

630 And trained (or inserviced) to do so.

641 Classroom teachers in all subjects who have access to equipment and know how to use it to enhance learning.

647 Those who have the expertise and only if pertinent programs are available

652 Should have a good working knowledge of specific programs

668 All teachers must be trained first.

683 Those who are capable

707 Trust me... teachers with limited experience on a computer are useless. (I am one of them!) I have had many frustrating moments on computers with students. If it were not for another teacher who is interested in

computers saving me, I would have abandoned using them. We need a specialist in the same room as the computer!

All Time Comments

019 More time is needed beyond regular classroom duties to learn

019 Teachers need to know about the various software packages available without spending ages looking for it

050 Time to plan the integration of computer use into a program and time To be totally familiar with programs

070 Money and time for inservicing

117 More time/resources to explore available software

134 we no not have time on curriculum table to do all the mandated items

213 Cheaper software, more time (less curriculum!)

306 Teachers must get training during school hours

311 Perhaps more professional days can be 'opened' up for such 'general needs'

It (on call help #23) is available in my school, but first time in 9 years!

319 Training must be more than 1/2 day inservice

364 Time to learn

375 Training not added to already heavy load

I have previously taught in business education and now am in social studies. The use of computers in social studies is very small but with help could be increased drastically. There is 1) lack of computers and 2) social studies teachers who know how to use them

380 Time to do it

433 Time allowed to train inside of reg. school hours

493 At junior high - computer specialists. In elementary there's not enough time to teach a proper program, given all the subjects we are already responsible for and with all the testing!

543 Time for planning integrated projects using computers

675 Those who have been given time and opportunity to be trained to use computers with students

667 Time for teachers to learn

701 Time to develop software resources

Time to explore telecommunications

Time and freedom to alter curriculum goals

Leadership to restructure

706 We are expected to teach ourselves. At no time have we been "supported" in trying to learn new software! "Here are the machines -- use them" -- that has been the attitude!

All Money/Equipment Comments

010 Need more use on IBM's for elementary students

010 Use mainly old Apples

010 Need to upgrade to IBM's so there is more space for new programs on the hard drive

014 Money!! to purchase

019 More money is needed

035 District support in purchasing and maintenance

060 Just need more computers (Macs)

061 Strategy to update computers to keep current (ie. ours are over 12 years old!!!)

062 Money - the parent group and bingo have given us almost all of our computers. Without them, it would be impossible to take part in this survey

063 In my school we have a decent computer lab with all machines running. a computer lab should have all the same type of machines and a repair technician to keep them up and running

070 Money and time for inservicing

077 The problem is we only have old outdated Apple computers and not enough printers for classroom use. we have a few new ones in the library.

079 we need updated equipment and more of it

091 More funding for computers is greatly needed

092 current technology is needed (not 10 yrs old!)

100 More money is needed!

109 We just received a memo stating grade 3 students should communicate through Internet to other classes across Canada (keyboarding and slide presentations). With all the cutbacks, I strongly believe that we cannot afford any of this for primary level. The money needs to be spent 1)keeping student ratio low 2)availability of aides, specialists, materials. I spend hundreds of dollars yearly just on the "basic" needs for my students (none can be claimed - taxes) CDROMS are just a dream - our priorities are too fundamental to even consider this. Rural schools are just struggling to exist so kids don't have to travel 3 hrs on a bus daily. Because of our government, we're going backwards not forwards. Computer wishes are just in another time warp. We need $ for aides to supervise the integrated needs kids who are literally climbing the walls or $ fix the vandalism caused by our forgotten youth. The $ are not there and if they are the money must be spent where the priorities are. Sorry Kathy but this is reality.

124 Government funding to update obsolete computers

126 Money for computers!

126 I teach in a small school with no funds for computers. We are short of money for texts and other necessary supplies. Computers seem like a luxury!

127 More money

144 Funds for hardware and software

158 More computers in classroom with excellent equipment would be beneficial.

167 More updated computers would be beneficial

177 we have 16 and 17 but no $!

197 More money for computers

202 Enough usable computers

202 All should be encouraged to use computers with students, however unless there are an adequate number of computers in good repair how can we expect all to use them

205 Funding for more computers

Funding to update computers reg.

222 Problem -- school board will not supply computers, modems and they will NOT pay for long distance charges. don't blame me, I've tried.

233 which comes first? trained instructors or computers? Often one or the other. Boards should be encouraged to supply and provide access ad teachers should be taught (trained in their use).

236 I am most familiar with word processing as I use our computer at home (I also wrote my Master's Thesis on one). At school I teach ECS (There is one computer in the classroom) and Gr 3 (There are two computers). At the present time our school is involved with setting up a computer lab (1 computer to 3 students). Staff training will take place this spring and fall. The lab will be expanded as funds allow.

266 I strongly feel this area is grossly understaffed, under researched and underfunded. Alberta students are missing out.

274 The 1st problem is hardware needs! get the equipment w/o having to beg!

278 Those who have the facilities to do so. Only a few classrooms in our school have computers in them. The rest of us are just SOL.

279 Enough computers for students and keeping them updated! (At a reasonable cost)

303 I also need a computer!

313 I would use it if the resources were available. My students depend on home computers or do without. I teach high school English and know that it would be a great asset to have them in the class.

327 Access to funds to obtain computers

327 Access to funds to obtain software

328 Programs that have computer software support -- Ideally each classroom should have 5 or 6 computers.

331 Important if we are to prepare students for the real working world. Most schools spend little or nothing on software and new (current) hardware.

337 All students should have access to computers

If all teachers are expected to use computers -- schools should supply teachers with their own computers. Also, if teachers are expected to use them in their classes, it would be helpful if a classroom set were available. To use computers effectively, both teachers and students must use them regularly.

338 I need computers! Funding for actual computers.

To promote them we need to have a class set to use in the school.

343 Availability of equipment -- appropriate hardware, software

344 Available resources must be provided. Software must be accessible.

361 The technology needs to be available. At present in our small community school our "Apples" are holding their own but many have been used for large classes for 15-16 years! We do not have access to classroom computers!

380 Money for more computers and software

390 Must relate to available equipment/resources in schools

40[illegible] Computer availability is a problem. Every classroom should be equipped with same computers.

4[illegible] Equipment must be current and available.

443 Only those for whom computers are easily accessible and readily available

451 Hardware and software purchases

454 Inservicing offered by boards at their cost

454 In a school my size, any more time would not be possible

476 To update computers. A commitment on behalf of teachers to use computers in their instruction.

479 There should be enough computers in the school so that a teacher and class have access to a computer lab 20% of their class. As an art teacher, I can see some benefit to using computers in the classroom but the graphics art teacher has a much greater need. I'm sure my program could survive (thrive) without the use of computers.

479 More computers in the school

480 We are a small elementary school so do not have a very good computer program or the necessary equipment. We would love to have more computer resources and more up to date equipment.

481 Some students do not have concepts which are easy to find software that is relevant. Some schools, e.g. colonies, do not allow computer use.

494 Easy access to a computer

508 As well as those who have access to computers

567 This is very difficult to determine. With all the cut-backs I would prefer to lose a few computers in our school in order to gain more teaching

staff. The computers we have are very outdated and not compatible to the computers used by the students in their homes.

594 It cannot be expected if government doesn't provide resources

618 Provided inservicing and computer accessibility

64i Classroom teachers in all subjects who have access to equipment and know how to use it to enhance learning.

501 Far too costly with Klein in power - upkeep new technology

511 Computers

516 Computer equipment needed in my room

521 CD ROM, etc.

Databases for office

Mark programs

528 Scanners

531 Updating hardware every few years (out of date maintenance means some of our equipment becomes doorstop!! No help to the kids!

539 Access to multimedia computers and access to computers that can be assembled by gr 4-6 (older MS DOS machines)

562 Money to keep ever ?? the hardware and software

577 Access to computers required

577 Computer in each classroom (for teachers and student use)

634 Prefer not to measure per week -- rather -- use of computers as needs arise. (Depends on units of students, etc..)

Other considerations: 1) scheduling and 2)lab supervision in elementary schools as most elementary schools have computer labs suitable only for small numbers of students at any one time.

649 We need money to buy enough equipment for children to get adequate time on computer. Our school has 15 working computers for a school population of 680

660 More printers must be available

665 Laser video projection equipment

670 Most of this would be in computing science courses

Due to the cost and rapid change in the technology, (something new every 3 months) schools can never afford to be up-to-date. While I hesitate to rain on your parade, I have seen many 'technological'

innovations from Pictorial Programmed instruction to slide and tape to Super 8 Loop to VCR/TV. Most of these work very well with self motivated students. In order for these systems to continue to function, students must be a) closely supervised or b) very responsible. The theory is great until Sally glues the P.P.I. pages together, Harry destroys three slides. Luweegee takes apart the film loop cartridge, and the tape for the VCR has sections missing after Suzy watched it. Another must is an ability to keyboard at a reasonable pace. I have witnessed elementary students hunt and peck, delete, and peck again. Perhaps paper and pen/pencil would be more efficient! Third, people who use computers must have good readings skills (writing too). If you can't do those two things, computers are of little use except remedial drill. I have worked at W.P. Wagner when it was a vocational school, and limited to excellent success (often depending on student self-motivation) was achieved using remedial math programs in a computer lab (max 15 students/one teacher) (usually 5-8 students/one teacher). while I admire your efforts to improve classroom learning, remember that all your wishes and desires are tempered by $$ available. A city center school with K-9 would never achieve a computer program like Harry Ainley with approximately 2000 students. Don't make students overly dependent on computers. They should be comfortable and capable oaf learning with pen, paper and textbooks as well. Most of this would be in computing science courses.

679 computers must be made available within the classroom in addition to software

709 Video camera

Audio to produce multimedia

All Internet Comments

308 Use of a modem

Use of Internet to replace encyclopedias

438 Training in accessing the Internet

539 Access to BBS (Internet)

648 Phone lines into classrooms for Internet communications

685 Internet

702 Bulletin Board software so that ALL students can access Email and Echomail (K12Net, selected Usenet) from across the "school-wide Network" (also important!) and from home (ie. parents/guest speakers) young/new teachers who have had good training (not getting it yet!) and much experience with technology.

Reasons Why Computers Aren't Used

012 LD classroom teacher for students with handwriting and spelling problems. My students use the computer for essay writing and they write their SS 30, 33 and Eng 30, 33 on the computer with thesaurus and spell check

019 But soon there won't be a choice anymore. all teachers will have to be computer literate at some level

052 None - PE class

124 It was very difficult to fill out this survey in terms of software/peripherals. Our school as other are very out-dated and obsolete e.g. Logo programs which either are defective or hardware defective. Very frustrating to go to lab and spend the entire time re-booting computers, switching disks, trying to find a machine that works. Public expects computers in the schools to meet "business requirements" or computer literacy. Hard to teach computers without the computers.$$

199 computers are the future - so are our students. They must have the opportunity to learn and use computers as much as possible - sometimes a difficult task considering the demands of meeting curriculum.

205 Computers are being used in our everyday lives -- our cars, our stereo systems, our stores, etc. The growth of communications (ie. Internet) is the future and we much provide our students with an understanding of how to use them.

362 I don't know if you want to use this -- I am a computer expert and have been teaching computers for 13 years

379 I am the teacher librarian for our school. I teach computer literacy to all learners in our school. Each student spends 70 min/week

401 We have only a 64K, 15 year old computer, a few floppy disks - drill and games, no printer.

409 Students use computers in a computer lab and in library -- taught and supervised by Teacher/Librarian

440 I understand that the purpose of your questionnaire has nothing to do with available equipment in the school, but until all classes have access on a regular basis to computers, there's no point in spending money to train us.

476 We have some of the peripherals at our school and they are being used by computer specialists. I will use them when I get trained in their use.

477 We expect an influx of equipment in our system within months. Some schools like ours are essentially without computers. I believe we'd be in the bottom 5% of our district having only 5 IIGS (Apples) for 180 students. BY September 1995 at the latest we'll all have reasonably equipped labs of 15-30 286's and will have access to 1 or 2 machines with CD ROM for students.

488 Our school is very large. I usually get my turn to have a computer in my classroom for Feb and March and part of April. Therefore, my class has had 0 hours so far. Yet, we just received one for our library.

504 Children in our computer classes on Saturday mornings use keyboarding software.

673 0 hours (Because there is no appropriate French (FSL) software and time is limited in music class

685 We all need to be computer literate. People can not pretend that it is not important.

708 I'd like them to learn to read and write. They spend most of their free time watching videos and playing "Idiotendo".